AFRICA'S FINANCIAL DEVELOPMENT: EXPLORING THE ROLE OF NATURAL RESOURCES ENDOWMENT AND INSTITUTIONS

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Abstract

Evidence shows that financial sector development is low in most African countries despite its critical role in the economy. While the persistent low level of financial development has been studied and found to be explained by a number of factors, the role of institutions cum natural resources revenue, most importantly in sub-Saharan Africa (SSA), is scarcely reported. The current study examines the interactive effects of natural resource rents and institutions on financial sector development in sub-Saharan Africa using a battery of modern econometric techniques. Among others, resource rents availability undermine financial development directly across all countries in the SSA, and indirectly contributes to weaken institutions. Moreover, low institutional quality is found to have contributed to limited intermediation of natural resource gains through the financial system in the SSA. Overall, our findings reinforce the argument that efficient fiscal governance would matter for financial development in (non) resource-rich economies of SSA.

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1. Introduction

The financial institutions and markets are seen as critical factors in economic development process, particularly through their role in allocating financial resources to productive activities. However, the extent to which this function is performed depends on the level of financial development in any economy. Financial development is based on contractual trust and information, which have been strongly linked to enhanced economic growth, development, and diversification of risk (Sharma, 2008; Beck, 2011). More importantly, a well-functioning financial system is a prerequisite for improved economic performance in both developed and developing countries, as the high level of financial development leads to high return on investment, promotion of sound cooperate governance, better access of the poor to finance and enhancement of economic growth as well as welfare (Rodrik, 2013).

Given the central significance of finance to economic development, various groups of factors that influence financial development have been discussed in the literature, ranging from institutional to macroeconomic determinants and geographical factors, including natural resources. More specifically, the relationship between natural resource revenues and financial development depends on the quality of political institutions, as natural resources rents undermine financial development where there are weak institutions by adversely affecting contract enforcement and the quality of contracting institutions (Bhattacharyya and Hodler, 2010). Thus, the financial system has been widely posited to be influenced by the policy thrusts and institutional framework adopted by the government (Demetriades and Fielding, 2009). This may be accounted for the level of financial sector development in sub-Saharan Africa (SSA), as the

financial sectors across countries in the region, with the exception of South Africa, are relatively underdeveloped (KPMG, 2014).

The sub-Saharan Africa has been an important case, as the region is endowed with abundant natural resources but with the fall in GDP growth to a 15-year low of 3.5%, which is expected to further fall in 2016 by 3% (IMF, 2016b). In addition, SSA countries have low saving rate and highly vulnerable to volatility of commodity prices resulting from too much dependent on natural resources extraction compared to other regions (Bloom and Sachs, 1998). For example, World Development Indicators (2012) showed the average resource rents as a percentage of GDP across all regions in the world between 2005 and 2010, with the exception of Middle East and North Africa (MENA) which was 35.58%, SSA was reported to be relatively high with 10.30%, while Latin America and Caribbean was put at 10.02%, followed by East Asia 3.75%, and last is Pacific and Europe with an average share of 3.61%. These have been largely suggested to account for the current recessionary situation experienced in most African countries, which has reduced the availability of private finance for development (Bachmann and Hanappi-Egger, 2014; Demirgüç-Kunt et al., 2015).

Prior to the current economic recession facing most SSA countries, private credit which is one of the significant measures of finance for development in SSA countries has witnessed a decade-long rise with credit growing to an average of 10% per annum resulting to a doubling of the credit-to-GDP ratio for the region as a whole. Particularly, growth has been strong in oil-exporting economies (IMF, 2016b), which has led to rapid growth in regional banks in SSA, comprising the emergence of large regional banks domiciled in South Africa, Kenya, Nigeria and Togo. However, the current economic challenge, given the slowing financial development, has further weakened the financial system across countries in the region. For instance, in 2015 and

2016, the region's private credit growth shrunk due to its contraction to 11.2% of GDP in 2015 and an estimated 7% for the half year to June 2016, almost half of the average for 2011 to 2014 of 13.4% (see figure 1.1). While the experience of low–income countries has been a steady and high level growth since 2011, and had been sustained in 2015, as it was remained at 18.9% prior to its slight falling to 15% by June 2016, the contraction was more noticeable in middle-income countries, such as Nigeria and Ghana in the region as credit growth fell in 2015 to 8.9% and 3% by June 2016 (IMF, 2016b).

Figure 1.1: Sub Saharan African private credit growth (2011 to June 2016)
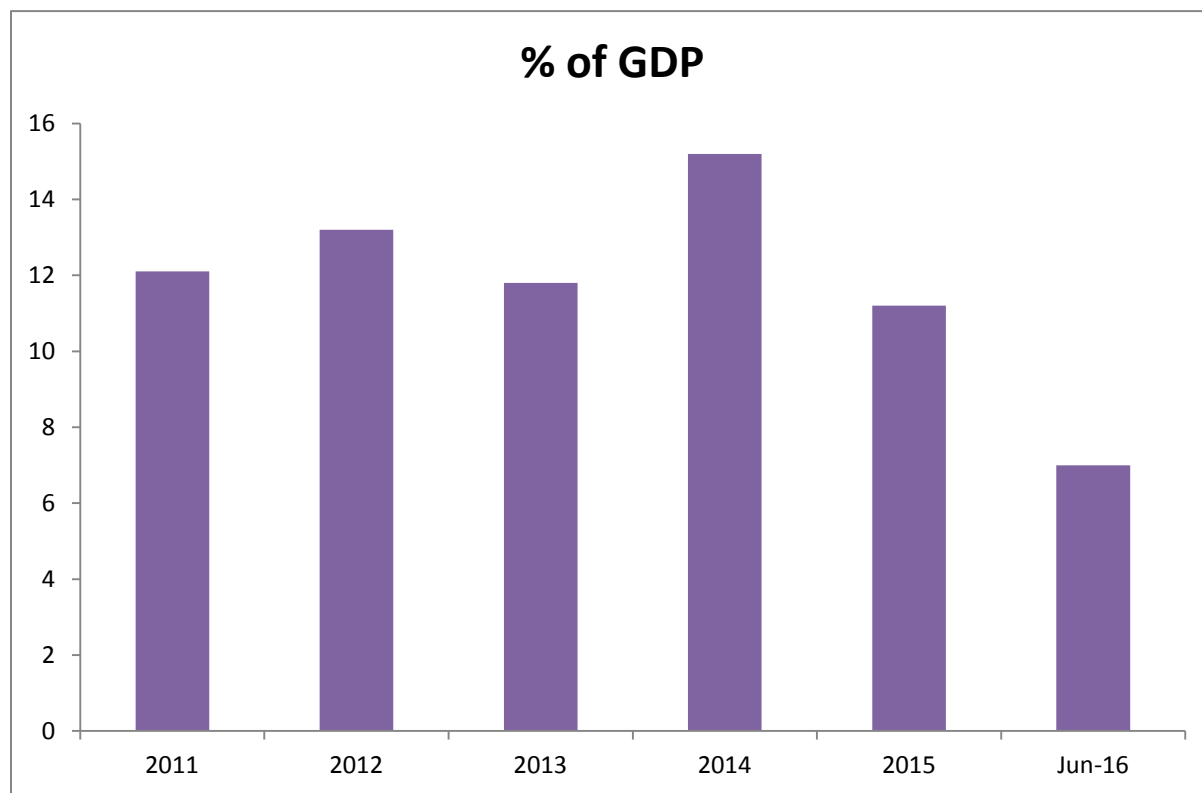
Source: World Economic Outlook datebase, IMF, April 2016

In the last decade, there has been significant progress particularly in the financial markets, but indicators of good governance still show that SSA countries are lagging behind the rest of the world. Deficiencies include weak banking supervisory capacity, poor corporate governance,

deficient legislative arrangements and poor accounting and auditing standards (European Investment Bank (EIB)), 2015a). Hence, the re-emergence of significant governance and regulatory problems which had added to the slowing of financial development. For instance, in Ghana and Mozambique, the governance and policy problems in the public sector have had negative spill-over effects on the financial sector. And also in Kenya and Nigeria, the alleged failures of governance in private and public institutions, including corruption and fraud, have led to institutional failures (IMF, 2016b).

Moreover, owing to the disappointing outcome and flaws associated with market-replacing efforts of the post independent era, in addition to financial liberalization and privatization policy of 1980s and 1990s sequel to the advice of IMF and World Bank, there have been several other financing programmes that seek in part to tackle the perennial issues affecting the financial development in SSA. In the past two decades, in order to enhance the expansion of credit to private sector, microfinance schemes have been promoted as the best alternative to ensuring access to financial services for small borrowers. This is a reflection of the success of institutions such as the Grameen Bank in Asia. Despite the increase in microfinance institutions in many SSA countries, financial sector has not attained the threshold necessary for the provision of efficient financial services (KPMG, 2014).

Against this background, taking into account the significant role of natural resource endowment and institutions in financial development process, this study is set to further provide a better understanding through the link relating natural resources to the level of financial development in SSA. In addition, a careful analysis of the sources of financial development can provide more evidence most important for policy making in the region.

The financial sectors in sub-Saharan African (SSA) countries are among the least developed in the world. To some extent this may be attributed to misguided policies which have affected the operation of financial institutions and markets. This has necessitated taking into account the increased opportunities for rent-seeking and weak institutions which undermines transparency that guides financial contracts, reflecting mainly the structural changes and political institutions. While the importance and links between certain institutional factors and financial development has been largely established in both theoretical and empirical literature (Acemoglu, Johnson and Robinson, 2004; Rajan and Zingales 1998, 2003; Roe and Siegel, 2008), the focus on how natural resources affect the relationship between institutions and financial development, particularly in SSA, has been scarcely reported.

Many studies have given considerable prominence to institutional and macroeconomic determinants, while the geographical factors, especially natural resources in financial development process, have received limited attention. However, theory and literature have provided different hypotheses on the effect of natural resources on financial development. On the one hand, the important link between financial development and natural resources is that resource rents can induce private saving, which may lead to high demand for financial services (Beck 2011; Bhattacharya and Hodler, 2014; Van Wijnbergen, 1984). On the other hand, higher investment in the natural resource sector can lead to lower investment in the financial sector and draw away skills from the financial system (Beck, 2010; Ross, 2004; Sach and Warner, 1995; Gylfason et al., 1999). Overall, there is little empirical evidence regarding the effect of natural resources on financial sector development, particularly in sub-Saharan African (SSA) countries. Hence, the increased interest on the effect of natural resources on financial development within the context of the region.

Furthermore, in SSA, the resource-rich countries in the region are more associated with the highest economic risk. For instance, rising non-performing loans, declined banking sector profitability and worsening capital adequacy ratios are most apparent in highly resource dependent countries, such as Nigeria and Angola, where the average non-performing loan ratio rose from 7.3% in 2014 to 9.8% in 2015. Particularly, increasing non performing debts were worse in Angola, Nigeria and the Republic of Congo, compared to countries like Ghana, Kenya and South Africa (IMF 2016a). This has been attributed to the failure of institutions to facilitate effective intermediation of the natural resource windfall gains through the financial sector. Thus, weak institutions influence the adverse effect of natural resources on the pace of financial development (Beck and Poelhekke, 2016). But the extent of the interactive effect of institutional quality and natural resources on financial development has not formed the central focus of most studies, especially regarding SSA. Given these and, in general, the level of development of financial sector in SSA the following objectives are pursued in the study.

i. examine the effect of natural resources on the financial sector development in sub Saharan African countries.

ii. investigate the effect of institutional quality on financial sector development in sub Saharan African countries.

iii. assess the interactive effects of institutional quality and natural resources on financial development in sub Saharan African countries .

given the concern that natural resource windfall gains are not effectively intermediated through the financial sector in most resource-based economies (Gylfason and Zoega, 2001), it is imperative to take into account the weak institutions that persisted over time, and which may be

influencing the relationship between natural resources and financial development in SSA. Also, the justification for this study also stems from the paucity of empirical findings on what determines the level of financial sector development in SSA countries..

2.   Overview of Financial Sector Reforms in SSA

In recognition of the importance consequential benefits of financial sector development, most SSA countries, before the 1990s, intervened heavily in their financial sectors by way of interest rates liberalisation, and directing lending to priority sectors of the economy such as agriculture, trade and manufacturing. Credit was seen as a powerful instrument of promoting economic development. Policy makers in these countries were convinced that the best way to promote economic growth was to identify key sectors of the economy and use subsidized credit and selective credit controls to foster the financing of priority sectors of the economy that were deemed to spur economic growth. However, due to the high levels of inflation experienced by most SSA countries at the time, real interest rates were often negative which made financial intermediation severely weakened.

At post-independence, the banking sector was largely dominated by government owned banks or a joint venture between government and the private sector as both state-owned and local privates banks were created to fill gaps left by foreign banks. Government owned banks were expected to lend to the priority sectors and the small farmers at subsidised rates. In a number of these countries, government banks also undertook aggressive branch expansion programmes in the rural areas as part of the government directives. However, the political pressure to lend to less-creditworthy borrowers often resulted to misallocation of resources and credit rationing, thereby triggering higher levels of non-performing loans (NPLs). In some of the countries, the

levels of non-performing loans accounted for 60-80 percent of the total loans of government owned banks. The largest share of these NPLs was accounted for by the state-owned enterprises (SOEs). Another source of the high NPLs was the loans to agriculture especially those extended to crop farming (Brownbridge and Gayi, 1999).

The poor economic performance of the countries of SSA was blamed on the repressive post-independent economic and financial system. Hence the model that McKinnon (1973) termed "financial repression" often resulted into inefficient allocation of resources and credit rationing, led to inflationary refinancing of commercial banks' operations by the central banks, and absorption by the government of the banking losses. The priority sectors rarely showed the performance that, primarily, had justified the measures (Gelbard and Leite, 1999).

The banking system was fraught with financial difficulties such that few instruments were provided and experienced a high proportion of NPL's that threatened their liquidity and solvency, and thus the stability of the entire financial system. The banks suffered from undercapitalisation, inadequate bank regulation and supervision, insufficient credit analysis, inappropriate sectoral policies, and weak accounting and management systems.

Consequently, the savings mobilisation and financial intermediation in SSA became the lowest in the world. For instance, the average M2/GDP ratio for the region fell from 27.3 percent in 1981-85 to 26.6 percent in 1986-1990 (Aryeetey, 2003), and also between the early 1980s and the end of 2004, the simple SSA average of private sector bank credit to GDP fell from 15.6 percent to 15.1 percent. Excluding 15 countries whose financial sectors showed signs of sustained development during this period, the average private sector credit to GDP ratio declined from 17.2 percent in the early 1980s to 8.7 percent by the end of 2004. This is all the more deteriorating considering that during this period efforts to liberalize the financial sector were combined with

greater discipline in implementing monetary policy, which in most SSA countries pushed down inflation outcomes and lowered fiscal deficits (McDonald and Schumacher, 2007).

Owing to the failure of financial repression policies to bring to bear the desired economic growth and development objectives, comprehensive economic reform programmes which were largely supported by the World Bank and the International Monetary Fund (IMF), were adopted by most SSA countries in the late 1980s and early 1990s. These reforms were implemented as part of structural adjustment programmes which anchored on a market based system and the need to achieve private sector led growth necessitated the restructuring of the economies of SSA countries.

In an attempt to speed up progress in the financial sector, following the economic and financial sector reforms most of the countries in the region moved away from the repressive economic and financial sector regimes leading to dismantling of credit controls and reduced or removed obligatory reserve requirements of banking system. Further, bank entry requirements as well as capital account restrictions were relaxed in the hope of enhancing development in the financial sector. For effectiveness, one of the central components of these reforms was the liberalisation of the financial sectors and particular emphasis was placed on liberalisation of interest rates, elimination of credit controls, restructuring and privatisation of commercial banks, removal of barriers to entry of new banks and particularly foreign ones, adoption of indirect instruments of monetary policy and strengthening prudential regulations and supervision.

The reforms were designed to lead to more efficient and deeper financial systems that could promote private sector led growth. The reduced government intervention in directing credit and setting of interest rates was anticipated to improve allocative efficiency with credit being channelled to the most productive sector. At the same time increased competition resulting from

liberalised entry or removal of regulations would lead to financial deepening and thereby strengthening financial intermediation.

A number of countries made fast and drastic reforms, while others followed evolutionary liberalisation process. Nonetheless, in almost all the countries, there were some uniformed measures that were adopted. For instance, Treasury bill auctions were first introduced to allow for market forces to influence Treasury bill rates and also to facilitate the use of indirect instruments of monetary policy. The countries allowed new entry of private and also foreign banks while at the same time the measures towards privatisation of government owned banks were being implemented. Measures to strengthen prudential regulation supervision were implemented including the introduction of new banking laws, capitalisation of government owned banks and restructure of the management of these banks. Improving the supervisory capacities of the supervision departments of the central banks became the central objective of the World Bank funded financial sector adjustment programmes (Soyibo, 1997; Aryeetey, 2003).

Moreover, the most consequential result of the liberalisation programme in SSA has been the growing role of the private sector in bank ownership and the rapid rise of non-bank financial institutions (NBFIs) and microfinance institutions (Aryeetey, 2003). Thus the number of financial institutions has grown significantly in almost all the countries due to the privatisation of state-owned banks and ease in granting of licenses to the private sector. Private sector credit, however, seems to have remained at very low levels in some countries and declined in others. The financial markets are still inefficient, weak and emaciated and financial depth is far smaller compared to levels obtaining in developed and emerging economies. The narrow focus of financial sector reforms which emphasized the elimination of financial repression by way of price and interest rate liberalisation has been attributed to this disappointing outcome (Nissanke and

Aryeetey, 1998). The authors posited that the reforms did not address sufficiently the structural and institutional problems facing most SSA countries financial systems. Additionally, the poor monitoring of the activities of borrowers, weak enforcement of collateral, and lack of enforcement of lender's rights for full disclosure of financial information about borrowers for the low financial depth charactering the financial markets in SSA are said to have contributed to these challenges (Aryeetey and Senbet, 1999).

The main features of SSA countries stock exchanges are the limited number of listed companies, low capitalisation and small diversity among the market participants. Consequently, (Senbet, 1997; Ndikumana, 2000; and Aryeetey, 2003) confirm that the markets are also highly volatile in terms of growth rates and rates of return. Despite a long history of fiscal deficits and a growing need for developmental and structural investments, with the exception of South Africa, bond markets in SSA have remained shallow, illiquid, and inefficient. However, a number of SSA countries have recently decided to upgrade the investment guidelines for nonbank financial institutions, recognizing the significance of soundness rules for promoting bond market development. Since it is important that rules governing portfolio investments for nonbank financial institutions aim at setting sound principles for investments and limiting risks. Therefore, developing SSA bond markets has also become an important policy focus of multilateral financial institutions. A joint initiative of the IMF and World Bank has been launched to assist, inter alia SSA countries, in building up bond markets by developing effective medium-term debt management strategies that are consistent with the goal of maintaining debt sustainability.

3.   **Review of Related Literature**

The general consensus in the empirical literature is that there are various categories of factors affecting the development of financial sector in any economy (see Tables 1 - 3). With

respect to developed economies, the key findings suggest that economic growth and trade openness are major determinants of financial development in developed economies. However, given the fact that developed countries have well-developed financial sectors, the benefits from further financial development are limited at best. In addition, while the Balance of Current Account was found to be the most relevant element for BRICs group (Brazil, Russia, India and China) and LAC group (Latin America and Caribbean) in determining the private credit (key indicator of financial development) in these regions, for the OECD group (Organization for Economic Cooperation and Development) private consumption is most crucial in financial development process.

Moreover, on both MENA and SSA, most empirical studies commonly found that financial sector is underdeveloped across all countries in these regions owing to weak institutions and poor macroeconomic environment. Although some macroeconomic factors (such as remittances, GDP per capita, foreign investment and financial liberation) were suggested to have positive influence on financial development, inflation and real interest rate are showed to adversely affect the effectiveness of financial sector. The effect of trade openness on financial development in the two regions revealed mixed results in the aforementioned review. Also, institutional factors found to play a more critical role in each region. Financial development is suggested to be enhanced by keeping corruption at low levels, increasing government accountability, improving regulation quality, maintaining rule of law and low levels of political violence.

Overall, international trade was found to be important for all groups of countries. But regarding demographic and geographic determinants, especially natural resources, of financial development, there appears to be little evidence in reviewed literature. Only few studies show

that population and population density have a positive impact on financial development in some regions, such as MENA and SSA, while natural resource endowments found to undermine financial depth. Hence, the increased interest on the effect of natural resources on financial development within the context of the SSA.

Table 1: Summary of major studies on macroeconomic determinants of financial development

Name/year	Issue addressed	Scope	Variable used	Techniques of analysis	Findings
Bayar (2016)	Investigates macro-economic determinants of stock market development in turkey	Turkey over the period of 2005 to 2015	Economic growth, stock market liquidity, inflation rate, banking sector development, macroeconomic stability and financial development indicators	ARDL cointegration, Causality test and regression analysis	There exists a negative relationship between inflation and financial development, while other factors have a positive impact on stock market development in the long run
Thai-Hale, Kim and Lee (2015)	Examine the determinants of financial development in Asia and the pacific	26 economies in Asia and the pacific over the period of 1995 to 2011	Economic growth, trade openness, institutional factors and financial development indicators	The dynamic generalized method of moments (GMM)	Economic growth and trade openness are key determinants of financial depth in development economies
Cherif and Gazdar (2015)	Explore the influence of macroeconomic environment on stock market development.	14 MENA countries over the period of 1990-2007	Financial development indicators, Income level, saving rates stock market liquidity and interest rate and inflation	Panel data and instrumental variable techniques	Income level, saving rates, stock market liquidity and interest rates are important determinant determinants of stock market development, while inflation rates do not prove to be significant.
Elsherif (2015)	Investigates the determinants of financial market development in Egypt	Egypt over the period of 1974 -2012	Economic growth , trade openness, financial development indicators , investment in human capital per capita GDP and inflation	ARDL and Johansen test	Inflation adversely impacts financial development, whereas financial development is positively influenced by all other factors.
Mahawiya (2015)	The role of inflation in the explaining the state of financial development in ECOWAS and SADC	Comparative study between ECOWAS and SADC over the period of 1980-2011	Real GDP per capita, inflation, financial development indicators trade openness and financial openness	Dynamic panel approach	Inflation found to robustly reverse financial development with effect greatest in ECOWAS.

Abdelazizt ouny (2014)	Examined the macro-economic determinants of the development of the banking sector in Egypt and Saudi Arabia	Over the period of 1977 to 2012 for Egypt, whereas the period is between 1984 and 2012 for Saudi Arabia	Economic growth, financial liberalization, real interest rate, trade openness, the growth rate of money supply, economic globalization and private credit	Cointegration analysis	Economic growth has a long-run negative effect whereas financial liberalization and real interest rate record a significant positive effect on credit to the private sector in both Egypt and Saudi Arabia. Finally economic globalization seems to have just a significant positive effect in Saudi Arabia, while in Egypt, growth rate of money supply exerts a positive and significant effect on development of banking sector
Githaiga and Kabiru (2014)	Explore the influence of remittances on financial development	31 countries between 1980 and 2012	Inflation, financial development indicators economic growth exchange rate, remittances from abroad and monetary policies	Generalized method of moment (GMM)	Remittances have an adverse effect on domestic credit to private sector and foreign direct, whereas the effect of remittances on bank deposit was positive though statistically insignificant.
Saito, Savoia, Lazier (2014)	Determinants of private credit in OECD developed, BRICs and LAC countries	OECD, BRICs and LAC countries between 2004 and 2010	Private consumption, international trade, market capitalization, Balance of current account and private credit	Panel regression models	Private consumption is found to be the most relevant determinant in OECD group, positively correlated with private credit, whereas for BRICs and LAC group, the balance of current account was the most relevant element. Overall, international trade is found to be relevant

					for all groups of countries.
Zafar (2013)	Explored macroeconomic determinants of stock market performance in (Pakistan)	Pakistan over the period between 19988-2008	Real interest rate, foreign direct investment as a percentage of GDP, domestic credit market capitalization as a percentage of GDP and value traded as a percentage	Quantitative regression analysis and hypothesis testing for measuring the significance	Foreign direct investment and value traded have a positive impact on stock market performance, whereas there exists a negative relationship between real interest rate and stock market performance.
Said and Grassa (2013)	Investigate the Macroeconomic determinants of the development of the **Sukuk** market (Islamic bond Market)	10 most **Sukuk** issuers countries over the period of 2003- 2012	GDP per capita, financial development indicators, economic size and trade openness	Panel analysis and Descriptive Statistics	They found that macroeconomic factors such as GDP per capita, economic size and trade openness have a positive impact.
Motelle (2011)	Examined the effect of remittances on financial development in Lesotho	Lesotho between 1990 and 2003	Remittances, trade openness , inflation, ratio of private credit to GDP and financial liberation	Granger causality test	Remittances tend to have a long run effect on financial development, but they do not cause financial development, whereas the financial development Granger-causes remittances.
Yu and Gan (2010)	Examined the determinants of banking sector development in Malaysia	Malaysia over the period of 2000 to 2009	Real interest rate, trade openness, financial openness and real income	Ordinary least Squares (OLS)	Real income is found to stimulate banking sector development, whereas financial openness has an adverse effect on banking sector development. In addition, real interest rate and trade openness are found to be statistically insignificant.
Falahaty and Hook	Explore determinants of financial market	Nine MENA countries over	Economic growth, trade openness, bank	Fully modified ordinary least square (FMOLS)	Financial development is affected by economic growth,

(2010)	development in nine MENA countries	the period of 1991-2009	concentration, financial development indicators and government ownership of banks and institutional quality	and dynamic ordinary squares (DOLS)	trade openness, bank concentration while (DOLS) technique only support trade openness and bank concentration as promoting financial development
Kablan (2010)	Examined the determinants financial development	29 SSA countries for the period of 1998-2002	Five groups of variable: market structure, financial development indicators, macroeconomic conditions, geography and legal traditions, political factors and business environment.	SFA for cost-effective frontier and GMM for explaining financial development	Financial development is adversely affected by inflation and heavy dominance of the system by a few banks.
Benya (2010)	Examined what determines financial intermediary development in SSA	SSA over the period of 1975-2006	Trade openness, financial openness, GDP growth rate and financial development indicators	Cross sectional data and panel techniques	There exists a positive relationship between trade openness and financial intermediary development and it is important in explaining financial intermediary development. However, financial openness negatively influences financial intermediary development and growth rate is insignificant

Table 2: Summary of major studies on demographic and geographic determinants of financial development

Name (year)	Issue addressed	Scope	Variable used	Techniques of analysis	Findings
Mlachila, Cui, Jidond, Newiak, Takebe, Ye and Zhang (2016)	The effect of regional factors on financial development in SSA	SSA between 1980 and 2013	Log of real GDP per capita, population, population density, the age dependence ratio, index of financial institution and financial development index	Generalised method of moments (GMM) estimator with lagged variable as instruments	They found that both financial markets and financial institutions in SSA countries are less developed compare to other developing regions, but the expansion of pan-African banks has promoted greater economic integration, and has increasingly filled the gap left by foreign banks.
Dehan (2015)	Evaluate the effect of inclusive access to financial services on private credit	120 countries over the period of 1999 to 2011	Creditor rights, information sharing, market factor and ratio of private credit to GDP	Cross –section model (findex data set)	The distribution of access influences private credit.
Ang and Kumar (2013)	Investigate the role plays by barriers to diffusion of financial technology	123 countries over the period 2000-2010	Genetic distance, credit rights protection, trade openness, financial openness, legal origin, geographic and cultural factors	Eichengreen and Pipat (2004)	Saving constraints is a major hindrance to domestic bond market development as well as financial market deepening.
Kurronen (2012)	Investigates the effect of natural resource dependence on financial sector.	133 countries over the period of 1996-2006	Trade openness, resource rents, institutional quality, real GDP, inflation and financial development indicators	Pooled OLS and fixed effect estimator.	The banking sector tends to be smaller in resource-dependent countries,
Dutta and Mukherjee (2012)	Investigate whether informal institutions(culture) can affect the level of	90 countries over the period of 1980 to 2007	Culture, inflation, legal origins, polity, trade, GDP growth and financial development	Quantile estimation and hypothesis testing	Culture significantly influences the level of financial development, and also as culture evolves in more

	financial development		indicators		advanced form will lead to better financial system.
Allen, Carletti, Cull, Qian, Senbet, Valenzuela (2012)	Resolving the African financial development gap	African countries over the period of 1995 to 2007	Population density, population, natural resources, off shore centre and financial development indicators	Benchmarking approach and regression model	Financial sectors remain significantly less developed by the standard of lees developed countries. They found that population density appears to be considerably more important for banking sector development in African than elsewhere.
Allen, Carletti, Cull Qian and Senbet (2010)	Examine the factors that are associated with financial development in Africa and compare them with those in other developing countries	African countries over the period of 2001 to 2005	Population density, population size, natural resources , per capita income, indicators of macroeconomic stability and financial development indicators	Benchmarking model of Beck et al, 2008	Population density is found to be considerably more important for banking sector development in African than elsewhere, whereas natural resources endowment is associated with a lower level of financial development

Table 3: Summary of the major studies on institutional determinants of financial development

Name (year)	Issued addressed	Scope	Variable used	Techniques of analysis	Findings
Bayar (2016)	Investigate the major institutional determinants of stock market development in transition economies of European Union	Transition economies of European Union over the period of 2002 to 2013	Political stability, regulatory quality, institutional quality, rule of law, control of corruption, macroeconomic factors and financial development indicators	Panel regression analysis	Institutional factors have a positive impact on stock market development, and that improvement in institutional factors and legal structure are vital for development of stock markets.
Thai-Ha, Kim and Lee (2015)	Explore the determinants of financial development in Asia and the pacific	26 economies in Asia and the pacific over the period of 1995 to 2011	Governance, institutional quality, GDP per capita, trade openness, the sum of exports and imports to real GDP and financial development indicators	Dynamic generalized method of moments (GMM)	Better governance and institutional quality foster financial development in developing economies, whereas results for developed countries in terms of policy are quite limited
Cherif and Gadzar (2015)	Investigate the impact of institutional quality on stock market development in 14 MENA countries	14 MENA countries over the period of 1990 to 2007	Composite policy risk index and financial development indicators	Panel data and instrumental variable techniques	Institutional environment as captured by a composite of policy risk index does not appear to be a driving force for the stock market capitalization in the region
Trinugroho, Agusman, Ariefianto Darsono Tarazi (2015)	Examine the determinants of financial deepening across regions in Indonesia	33 provinces in Indonesia between 2004 to 2010	Government and bureaucratic index, macroeconomic factors and financial development indicators	OLS techniques	Local governance matters in explaining the level of financial deepening as the level of financial development is

					influenced by bureaucratic index and government index.
Mbulawa (2015)	Determinants of credit to private sector	11 SADC countries between 1996 to 2010	Credit to the public sector, savings, per capita GDP, gross fixed capital formation, financial openness, interest rate, political factors, institutional factors, governments debt and financial development indicators	Fixed-effects and GMM estimations	When institutional factors are improved and low level of political violence is maintained, financial development is enhanced.
Said and Grassa (2013)	Investigate the institutional determinants of the development of the Islamic bond market	10 most Sukuk issuer's countries over the period of 2003 to 2012	Regulatory quality, rule of law, control of corruption and financial development indicators	Panel data analysis	Countries with a higher degree of institutional development have a larger Sukuk market, which reflects the efficiency and reliability of regulations
Ayadi, Arbak, Naceur and De Groen (2013)	Investigate the reasons why financial sector is lagging behind in MENA's region	MENA countries between 1985 to 2009	legal quality, democratic accountability, GDP per capita, inflation, growth in government debt, financial development indicator and financial liberalization	Random effects and panel regression estimations	Strong legal institutions, good democratic governance and adequate implementation of financial reforms can have a substantial positive impact on financial developmentt only when they are present collectively
Falahaty and Hook (2010)	Investigate the determinants of financial market	Nine MENA countries between 1991	Control of corruption, rule of law, bureaucratic quality and financial development	Fully Modified Ordinary Least Squares (FMOLS)	Improved legal and institutional factors can help develop their

	development in nine Mena countries	-2009	indications	method	financial markets.
Anayiotos and Toroyan (2009)	Explore the impact of certain institutional factors on financial development	37 SSA countries over the period 2007 to 2009	Institution factors, political stability, asset quality and profitability and financial developments indicators	Data envelopment Analysis (DEA)	Institutional factors affect financial depth and access to financial services more than asset quality and profitability and return on equity.
Seetanah, Padachi and Hosany (2009)	Analyse the determinants of financial development in Mauritius	Mauritius for the period of 1970- 2009	Institutional quality, control of corruption, political factors macroeconomic factors and financial development indicators	Auto regressive distributed lag (ARDL) and the use of questionnaire	Institutional quality is found to be more important for financial development.

3.   **Methodology**

3.1   **Theoretical Framework and Model and Specification**

The theoretical foundation employed in this study is based on demand-following finance theory which is from Joan Robinson's proposition after the supply-leading finance hypothesis (Bagehot, 1873; Schumpeter, 1911). While supply–leading finance postulates that financial development has a stimulating impact on the economy (Goldsmith, 1969; Mickinno, 1973 and Shaw, 1973), the demand-following finance theory otherwise known as the growth-led finance is based on the assertion that "finance follows where enterprise leads" and that the causal relation runs from the real sector to the financial sector. It emphasizes that financial development is endogenously determined by the real sector. The demand-following "approach" is consistent with the Coase theorem and much of new institutional economics, in that institutions adjust to market imperfections in a way that maximizes individual utilities (Coase, 1956; Hodgson, 1998).

The growth of the economy generates additional and new demand for financial services, which bring about a supply response in the growth of the financial system (Patrick, 1966). Moreover, higher economic growth means more revenue resulting from resources, enabling the government to invest in infrastructure which is critical for financial development. The financial development induces real capital formation in the early stages of economic development but gradually diminishes and eventually becomes responsive to economic growth (Kuznets, 1995; Stem, 1989).

Fundamentally, the endowment view is incorporated into the proposition, which emphasizes that the geography, topology and disease environment of a country determines the development of all institutions, including the development of private property rights and financial institutions (Acemoglu, Johnson and Robinson 2001). The endowment theory holds

that differences in endowments shape initial institutions and these initial institutions have had long-lasting effects on private property rights protection and financial development. Based on these theoretical propositions, a financial development relationship is specified as follows.

$$FD = f(Y, Z) \qquad\qquad 3.1$$

Where *FD* is financial development indicator, *Y* refers to real *GDP* per capital and *Z* represents other factors that hypothetically could influence financial development.

Based on the theoretical arguments presented above and following Mickinno, 1973; Shaw, 1973; Levine 1993 and Beck 2011, the financial development relationship is modeled as follows:

$$ln(FD_{i,t}) = \propto + \beta \, ln(FD_{i,t-1}) + \psi \, ln(INT_{i,t}) + \gamma \, ln(NR_{i,t}) + \gamma' \, ln(X_{i,t}) + \varepsilon_{i,t} \qquad 3.2$$

Where $FD_{i,t}$ is the indicator of financial development for country i in period t; $FD_{i,t-1}$ is the financial sector indicator lagged by 1 to represent initial level of financial development, $INT_{i,t}$ is the institutional index for country i in period t; $NR_{i,t}$ is the natural resources for country i in period t; $X_{i,t}$ is a vector of the control variables for country i in period t, including real GDP per capita, inflation, market size, population density and communication infrastructure; and $\varepsilon_{i,t}$ is the error term. The constant is denoted by α while β, ψ, γ and γ' are the coefficients that show how much a one unit increase in each individual variable affects financial development. All variables are in logarithmic form for smoothing the series. In addition, the estimated model which captures the interactive effect of institutional quality and natural resources is specified as:

$$ln(FD_{i,t}) = \propto + \beta \, ln(FD_{i,t-1}) + \psi \, ln(INT_{i,t}) + \gamma_0 ln(NAR_{i,t}) + \gamma_1 ln(INT_{i,t} * NAR_{i,t})$$

$$+ \gamma' \, ln(X_{i,t}) + \varepsilon_{i,t} \qquad\qquad 3.3$$

In equation (3.3) above, emphasis is on the statistical significance of the interaction coefficient (γ_1). Depending on its sign, it can be inferred whether institutional quality and natural resources are complements or substitutes in the financial development process. Given that the countries in the sample differ in many ways, it is necessary to control for heterogeneity. Hence, the error term in equation 3.3 is modeled as:

$$\varepsilon_{i,t} = \mu_i + v_{i,t} \qquad \qquad 3.4$$

Where μ_i is the unobserved time invariant country specific effects and $v_{i,t}$ is the disturbance error term. Equation 3.3 is then transformed to:

$$\ln(FD_{i,t}) = \alpha + \beta \ln(FD_{i,t-1}) + \psi \ln(INT_{i,t}) + \gamma_0 \ln(NAR_{i,t}) + \gamma_1 \ln(INT_{i,t} * NAR_{i,t})$$
$$+ \gamma' \ln(X_{i,t}) + \mu_i + v_{i,t} \qquad \qquad 3.5$$

Earlier studies indicate that there may be the possibility of dynamic information even in panel data framework, as the variable may have something to do with explaining itself as well (Wooldridge, 2002; Levine et al., 2000), such that a problem of endogeneity between financial development and explanatory variable is possible. To incorporate dynamics into the model, equation (3.5) is rewritten as an autoregressive one model (AR (1)), that is:

$$FD_{it} - FD_{it-1} = \alpha_t + \beta FD_{it-1} + \psi INT_{it} + \gamma_0 NAR_{i,t} + \gamma_1 (INT_{i,t} * NAR_{i,t}) + \gamma' X_{i,t} + \mu_i$$
$$+ v_{i,t} \qquad \qquad 3.6$$

Where FD_{it} is the logarithm of financial development, $FD_{it} - FD_{it-1}$ is the growth rate of financial development, FD_{it-1} is the initial level of financial development and α_t refers to the period specific intercept terms to capture changes common to all countries. All other variables are defined as before. Equivalently, equation (3.6) can be written as:

$$FD_{it} = \propto_t + (\beta + 1)FD_{it-1} + \psi INT_{it} + \gamma_0 NAR_{i,t} + \gamma_1(INT_{i,t} * NAR_{i,t}) + \gamma' X_{i,t} + \mu_i$$
$$+ \upsilon_{i,t} \qquad\qquad 3.7$$

Equation (3.7) can also be written in first differences which eliminate the country-specific effect component, μ_i as:

$$\Delta FD_{it} = \Delta\propto_t + (\beta + 1)\Delta FD_{it-1} + \psi\Delta INT_{it} + \gamma_0\Delta NAR_{i,t} + \gamma_1\Delta(INT_{i,t} * NAR_{i,t}) + \gamma'\Delta X_{i,t}$$
$$+ \Delta\upsilon_{i,t} \qquad\qquad 3.8$$

There can be the problem of endogeneity, as FD_{it-1} might be endogenous to the error terms through (υ_{it-1}). Thus, the need to control for both time and country-specific effects, while using appropriate lags of the regressors as instruments to address the endogeneity problem. The estimated model then becomes:

$$lnFD_{i,t} = \alpha + \beta . lnFD_{i,t-1} + \psi . INT_{i,t} + \gamma_0 . NAR_{i,t} + \gamma_1(INT_{i,t} * NAR_{i,t}) + \gamma' . X_{i,t} + \mu_i$$
$$+ \upsilon_{i,t} \qquad\qquad 3.9$$

3.2   Techniques of estimation

This study employs different estimation methods, equation (3.2) and (3.3) are estimated using the pooled OLS regression and fixed effect estimation, for they are indicative and provide a robustness check. However, due to possible correlation between the lagged dependent variable and the error term, υ_{it}, and the presence of unobserved heterogeneities, possible endogeneity and measurement error not accounted, the estimated equations can result in biased and inconsistent estimators. Therefore, in this case, a more appropriate estimation method developed by Arellano and Bover (1995) and Blundell and Bond (1998) that estimated with a level-equation and a difference equation will be used, which is called a system GMM. The resulting system of

regression equations in differences and levels has better asymptotic and finite sample properties than the Arellano-Bond (1991) differences GMM estimator.

Thus, equation (3.5) and (3.9) are estimated, using the dynamic panel system GMM estimator, which produces unbiased and consistent estimates after controlling for endogeneity and country-specific effects even when the sample period is short. In particular, we follow this approach to deal with endogeneity. It is especially appropriate for this situation where we have (i) few time periods and many individuals; (ii) a linear functional relationship; (iii) more importantly, in a period of economic and financial behaviour largely influenced by past experiences and old patterns of behaviour, economic or financial relations lagged values of the variables examined in the research model. Hence, adding the lagged value as an explanatory variable is important to the research model, such that the lagged levels as instruments for first difference equations and the lagged first differences as instruments for level equations.

Table 3.1: Variable definition and Measurement

Variables	Definition and measurement of variable	Sources of data
Financial development indicator	Proxy by the ratio of private credit to GDP; credit extended to the private sector by commercial banks and other financial institutions	WDIs, 2015 edition
Macroeconomic variables		
Real GDP per capita	GDP per capital (constant 2010 US$). It is	WDIs, 2015 edition
Inflation rate	It is measured by consumer price index (annual %),	WDIs, 2015 edition
Geographical/ demographic variables		
Total natural resource rents	Sum of oil, gas, coal (hard & soft), mineral and forest rents expressed as a share of GDP	WDIs, 2015 edition
Population density	It is measured by the number of residents per square kilometer	WDIs, 2015 edition
Communication infrastructure	Proxy by number of internet users	WDIs, 2015 edition
Market size	Proxy by population size, the number of inhabitants in a given country	WDIs, 2015 edition
Institutional quality variables		
Control of corruption	It captures perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests.	WGIs, 2015 edition
Government effectiveness	It captures perceptions of the quality of public services, the quality of the civil service and the	WGIs, 2015 edition

	degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies.	
Rule of law	It captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.	WGIs, 2015 edition
Political stability	It measures perceptions of the likelihood of political instability and/or politically-motivated violence, including terrorism.	WGIs, 2015 edition
Regulatory quality	It captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.	WGIs, 2015 edition
Voice and accountability	It represents the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media.	WGIs, 2015 edition
Institutional index	Index of six institutional indicators (i.e. control of corruption, government effectiveness, political stability, regulatory quality and voice and accountability) by Daniel Kaufmann, Aart Kraay and Massimo Mastruzzi (2010). It is derived using Principal Component Analysis	E-views 9 output

Source: author's compilation

This study focuses on the demographic and geographical, institutional determinants of the financial sector development in the Sub-Saharan African countries. These countries include: Angola, Benin, Burkina Faso, Botswana, Burundi, Cabo Verde, Chad, Congo, Congo Dem. Rep, Cote d'lvoire, Equitoria Guinea, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Madagascar, Malawi, Mali, Mauritius, Mozambique, Namibia, Niger, Nigeria, Rwanda, Sao Tome & Principe, Senegal, Sierra Leone, South Africa, Swaziland, Tanzania, Togo, Uganda and Zambia. The main focus on this subject is a reflection of the fact that the investigation of some crucial factors that can have effects on financial development in the region is scarcely studied. The study covers the periods 2005-2014.

4.   Results and Discussion of Findings

This chapter focuses on analysis, estimation of models, presentation of results and discussion on the geographical and institutional determinants of financial sector development in sub-Saharan African (SSA) countries. Majorly, the discussion is centered on the effect of natural resource and institutional factors on financial development in SSA countries. The first section provides a brief description of the behavior of the variables with a particular emphasis on normality and variability of the data, while the remaining sections present the results of econometric techniques earlier specified.

4.1. Basic Statistics

This section provides information about the normality and variability of the data. All the variables are expressed in log except institutional quality variables and inflation which are already in rate form. In Table 4.1, the average (i.e. mean), standard deviation, minimum and maximum values of each variable is presented. As shown in the results, financial development indicator in sub-Saharan Africa (SSA) has an average of 2.71% with estimated minimum value of 0.18% and maximum value of 5.08%. The standard deviation values for inflation is the highest with 6.34%, while institutional quality variables shared the lowest value between 0.83% and 0.52%. This suggest that there is high variation in the value of the variables that influence financial sector development in SSA. On the average, -2.78% is estimated for institutional quality index, with minimum and maximum values of -5.17%% and 5.22% respectively. This means that there are strong cases of poor governance and weak institutions in the region. In addition, the mean value of total natural resource rent is 2.07%, while -6.77% and 4.09% represent its minimum and maximum values. It implies that only little of natural resource earnings in SSA are accounted for.

Table 4.1: Summary Statistics

	Obs.	Mean	Std. D	Min.	Max.
Financial development indicator					
Private credit	360	2.71004	0.858825	0.183210	5.075954
Macroeconomic variables					
GDP per capita	360	7.099061	1.130710	5.323361	10.15552
Inflation	359	7.242505	6.344433	-35.83668	34.69527
Geographical Variables					
Natural resource rents	334	2.072834	1.627884	-6.774387	4.096526
Population	360	15.85327	1.505688	11.93915	18.99435
Population density	360	3.902884	1.263765	0.9010166	6.431572
Number of internet users	359	1.387742	1.219898	-1.535298	3.89182
Institutional Quality Variables					
Control of corruption	360	-0.568824	0.622518	-1.836495	1.141267
Voice of accountability	360	-0.457284	0.696752	-1.980617	0.982740
Government effectiveness	360	-0.674246	0.589119	-1.768885	1.130958
Political stability	360	-0.360110	0.835683	-2.374598	1.186454
Regulatory	360	-0.525236	0.524337	-1.619515	1.000709
Rule of law	360	-0.600315	0.606672	-1.652965	1.006921
Institutional index	360	-2.78209	1.809292	-5.17858	5.222001

Source: Author's computation

Table 4.2 gives information about the normality and variability of the data, with a particular focus on the skewness and kurtosis. The skewness is used to investigate the degree of asymmetry, that is, the deviation from symmetry of a distribution. The result indicate that the variables are positively skewed i.e. they have more of positive changes than negative. Kurtosis is used to evaluate the peak of a distribution. Findings from the Kurtosis reveal the normality in the distributions.

Table 4.2: Skewness and Kurtosis normality test

Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	Adjchi2(2)	Prob.>chi2
GDP per capital	360	0.0000	0.1684	25.82	0.0000
Inflation	359	0.1637	0.0000	49.66	0.0000
Resource rents	334	0.0000	0.0000	-------	0.0000
Population	360	0.0005	0.7474	11.80	0.0027
Population den	360	0.0095	0.4170	7.11	0.0285
Internet users	359	0.2929	0.0058	8.19	0.0167
Private credit	360	0.1032	0.0132	8.25	0.0162
Corrpt	360	0.0000	0.6847	20.74	0.0000
Goveff	360	0.0000	0.7405	15.04	0.0005
Pols	360	0.0001	0.0879	16.27	0.0003
Acc	360	0.4847	0.0000	28.28	0.0000
Regq	360	0.0005	0.4931	11.22	0.0037
Rlaw	360	0.0007	0.6067	10.68	0.0048
Int index	360	0.0071	0.8797	7.01	0.3000

Note: The Skewness and kurtosis have the value of 0 and 3 for normal distribution

Source: Author's computation

Given the need to establish how the independent variables are associated, a correlation analysis was carried out in Table 4.3. Considering the correlation among the variables, the table indicates weak, low and moderate correlation. While GDP per capita appears to be correlated with institutional indicators, private credit and number of internet users, the strength of their relationship is far from perfect. Conversely, inflation, natural resource rents, population and population density have negative (weak) correlation with GDP per capita. In addition, the results shows that natural resource rents have adverse relationship with both financial development indicators (private credit) and institutional measures. However, the correlation between institutional variables and financial development is moderate. From empirical and theoretical perspective, multicollinearity exists when the correlation coefficient is more than 0.80 and also correlation analysis does not imply any direction of the causal relationship (Bryman and Cramer, 2002, Kennedy 2003). Thus, the weak and moderate correlation values among the independent variables in the correlation analysis in the table indicates the absence of multicollinearity.

Table 4.3: Correlation Analysis

Variable	GDP	Inf	Rrent	Pop	Popd	Cifr	Prcredit	Corrpt	Goveff	Pols	Acc	Regq	Rlaw	Int index
GDPc	1.0000													
Inflation	-0.1572	1.0000												
Nrent	-0.2250	0.0930	1.0000											
Population	-0.4031	0.1315	0.3378	1.0000										
Pop density	-0.3056	0.1492	-0.4087	0.0356	1.0000									
Internetuser	0.5872	-0.0685	-0.4170	-0.2105	0.1729	1.0000								
Privatecredit	0.3595	-0.0732	-0.6028	-0.0750	0.2206	0.6605	1.0000							
Corrpt	0.2697	-0.0644	-0.6250	-0.2783	0.0230	0.3791	0.6308	1.0000						
Goveff	0.3324	-0.0394	-0.6898	-0.1406	0.0987	0.5001	0.7315	0.8956	1.0000					
Pols	0.4408	-0..1526	-0.4398	-0.5479	-0.1369	0.3280	0.4447	0.6710	0.6320	1.0000				
Acc	0.1257	-0.0012	-0.6028	-0.0692	0.0820	0.3379	0.6588	0.7585	0.8278	0.6031	1.0000			
Regq	0.3054	-0.0906	-0.6642	-0.0356	0.0671	0.4897	0.7347	0.8354	0.9325	0.5820	0.7987	1.0000		
Rlaw	0.3330	-0.0974	-0.6927	0.0805	0.4612	0.4612	0.6767	0.9043	0.9251	0.7507	0.8229	0.8996	1.0000	
Int Index	0.0151	-0.0551	-0.0065	-0.0002	-0.0068	0.1174	0.0857	0.1104	0.1074	0.1497	0.1159	0.0964	0.1372	1.0000

4.2   The effect of natural resources on financial development in SSA

To achieve the first objective of the study, this section presents the results and discussion on the effect of natural resources on financial development in SSA. Table (4.4) shows the results of pooled OLS, Fixed effects and System-GMM. Fixed effects estimation is preferred to random effects in this study as hausman specification test in each section suggests the rejection of null hypothesis that random effect is appropriate. The pooled OLS result indicates that the coefficient of total natural resource rent (0.258) is negative, but it is statistically significant. This implies that, holding all other factors constant, a rise of one percent in natural resource rents of GDP would lower credit to the private sector by 0.258%. It is suggestive of the possibility of higher investment in the natural resource sector to hinder growth of the financial sector by drawing away skills from the financial system. This results is consistent with the previous findings that explained adverse effect of natural resources on financial deepening (Beck 2011; Kurronen 2012). The coefficients of other geographical factors (population, population density and number of internet users) are, however, positive, although not all found to be statistically significant. This finding is in consonance with theoretical expectation. The results are in line with the work of (Allen, Carletti, Cull Qian and Senbet, 2010; Dehan 2015) such that the distribution of access positively influences private credit and population density is found to be considerably more important for financial sector development in Africa.

In accordance with theory, the results show that log of GDP per capita has a positive impact on financial sector development. There is high growth prospects for emerging economies which stimulate increased investments thereby enhancing increased demand for credit (Robinson, 1952; Patrick 1966). Furthermore, another control variable, inflation adversely affects financial development. Owning to lower interest rates, inflation discourages savings. It

lowers the real return on the invested capital, which in turn leads to declined investment. This corroborates the work of (fry, 1995; Bayar, 2016).

However, under pooled OLS the problem of endogeniety remains unsolved, while the Hausman specification test suggests that fixed effects is appropriate to ensure that unobserved heterogeneity is controlled for. The signs of the coefficients of natural resource rents (Nrent), GDP per capital, population density (Popd) and inflation (Inf) are preserved under fixed effects estimation results but population (Pop) and number of internet users (Num) lost their signs. This can be interpreted as a largely uneducated population seems to prefer to hold their wealth in form of physical assets, a prevalent case in SSA (KPMG, 2014), rather than financial assets due to poor awareness and insufficient information. Less savings are likely to adversely affect the credit creation ability of financial system. The inclusion of fixed effects have the effect of eliminating the significance of the variables, except for GDP per capita that gained more importance, although the effect of natural resource rent is less pronounced. In addition, Heteroskedasticity and autocorrelation are accounted for. This estimation procedure reduces the impact of missing observations in the unbalanced panel.

The results from the System-GMM dynamic panel estimator, which allows us to control for the possible endogeneity problem of sector-specific variables. The AR(2) p-value is insignificant, suggesting no second-order autocorrelation, which makes the GMM estimator consistent. Here, the null hypothesis of no second-order autocorrelation cannot be rejected. The test of overidentifying restrictions (Sargan test), showing whether the instruments as a group are uncorrelated with the error process, gives acceptable p-value (1.0000). The lag of private credit to GDP (indicating the dynamic nature of our model) is positive and statistically significant. This implies that private credit to GDP is positively influenced by its value in the previous period. Our

results corroborate the findings of (Thai-Hale, Kim and Lee, 2015), who also found the previous values of private credit to be important for financial development. The results on population density, GDP per capita, inflation, natural resource rents and number of internet users further reiterate the findings of the pooled OLS, but only GDP per capita and inflation is found to be statistically significant, while the sign of the coefficient on population is in line with the fixed effect estimation.

Table 4.4: The effect of natural resources on financial development in SSA

FD	Pooled OLS	Fixed Effect	System-GMM
Lag of FD			0.8543
			(0.000)**
Natural resource rent	-0.2580	-0.0046	-0.0156
	(0.000)**	(0.925)	(0.706)
Population	0.1182	-47.925	-0.9307
	(0.000)**	(0.140)	(0.425)
Population density	0.5061	51.5112	0.6993
	(0.121)	(0.115)	(0.313)
Number of internet users	0.3594	-0.0844	0.0077
	(0.0000)**	(0.081)	(0.948)
GDP (log)	0.0085	0.6106	1.7407
	(0.840)	(0.015)**	(0.002)**
Inf (log)	-0.0269	-0.0234	-0.304
	(0.413)	(0.226)	(0.001)**
Constant	1.062	561.86	5.3356
	(0.0618)	(0.150)	(0.710)
R^2	0.9648	0.7471	
Observations	284	284	248
No. of Countries	36	36	36
Huasman test		101.04	
		(0.0000)	
Panel (hetero)test		293.22	
		(0.0000)	
PCSEs test		662.44	
		(0.0000)	
Number of instruments			128
A-Bond AR(1) test p-value			-2.9415
			(0.0062)
A-Bond AR(2) test p-value			-0.6933
			(0.3125)
Sargan test			22.029
			(1.0000)

Figure in the parentheses are p-values. ** indicates significance at 5% level.

**4.3	The effect of institutional quality on financial development in SSA**

This section focuses on the second objective of this study. Table 4.5 to 4.7 present the results of the effect of institutional quality on financial development in SSA. The results of pooled OLS, Fixed effect estimation and System-GMM are shown in the tables respectively. Our findings show the role of institutions on financial development with private credit to GDP as dependent variable, and GDP per capita, inflation, population, population density and number of internet users as controls. Under pooled OLS, in column (i) to (vi), the financial development indicator (private credit to GDP) rises with the six measures of institutions (i.e. control of corruption (corrpt) government effectiveness (goveff), political stability (pols), regulatory quality (regq), rule of law (rlaw) and voice and accountability (acct)). All the six institutional factors included in the model are significant at 5% level and also have a positive impact on financial sector development among SSA countries. The results imply that improvements in institutional factors in SSA countries would enhance financial development. This is consistent with the existing literature that when institutional factors are improved and low level of political violence is maintained, financial development is enhanced (Mbulawa, 2015; Seetanah, Padachi and Hosany, 2009).

However, in our preferred specification (column vii), with the institutional index, institutions are not statistically significant at the 5% level with a coefficient of 0.582. Most African economies have low values for institutional quality which suggests that policies that help to strengthen governance and institutions would significantly improve the level of financial development (Demetriades and Andrianova, 2004). The inclusion of population, population density and number of internet users permits the testing of the hypothesis that distribution of access do not influence private credit. The variables are positively associated with financial

development indicator and they are statistically significant. Thus, these corroborate the finding that the distribution of access influences private credit which, in turn, lead to improved financial development (Dehan, 2015). The findings is also in consonance with section (4.2) that Real GDP per capita is a positive determinant of financial development.

Table 4.6 reports the fixed effects estimation results. The findings indicate that financial development indicator declines with two out of six measure of institutions. In contrast with pooled OLS results, we find that voice of accountability and regulatory quality have an adverse effect on the level of financial development. The implication of this is that although bureaucracy is also important for financial sector development, its effect is limited to the willingness of providing credit. Under a more bureaucratic regime, its effect is even negative for financial development as the speed of asset accumulation tend to reduce and trade at bourses is also expected to decline. These findings are in coherence with previous studies (Perotti and Volpin, 2007; Cherif and Dreger, 2014). Nonetheless, our preferred measure—the institutional index of governance variables—is positive and statistically significant. Given the country-specific circumstances, this shows that institutions matter and critical to financial sector development. Furthermore, the coefficients on population are negative from column (i) to (vii), while the negativity of communication infrastructure (proxy by the number of internet users) with the exception of column (i) is between (ii) and (vii). This difference in results may be as a result of simultaneity consideration. In addition, given the tests of serial correlation and heteroscedasticity at 5% level as shown in the table, and the potential for endogeneity, these estimated results may be biased and inefficient. However the coefficients of GDP per capita, inflation and population density are in consistent with our OLS estimates.

To ascertain the robustness or otherwise of the results obtained above, table 4.7 shows the results of the System-GMM. The institutional quality variables and institutional index maintain their positive signs, however, they are not statistically significant at 5% level. This implies that all the institutional factors included in the model have a similar important role among SSA countries in influencing financial sector development, while the insignificance of these institutional measures could be attributed to low values of institutional quality variables in Africa. Results indicate that making progress in strengthening institutions would have strong positive impact on improving financial sector in SSA. In general, institutional environment has a crucial impact on the level of the financial sector development (Anayiotos and Toroyan, 2009). The coefficients of lag of financial development indicator are positive and highly significant in all the columns— (i) to (vii). This is consistent with section 4.2.

Moreover, the results of control variables, with exception of GDP per capita and inflation which consistently maintain their signs and highly statistically significant at 5% level, the coefficients of population in column (iii) and (v) are negative, for population density, column (i), (ii) and (vi) are also negative, while only column (vi) is negative for number of internet users. In all, the variables are not statistically significant, except for population that is significant in column (v) at 5% level. The insignificance of these variables can be attributed to the fact that although electronic medium, especially the Internet may be an efficient way to undertake financial transactions, this medium is also prone to fraud and breach in the protection of individual privacy. Due to lack of security and privacy, especially in SSA, the general population is often reluctant to use the digital medium to conduct their financial transactions (Vaithilingam, Nair and Samudra, 2006)

Table 4.5: The effect of institutional quality on financial development in SSA (Pooled OLS)

FD	(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)
GDP per capita	0.081 (0.036)**	0.0229 (0.534)	0.0312 (0.459)**	0.1150 (0.002)**	0.035 (0.340)**	0.04087 (0.289)	0.072(0.123)**
Inflation	-0.073 (0.000)**	-0.0797 (0.006)**	-0.5782 (0.080)	-0.0873 (0.002)**	-0.0499 (0.085)	-0.0505(0.096)	-0.0538(0.143)
Corrpt	0.666 (0.000)**						
Goveff		0.7693 (0.000)**					
Pols			0.430 (0.000)**				
Acct				0.614(0.000)**			
Redq					0.860(0.000)**		
Rlaw						0.6829 (0.000)**	
Int index							0.0107 (0.582)
Population	0.108 (0.000)**	0.4800 (0.017)**	0.1564 (0.000)**	0.0617 (0.002)**	0.014 (0.493)	0.0849(0.000)**	0.0471(0.064)
Population density	0.109 (0.000)**	0.0747 (0.005)**	0.1273 (0.000)**	0.1164 (0.000)**	0.0876 (0.001)**	0.0809 (0.004)**	0.090 (0.008)
Number of internet users	0.296 (0.000)**	0.2593(0.000)**	0.3655(0.000)**	0.2727(0.000)**	0.2453[0.000]**	0.2886(0.000)**	0.4148 (0.000)**
Constant	0.103(0.844)	1.792 (0.001)**	0.7420 (0.213)	0.5160(0.301)	2.0992(0.000)**	0.8369 (0.105)	0.6238 (0.330)
R^2	(0.631)	(0.656)	(0.552)	(0.664)	(0.656)	(0.623)	(0.446)
Observations	342	342	342	342	342	342	342
No. countries	36	36	36	36	36	36	36

Figure in the parentheses are p-values. ** indicates significance at 5% level.

Table 4. 6: The effect of institutional quality on financial development in SSA (Fixed effects)

FD	(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)
GDP per capital	0.2882 (0.231)	0.4208(0.075)	0.3657 (0.121)	0.502(0.035)**	0.5333(0.036)**	0.4104(0.085)	0.3535(0.123)
Inflation	-0.0218 (0.257)	-0.0242(0.214)	-0.0206 (0.301)	-0.025(0.020)**	-0.255 (0.192)	-0.022(0.261)	-0.0235 (0.222)
Corrpt	0.2467 (0.007)**						
Goveff		0.1546(0.156)					
Pols			0.117(0.020)**				
Acct				-0.040(0.694)			
Redq					-0.0639(0.622)		
Rlaw						0.1519 (0.180)	
Int index							0.0201 (0.008)**
Pop (log)	-39.1871(0.224)	-56.2899 (0.075)	-66.942(0.032)**	-62.735 (0.047)**	-65.661(0.042)**	-60.623 (0.054)	-42.46 (0.184)
Population density	42.1901(0.190)	59.1581 (0.074)	69.721(0.026)**	65.4905(0.038)**	68.445 (0.034)**	63.520 (0.043)**	45.320(0.156)
Number of internet users	0.0501 (0.273)	-0.0498(0.281)	-0.0266(0.566)	-0.0430(0.353)	-0.0441(0.339)	-0.0537 (0.250)	-0.0508(0.267)
Constant	456.79 (0.235)	66.423(0.080)	788.20(0.035)**	737.084(0.050)	771.97(0.045)**	712.072 (0.058)	495.724 (0.193
R^2	(0.0.501)	(0.492)	(0.498)	(0.489)	(0.489)	(0.492)	[0.500]
Hausman test	77.85 (0.000)	83.33(0.000)	35.23(0.000)	90.76(0.000)	90.25(0.000)	79.96(0.000)	49.35(0.000)
Panel (hetero)test	585.12(0.000)	651.99(0.000)	258.56(0.000)	995.40(0.000)	489.84(0.000)	703.61(0.000)	703.61(0.000)
PCSEs test	357.94 (0.000)	334.68(0.000)	313.78(0.000)	882.31(0.000)	535.14(0.000)	554(0.000)	554.71(0.000)
Observations	342	342	342	342	342	342	342
No. countries	36	36	36	36	36	36	36

Figure in the parentheses are p-values. ** indicates significance at 5% level.

Table 4.7: The effect of institutional quality on financial development in SSA (System-GMM)

FD	(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)
Lag of fd	0.7984 (0.000)**	0.7830 (0.000)**	0.7480 (0.0000)**	0.8116(0.000)**	0.7089 (0.000)**	0.7657 (0.000)**	0.9021 (0.000)**
GDP per capita	1.5367 (0.000)**	1.2817(0.002)**	1.3161 (0.0000)**	1.8864(0.000)**	0. 9528(0.000)**	1.4171 (0.003)**	0.984(0.032)**
Inflation	-0.0405(0.000)**	-0.3411(0.000)**	-0.0361[0.000]**	-0.0416(0.000)**	-0.0290 (0.035)**	-0.0369(0.000)**	-0.0319(0.000)**
Corrpt	-0.0574 (0.746)						
Goveff		0.0502 (0.789)					
Pols			0.122 (0.096)				
Acct				0.023[0.904)			
Redq					0.3041(0.053)		
Rlaw						0.5748 (0.016)**	
Int index							0.0004 (0.974)
Pop (log)	0.1100 (0.166)	0.0739 (0.808)	-0.0977 (0.747)	0.6772 (0.389)	-0.0703(0.020)	2.3287 (0.325)	0.337 (0.345)
Population	-0.5554 (0.354)	0.1255(0.870)	0.9114 (0.057)	-0.1981 (0.545)	0.0480(0.709)	-1.0279 (0.651)	0.006(0.876)
Number of internet users	0.020 (0.897)	0.0632(0.423)	0.0152(0.776)	0.0256(0.794)	0.0059(0.361)	-0.0891 (0.328)	0.0386(0.515)
Constant	0.5735(0.767)	1.320 (0.888)	1.6729 (0.718)	-8.158(0.426)	-2.566(0.030)**	-30.27 (0.234)	-0.1965(0.810)
No. of instrument	136	136	136	136	136	136	136
A-Bond AR(1) test p-value	-2.729(0.0064)	-2.940(0.0033)	-2.4324 (0.1050)	-3.178(0.0015)	-2.752(0.0059)	-2.328(0.0199)	-2.445(0.0145)
A-Bond AR(2) test p-value	-0.916(0.3596)	-0.916(0.6752)	-0.525 (0.5995)	-0.169(0.8675)	-0.913(0.361)	0.696(0.4866)	-0.813(0.4162)
Sargan test	24.265 (1.000)	22.39(1.000)	16.319(1.000)	19.376(1.000)	21.392(1.000)	21.577(1.000)	21.405(1.000)
Observations	270	270	270	270	270	270	270
No. countries	36	36	36	36	36	36	36

Figure in the parentheses are p-values. ** indicates significance at 5% level.

4.4   The interactive effect of institutional quality and natural resources on financial development in SSA

In this section, the interactive effect of institutional quality and natural resources is presented in table 4.8, 4.9 and 4.10 respectively. Under our pooled OLS in table 4.8, the results of the interaction of various institutional measures and our main variable of interest (institutional index) with total natural resource rents in the model (column (i) to (vii)) have a positive effect on financial development. This suggest the complimentary role of institutions (i.e. institutional quality compliments the effectiveness of natural resource rents) in financial development process. It reveals that the extent of contribution of natural resources to financial development depends on the quality of institutions, such that resource rents coupled with a strong institutional environment will stimulate financial development. This supports the conclusion of the previous studies (Collier and Hoeffler, 2009; Bhattacharyya and Hodler, 2010). In the table, the interaction term of institutional index and natural resources (our preferred specification) is insignificant while all the institutional measures are significant. Given that in SSA, most economies are characterized by weak institutions which account for poor intermediation of natural resource rents through financial sector, any policy that promotes good governance and institutions would significantly enhance financial development process through its role on the effectiveness of natural resources in the region. This is also in line with the existing literature (Mukand and Rodrik, 2005). Regarding the control variables, both the signs of the coefficients and level of their respective p-values, at 5% level, are in line with table 4.5 and they all conform to our theoretical expectation.

Using the Fixed effect model (table 4.9), only the coefficient (for the interaction term) on the interaction of voice of accountability and natural resource rents is negative, while others have positive signs including institutional index as reported in our pooled OLS estimates (4.8). This

negativity indicates the indirect effect of natural resource rents on financial development through the way of institutional quality. It implies that natural resource rents through the channel of institutions have an adverse effect on financial development. It can be argued that as natural resources rents increase, it will encourage rent-seeking behavior and undermine accountability and credibility that guide financial contracts, which in turn, hinder financial development. These results validate that financial development is low in most resource dependence countries and are in coherence with previous works (Hooshmand, Hosseini, Moghani 2013; Bhattacharyya and Hodler, 2010). The outcome of our macroeconomic variables are quite consistent with initial expectations, in that a lower inflation and a higher GDP per capita is associated with higher financial development level. However, the coefficients of other control variables are not all consistent with our a priori expectation. This may be due to simultaneity consideration and for the possibility of endogeneity problem.

Table 4.10 reports the results of System-GMM estimation with p-values. The statistical tests conducted show that our model is appropriate. The first test for System-GMM estimation is Arrelano-Bond test with null hypothesis that there is no serial correlation. The p-values of this test that are reported reveal that the model specification is valid in each model, as we have no second order autocorrelation in the models. On the validity of the instruments, the overidentification test (Sargan test) generally indicate that the instruments are valid. Given the suitability of our model, the results indicate that the interaction of all the institutional measures with natural resource rents have a positive and significant effect on the financial development. The finding suggests that the institutional quality and natural resources are complements. This section support the notion that resource rents enhance financial development in countries with strong institutions. For the control variables; GDP per capital, communication infrastructure

(number of internet users), with the exception of inflation, in all the columns, have a positive in effect on financial sector development. However, for market size (population), only in column (i), the positive sign is lost. This can be attributed to a high level of uneducated people across all countries in SSA that favour wealth holding in form of physical asset over financial asset. The results are consistent with those obtained by previous studies (Vaithilingam, Nair and Samudra, 2006; Ang and Kumar, 2013).

5.   Concluding Remark and Policy Recommendation

The study has assessed the effect of natural resources and institutions on financial development in SSA. A dynamic panel model was estimated using System-GMM method of analysis. The policy implications of the interplay between natural resource rents and institutional quality was critically examined and discussed in the study. The findings clearly indicated that the huge resource rents in addition to undermining financial development directly across all countries in SSA, also contributes to weakened institutions indirectly, thereby lowering the level of financial development in the region. Furthermore, low institutional quality leads to inadequate intermediation of natural resource gains through the financial system in SSA. Overall, the findings reinforced the argument that private credit to GDP is positively influenced by its value in the previous period, inflation would inhibit financial development and GDP per capita is a positive determinant of financial development. The study has also empirically showed that while the distribution of access positively influences financial development, the general population is often reluctant to use the digital medium to

conduct their financial transaction owing to lack of security and privacy, which hindered financial development in SSA.

The findings of this study support the view that the availability of natural resources if not well managed do not promote financial development. Thus, certain policy implications emerge from this study. Most importantly, in order to promote the financial development level, policy makers must adopt some policies to enforce law among individuals, reducing corruption, increasing the voice of people and accountability of authorities. And that the governments must promote their efficiency and ability for implementing policies by ensuring transparency and fostering contract enforcement in SSA.

Also, improving the quality of laws and regulations by reducing complex bureaucratic process can help to enhance financial development. Therefore, appropriate institutional re-arrangement is necessary for better performance of many of the economic institutions in SSA, thereby preventing the adverse effect of resource rents on institutional quality. This will neutralize to some extent the negative impact of natural resources on institutional quality and, in turn, on financial development.

The results further indicate that complimentary interactions exist between institutional indicators and natural resource rents. The implications is that both natural resources and institutional quality matter in financial development process. Hence, strategies and policies that will facilitate efficient and effective intermediation of resource rents through financial system should be adopted in countries.

Given the positive effect of economic growth (proxy by GDP per capita) as well the negative effect of inflation on financial development in these countries, it is

recommended that in order to promote the level of financial development, policymakers should adopt appropriate policies to increase economic growth and control the inflation. This can be achieved through the effective coordination of macroeconomic policies among the various organs of government in the region.

Finally, owing to low level of financial development in resource-based economies, there is need to expedite action on the structural transformation of their economies, particularly in SSA, through more of public spending adjustments and increased fiscal discipline. This will enhance the diversification of African export markets, which can reduce the influence of volatility of the commodity prices on the SSA economies.

Table 4.8: The interactive effect of institutional quality and natural resources on financial development in SSA (Pooled OLS)

FD (LOG)	(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)
GDP per capita	0.2657 (0.000)**	0.2455 (0.000)**	0.0558 (0.232)	0.2998[0.000]**	0.2244(0.000)**	0.2213 [0.000]**	0.0580(0.237)
Inflation	-0.0486(0.121)	-0.0534 (0.085)	-0.0308 (0.399)	-0.0621[0.041]**	-0.0454(0.155)	-0.0349(0.278)	-0.0469 (0.225)
Nrent*Corrpt	0.0222 (0.000)**						
Nrent*Goveff		0.0218 (0.000)**					
Nrent*Pols			0.012(0.000)**				
Nrent*Acct				0.023[0.000]**			
Nrent*Redq					0.022 (0.000)**		
Nrent*Rlaw						0.0204 (0.000)**	
Nrent*Int index							0.0015 (0.140)
Population	0.0846(0.000)**	0.0734 (0.001)**	0.093(0.001)**	0.063[0.003]**	0.0633 (0.005)**	0.0833 (0.000)**	0.0462 (0.086)
Population density	0.0977(0.001)**	0.0879 (0.002)**	0.1002(0.000)**	0.101[0.000]**	0.0903 (0.000)**	0.0895 (0.002)**	0.0913(0.009)**
Number of internet users	0.2335 (0.000)**	0.2268(0.000)**	0.3780(0.000)**	0.211[0.000]**	0.2458(0.000)**	0.2493 (0.000)**	0.425(0.000)**
Constant	-0.8345 (0.142)	-0.4381(0.431)	0.3780(0.000)**	-0.722[0.186]	0.226(0.000)**	0.5318 (0.359)	0.7205 (0.287)
R^2	(0.633)	(0.640)	(0.505)	(0.657)	(0.620)	(0.613)	(0.454)
Observations	320	320	320	320	320	320	320
No. countries	36	36	36	36	36	36	36

Figure in the parentheses are p-values. ** indicates significance at 5% level.

Table 4.9: The interactive effect of institutional quality and natural resources on financial development in SSA (Fixed effects)

FD (LOG)	(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)
GDP per capital	0.5564 (0.025)**	0.5947 (0.017)**	0.5418(0.034)**	0.5716(0.022)**	0.5765 [0.022]**	0.5632 [0.024]**	0.3059(0.224)
Inflation	-0.0203(0.287)	-0.0204 (0.284)	-0.0209 (0.277)	-0.0215 (0.260)	-0.0220(0.252)	-0.0203 (0.288)	-0.0170(0.360)
Nrent*Corrpt	0.0055 (0.021)**						
Nrent*Goveff		0.0049(0.028)**					
Nrent*Pols			0.0025 (0.198)				
Nrent*Acct				0.004(0.059)			
Nrent*Redq					-0.003(0.224)		
Nrent*Rlaw						0.005(0.032)	
Nrent*Int index							0.0166(0.000)**
Population	-42.8810 (0.183)	-44.758 (0.165)	-49.211(0.129)	-45.629 (0.158)	-45.931(0.157)	-45.40(0.159)	-38.6864(0.219)
Population density	46.152 (0.152)	47.978 (0.136)	52.4051 (0.105)	48.861 (0.130)	49.147(0.129)	48.610(0.131)	41.626(0.186)
Number of internet users	-0.0921 (0.053)	-0.0906(0.058)	0.0769(0.111)	-0.0894(0.062)	-0.0853(0.075)	-0.0889(0.063)	-0.0434(0.360)
Constant	501.54 (0.195)	524.00(0.176)	577.918(0.138)	534.55(0.168)	538.20(0.167)	531.963 (0.170)	454.069 (0.230)
R^2	(0.536)	(0.535)	(0.529)	(0.533)	[0.529]	[0.534]	(0.556)
Hausman test	65.19(0.0000)	64.89(0.000)	59.29(0.000)	64.88(0.000)	63.55(0.000)	63.10(0.000)	45.47(0.000)
Panel (hetero)test	359.01(0.000)	351.39(0.000)	219.13(0.000)	430.31(0.000)	338.00(0.000)	300.36(0.000)	216.92(0.000)
PCSEs test	478.99(0.0000)	432(0.000)	546.07(0.000)	525.83(0.000)	687.80(0.000)	540.12(0.000)	574.99(0.000)
Observations	320	320	320	320	320	320	320
No. countries	36	36	36	36	36	36	36

Figure in the parentheses are p-values. ** indicates significance at 5% level.

Table 4.10: The interactive effect of institutional quality and natural resources on financial development in SSA (System-GMM)

FD	(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)
Lag of FD	0.865 (0.000)**	0.8837 (0.000)**	0.8172 (0.000)**	0.8686(0.000)**	0.7619 (0.000)**	0.8478 (0.000)**	0.8600(0.000)**
GDP per capita	0.5314 (0.121)**	0.7503 (0.021)**	1.2894(0.000)**	1.5051(0.001)**	1.286(0.0003)**	1.0980(0.000)**	1.423(0.000)**
Inflation	-0.00258 (0.001)**	-0.0127(0.061)	-0.0165(0.005)**	-0.0300 (0.000)**	-0.023(0.000)**	-0.0192(0.000)**	-0.008(0.232)**
Nrent*Corrpt	0.0052(0.000)**						
Nrent*Goveff		0.0057(0.000)**					
Nrent*Pols			0.030(0.000)**				
Nrent*Acct				0.005(0.000)**			
Nrent*Redq					0.005(0.000)**		
Nrent*Rlaw						0.003(0.000)**	
Nrent*Int index							0.0004(0.000)**
Population	-0.0396(0.000)**	-0.0773 (0.000)**	-0.1161(0.005)**	-0.0513 (0.000)**	-0.023(0.193)	-0.0657(0.172)	-0.022(0.567)
Population density	-0.0249(0.112)	0.0049(0.652)	0.0194 (0.521)	0.0379 (0.024)**	0.0112(0.048)**	0.0615(0.050)	0.0541(0.001)**
Number of internet users	0.1164(0.018)**	0.1643(0.714)	0.0657(0.138)	0.0689(0.101)	0.0912(0.021)**	0.0907 (0.150)	0.0064(0.028)
Constant	0.979(0.056)	1.8350 (0.000)**	2.4015 (0.718)	0.777(0.000)**	0.3532(0.337)	1.104 (0.104)	0.4383(0.495)
No. of instrument	128	128	128	127	127	128	128
A-Bond AR(1) test p-value	-3.0714(0.0022)	-3.6585(0.0003)	-3.4147(0.1050)	-3.1856(0.0014)	-2.7121(0.0067)	-2.5691(0.0102)	-3.4367(0.0006)
A-Bond AR(2) test p-value	-0.4258(0.2577]	-0.222(0.8242)	-0.7121(0.5995)	-1.0186(0.3084)	-1.0181(0.3087)	-1.2634(0.2065)	-0.3609 (0.7182)
Sargan test	17.421(1.000)	22.3463(1.000)	19.611(1.000)	23.1259(1.000)	20.2843(1.000)	23.3282(1.000)	20.2302(1.000)
Observations	248	248	248	248	248	248	248
No. countries	36	36	36	36	36	36	36

Figure in the parentheses are p-values. ** indicates significance at 5% level

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