Financial Structure and Economic Growth: Evidence from Sub-Saharan Africa

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Abstract

This study examines the effect of financial structure on economic growth in Sub Saharan Africa. The sample consists of both low and middle income countries, whose financial systems range from poorly developed to relatively well- developed in the context of developing countries. Using dynamic panel estimation techniques, the study investigates both the short and long-run effects of financial structure on growth, focusing on 14 SSA countries over the period 1980-2014. The results indicate that financial structure is not significant in explaining growth in the region. The study is robust to sample groupings, and the results do not change when we exclude countries with better developed financial systems relative to other countries in the sample.

1 Introduction and background

Since the early 1990s, there has been an increase in empirical research on the finance-growth nexus, with some studies employing formal growth models (see Levine 2005; King & Levine 1993a; King & Levine 1993b; Beck, Levine, et al. 2000) and others investigating the causal relationship between finance and growth (see Hassan et al. 2011; Odhiambo & others 2008; Christopoulos & Tsionas 2004; Demetriades & Hussein 1996; Levine et al. 2000 inter alia). A recent study that makes use of extended data (Rousseau and Wachtel, 2011) does not find very strong support for the widely held view that there is a positive relationship between finance and growth, or that countries grow faster when they have a well-developed financial system, as postulated in Levine (2005).

Stock markets and banks are the main sources of finance in an economy. It is widely believed that they play an important role in determining the speed and character of economic growth (Goldsmith 1955). As a result, a branch of the finance-growth literature has emerged that aims to evaluate the role of financial structure on economic growth. Financial structure is broadly defined as the mix of financial instruments, financial markets, and financial institutions in a country. A financial system with more reliance on the banking system is characterised as bank-based, while one that relies more on the stock market is characterised as market-based. More formally, financial structure is defined as the degree to which a country has a bank-based or market-based financial system (Demirguc-Kunt & Levine 2001).

The empirical literature on the effect of financial structure on economic growth is not as extensive as the empirical literature on the role of financial development in economic growth. Goldsmith (1959) notes the lack of an accepted conceptual definition of financial structure, and how it should be measured. Recent studies on financial structure and economic growth featuring Germany and Japan as bank-based financial systems, and the United States of America (US) and the United Kingdom (UK) as market-based financial systems therefore made use of country specific definitions of financial structure (Luintel et al. 2008). Generalizations were then reached on the relevance of financial structure, after these studies showed that financial structure was important in explaining growth in these four economies. However, Beck & Levine (2002) note that the evidence from analysis of these countries cannot be generalised, because of their shortcomings. The studies argue that Japan performed better than the US in the 1980s because it was more “bank-based”. However, this view changed in the 1990s when poor economic performance was recorded in Japan (Stulz, 2001). Most subsequent empirical studies investigated developed countries because of the availability of data and the existence of functional stock markets.

Sub-Saharan Africa (SSA) has not been widely studied, given the nonexistence of stock markets in many countries in the region. Stock markets in SSA are relatively new, with the majority established after 1989 (Yartey & Adjasi 2007). Prior to this, there were only five stock markets in SSA[1]. This is not the case for developed countries, with established stock markets, which have been shown to play a positive role in promoting growth in these countries (Arestis et al. 2001). This positive contribution of stock markets to economic growth is one of the reasons why countries in SSA were encouraged to set up stock markets. There was also the idea that establishment of stock markets was a global pattern and Africa needed to follow suit. Kenny & Moss (1998) note that stock markets were seen as a prestige project that every country needed to have at the time.

To date, despite numerous studies on the topic, there is hardly any consensus on the relative importance of bank-based vs market-based financial systems (Luintel et al. 2008). This has been attributed to a number of reasons which include the use of different indicators to define financial structure, the sample groupings of panel based studies, as well as the methodological approaches used. Panel/cross sectional studies, for example largely show that financial structure does not matter. However, the failure to account for sample heterogeneities is one of the major criticisms of panel based studies. But even if one accounts for panel heterogeneities as in Luintel et al. (2008), there is a lack of consistency between panel based parameter estimates and time series parameter estimates.

This study contributes to the literature by providing additional evidence from SSA on the role of financial structure on economic growth. This is made possible by the availability of the Global Financial Development Database (GFDD), an extensive dataset of financial system characteristics for economies across the globe (Cihak et al. 2012). The contribution of this study is therefore fourfold. First, it provides empirical evidence from SSA, a region that has not attracted much research interest on the topic. Second, it considers both the short-run and the long-run dynamics of financial structure on economic growth. Third, it accounts for the level of financial development in the analysis. Finally, it accounts for cross country heterogeneity by making use of the Pooled Mean Group (PMG) estimation method of long-run relationships in dynamic heterogeneous panels proposed by (Pesaran et al., 1997, 1999).

The rest of the paper is organised as follows: Section 2 provides an overview of the theoretical and empirical literature on financial structure and growth, section 3 covers financial structure in SSA, section

[1] South Africa, Kenya, Nigeria, Zimbabwe and Cote d'Ivoire

4 discusses the data and methodology, while our empirical results are given in section 5. Finally, section 6 concludes.

2 Theoretical and Empirical Literature Review

2.1 Theoretical Literature

Theoretically, there are a number of avenues through which development in the financial sector can boost economic growth. First, the financial sector can increase savings, and thereby increased resources available for investment. Second, it could increase productivity of investment as a result of efficient allocation of saving. Third, through monitoring of investments as well as ensuring corporate governance once finance has been provided by financial institutions. Fourth, it can lead to reduction in transaction cost which promotes specialisation, technological innovation and eventually growth (Murinde 2012; Levine 2005; Ghirmay 2004). Both banks and stock markets mobilise savings for eventual allocation to investments. They are also involved in enhancing productivity by pooling consumers' liquidity risk, so that consumers have no need to hold savings in liquid but unproductive investments.

Although they provide similar services, banks and stock markets differ in the way they offer these services. For example, bank-based systems provide inter-temporal risk sharing, whereas cross-sectional risk sharing is provided in market-based systems (Boot & Thakor 1997). Such differences have led to arguments for a well-developed banking system, while others favour a well-developed market based system. Another difference is in the way banks and markets conduct their transactions. While markets are more arm's length in their transactions with firms, banks closely monitor firms and identify promising entrepreneurships to fund. Banks are therefore directly involved in project selection, making capital from the banking sector more expensive (Ray & Chakraborty 2006). Despite these differences, there is no theoretical consensus on the merits that accrue to a country in having a bank-based or a market-based financial system (Luintel et al. 2008).

Financial structure is commonly evaluated on the basis of the main competing theories, which include the bank-based theory, market-based theory, financial services theory, and the law and finance view (Levine 2002; Arestis et al. 2004; Luintel et al. 2008). Incorporating financial structure in modelling growth entails augmenting the classical growth model with measures of financial structure. We explain each theory below.

Bank based theory is anchored in the dominance of the banking system in a country. The advantages of having a bank based system differ for given levels of economic development. For example, it has been

argued that, at the early stages of development[2], banks outperform markets (Ray & Chakraborty 2006). This is because banks are in a better position to resolve agency problems in a system characterized by asymmetric information. This theory therefore advocates for stronger bank based systems rather than market based systems because banks play a more effective role in financing development than financial markets, and more so in developing countries. The argument here is that market based systems reveal information publicly, and therefore investors have no incentive to seek and acquire information. Bank based systems, instead, focus on forming long term relationships that guide their engagements with agents. This results in better resource allocation for banks (Levine 2002; Levine 2005; Allen & Carletti 2008). It is also shown that markets are prone to free riders. That is, an outsider may spend time and money looking for information for decision making, and this information is then easily passed on to other investors, making the outsider incur more costs than the rest.

Characteristics to take into account when recommending bank based financial systems include, *inter alia*, the political organisation of the society and the legal and regulatory framework. For example, Bhattacharyya (2013) argues that non-democratic societies have bank based financial systems. This is because non-democratic political rulers can use their power to create monopolistic banks that are beneficial in providing credit to them. Thus, non-democratic societies tend to push for a bank based system. This results in a dominant underdeveloped banking system that is detrimental to growth (Bhattacharyya 2013). Studies also show that bank based systems tend to dominate in countries with weak legal systems (Rajan & Zingales 1998).

Market based theories emphasize the dominance of financial markets. The advantages of having a stock market based system is that it encourages specialisation as well as acquisition and dissemination of information. This reduces the costs of mobilising savings and encourages investment (Arestis et al. 2001). Proponents of this type of theory capitalize on the weaknesses of bank based theory, which is pegged on the inefficiencies of large powerful banks. Such banks can hinder the progress of innovation by extracting informational rents and protecting firms with close bank ties from competition, colluding with firm managers against other creditors, and impeding efficient corporate governance (Levine 2002). These theories claim that such inefficiencies are reduced in market based systems, and, thus, markets are better at enhancing economic growth and development. Another advantage of markets stressed by these theories is that, through the pricing system, they provide information feedback. For example, in equilibrium, prices provide firms with information, which in turn is used by firms to affect future market

[2] When a country is transitioning from a traditional economy to an industrialized one

prices. This is a form of market governance, which has a positive effect on economic performance (Boot & Thakor 1997).

When stock markets are well developed, they enhance corporate governance by mitigating against principal-agent problems (Arestis et al. 2001). Managers cannot divert funds from the core business of the firm for private gains, and therefore work more towards ensuring profitability. As such, markets rely more on contracts, and the strength of the legal system in enforcing contracts (Tadesse 2002). However, as noted earlier, in the presence of weak legal systems, banks are preferred. According to Porta, et al. (1998) British legal systems protect private property rights, and thus encourage the development of a market based system. They compare this to the French legal system, which supports a bank based system through supporting a judicial system that is close to redundant, with no protection for private property rights.

The *financial services view* is based on the premise that the source of finance does not matter but instead what matters is the availability and the efficient provision of financial services (Arestis et al. 2004; Levine 2002). This minimizes the importance of the role of banks and financial markets. When the financial system is functioning efficiently, it reduces information asymmetries and risk, and boosts the mobilisation of savings, and leads to efficient capital allocation (Peia & Roszbach 2014). However, if banks and financial markets are not efficient, the positive effect of finance on the economy cannot be guaranteed. As Beck et al. (2008) note, "*...on the debate between banks and markets, the suggestion that one type of system is clearly better than the other no longer has much support in the literature, whether for access or for financial sector development*" (p.70). The authors further argue that it is far much better to create an environment in which both systems optimise their activities. At the same time, they acknowledge that long term financing is better accessed from relatively large securities markets, while banks are more associated with the availability of short term financing. This suggests that banks and financial markets are not in competition with one another. Given that they are different components of the financial system, they ameliorate different costs, facilitate different transactions and provide different information in the system (Levine 1997; Boyd & Smith 1998; Beck et al. 2000; Demirguc-Kunt & Levine 2001). Governments should therefore be concerned with creating better functioning banks and markets (Levine 2002).

The literature also shows that banks and markets are substitute sources of corporate finance because, when a firm raises capital by issuing new equity, it reduces its need to borrow from a bank (Arestis et al. 2001). As alluded to earlier, what determines the development of one system as opposed to another is

the characteristics and circumstances in a country, and this has a bearing on the effectiveness of the financial system. If banks are better able to handle agency problems than markets, then development of the stock market may hamper growth, especially if the market develops at the expense of the banking system. Whatever system emerges, given country specifics, ought to be able to provide adequate financial services. Therefore, the theory states, the type of financial structure is irrelevant.

A subset of the financial services view is the *law and finance view,* which borders on enforcement of financial contracts. It emphasizes the need for a strong legal and regulatory framework that can protect the rights of financial players. Theory postulates that an efficient legal system is far better placed to support financial transactions, regardless of whether they are being provided by banks or markets. When property rights are protected and rules and regulations are rightfully enforced, a country's financial system benefits and develops (Porta, et al. 1998; Rajan & Zingales 1996). This development can stem either from the banking system or from the market system, or from both, and the source of financial development is irrelevant. This view therefore concludes that financial development is more likely to occur in an environment that protects the property rights of players in the financial system.

The above theories have given rise to numerous empirical studies that seek to test the validity of each view. The results vary depending on the approach, as well as the indicators used to measure the different aspects of financial structure. These include measures of size, activity, and efficiency of both markets and banks (Levine 2002; Tadesse 2002; Beck & Levine 2002) as well as indicators of laws and regulations (Levine et al. 2000).

2.2 Empirical literature

Overall, cross-sectional studies tend to show that financial structure does not matter for growth (Luintel et al. 2008). Their critics make the observation that these studies do not take account of cross country heterogeneity. These studies show that financial structure is irrelevant in explaining growth, noting that what matters is the level of financial development (See for example Levine (2002)). This view is supported by results obtained from studies on the effect of financial structure on industry level growth (Beck & Levine 2002), as well as from studies on the effect of financial structure on investment (Ndikumana 2005). These studies support the view that banks and stock markets are complementary and not competitors. However, other studies (Luintel et al. 2008; Tadesse 2002) show that financial structure matters. We explain and evaluate these findings below.

A study by Levine (2002), of 48 developed and less developed countries shows that financial structure is irrelevant in explaining growth, and these results were robust to a number of sensitivity tests, that included different measures of financial structure. This is among the earliest cross-country studies on financial structure and growth, with four countries from SSA, South Africa, Ghana, Kenya, and Zimbabwe included in the study. The author defines overall financial structure as the first principal component of three components of financial structure, namely activity, size, and efficiency. Activity is measured as the activity of the stock market compared to the activity of banks. Size is measured as the size of stock markets compared to that of banks, Efficiency is measured as efficiency of stock markets relative to that of banks. Pinno & Serletis (2007) use the same dataset and variables defined by Levine (2002), and account for cross country heterogeneity by employing Bayesian classification, and find that financial structure matters. Their findings lead them to conclude that market-based systems are more advantageous for developed countries, while bank-based systems benefit developing countries. They explain that their findings differ from those of Levine (2002) because they account for cross country heterogeneity, unlike Levine (2002) who assumes equality of parameters across countries in his study.

The same financial structure indicators are used in Beck & Levine (2002)[3]. Their study examines whether a country's financial structure influences the formation of new establishments, capital allocation, and the growth of industries with different dependence on external finance. Their study is a cross country/cross industry analysis of developed and developing countries. Their sample consists of data from 42 countries and 36 industries averaged between 1980 - 1989, with four countries from SSA, Kenya, Zimbabwe, South Africa, and Nigeria, included in the sample. The authors find that financial structure has no significant impact on industry growth patterns. Rather, industries that rely heavily on external finance grow faster in countries with well-developed financial systems. Classifying a country's financial structure as either bank based or market based is thus not useful for the purpose of promoting industry growth or efficient capital allocation. Countries seeking to promote industry growth should instead focus on ensuring overall financial development, regardless of the source. Ndikumana (2005) comes to a similar conclusion that it is overall financial development that matters, and not whether a country's financial system is bank based or market based.

Contrary to the above findings, Tadesse (2002) using industry level data for a panel of both developed and less developed countries finds that financial structure matters. The author notes that the effectiveness of financial architecture (financial structure) depends on the level of development of the financial sector,

[3] This is in addition to regulatory restrictions of banks and state ownership of the assets of the ten largest banks

and the prevalence and severity of agency problems in the country. Thus, the superiority of a financial system is dependent upon its effectiveness in performing the functions it has been mandated to perform. This means that, in some countries, banks will have a comparative advantage, while in others, markets will have a comparative advantage. The study shows that banks outperform markets in countries with underdeveloped financial systems and in countries dominated by small firms. The opposite holds true, that is, countries with well-developed financial systems do better economically if they are market based than if they are bank based.

Likewise, Luintel et al. (2008) find that financial structure matters in some countries in their sample[4]. Their study compares results from time series analysis with those from panel estimates of the same countries. Using a dynamic heterogeneous panel approach, they estimate the within-dimension parameter estimates and find that financial structure matters for growth. Specifically, their results show that market-based financial systems are more important for growth than bank-based financial systems. Noting the differences between their findings and those of other cross sectional studies, including Beck & Levine (2002); Levine (2002), the authors point to the differences in methodologies and the treatment of cross country heterogeneity, which, if taken into consideration could reconcile the distinctly different sets of results (Luintel et al. 2008)

A number of time series studies on financial structure and economic growth show that financial structure matters for growth (Arestis et al. 2004; Peia & Roszbach 2014; Luintel et al. 2008; Arestis et al. 2001). It has been shown that conclusions from cross country growth regressions may lead to incorrect inferences for the different panel units included in the sample (Arestis et al. 2001). This is because panel based studies mask important country specific characteristics. Parameter heterogeneity across the panel units can also lead to wrong conclusions (Luintel et al. 2008). The authors posit that countries *"exhibit different production structures, levels of banking, financial and capital market development"* (pg.5) necessitating country specific analysis.

From an empirical analysis of five developed economies, Arestis, et al. (2001) conclude that the effect of banks on growth is more powerful than that of stock markets. They posit that the effect of stock markets may have been exaggerated by studies that utilize cross country growth regressions. They use the log of stock market capitalisation and the log of domestic bank credit as ratios of GDP, to account for stock market and banking sector development respectively. They argue that cross country growth

[4] Argentina, Brazil, Greece, Mexico, Philippines.

regressions can only provide a general view on the relationship between finance and growth, and this can vary when considering individual countries. Arestis, et al. (2004) conclude that financial structures can have a significant effect on the level of output in some countries but not in others, in their analysis of a sample of six developing countries. They show that market based systems were more conducive for growth in Greece, Taiwan, South Korea and India, while a bank-based system was more conducive for growth in South Africa. Their study showed that, in the case of Philippines, however, financial structure was insignificant in explaining growth.

Reviewing the empirical literature, it becomes obvious that conflicting conclusions have been reached, based on the methodologies used as well as the assumptions of either homogeneity or heterogeneity made concerning the countries used in study samples. This study takes into consideration the shortcomings of previous studies, including cross country heterogeneity overlooked by Levine (2002) and Beck & Levine (2002), but considered in Luintel et al. (2008) and Pinno & Serletis (2007). It also takes into account both long-run and short-run dynamics. The study focuses on SSA countries, classified as predominantly bank-based and influenced by similar technologies, and makes the assumption of a common long-run relationship between financial structure and economic growth plausible, while allowing the convergence dynamics of the long-run and the short-run to differ. This is made possible by the use of the pooled mean group estimation method by Pesaran et al. (1999) and Pesaran & Smith, (1995), which combines average and pooling methods of panel data estimation.

3 Financial structure in Sub-Saharan Africa

SSA consists of 48 countries most of which are characterised by underdeveloped financial systems. The majority of the financial systems were inherited from the countries' former colonies. South Africa and Mauritius are exceptions, given their more developed financial systems. In the years after independence[5], many of the financial systems were characterised by financial repression, directed credit and state ownership of financial institutions, mostly banks. The majority of the countries did not have stock markets and non-bank financial institutions like insurance companies, mutual funds, pension funds, and development banks. Most stock markets in Sub Saharan Africa were established after 1989 (Yartey & Adjasi 2007). Prior to this date, there were only five stock markets in SSA (South Africa, Nigeria, Kenya, Zimbabwe, and Cote d'Ivoire). A large proportion of the population was un-banked, and in those countries with stock markets, Africans were not allowed to participate in these markets (Allen et al., 2011). This changed with the extensive privatisation of state-owned banks, following the structural

[5] Most countries in SSA gained independence in the early to mid-1960s

adjustment programmes of the World Bank in the mid-1980s, and the liberalisation of financial systems, which led to financial deepening, emergence of new products as well as the use of new technologies (Honohan & Beck 2007).

The financial structure of the majority of SSA countries is still dominated by the banking sector, with very low trading activity in financial markets (Standley 2010). The stock markets are still characterised as immature, despite having been in existence for over two decades. In the last decade however, effort has been geared towards developing, deepening and integrating existing stock markets, as well as creating new markets. Even though the financial sector in SSA is characterised as bank-based, this is not because the banking sector is significantly well developed. Nyantakyi & Sy (2015) note that banks in Africa are shallower, with a limited network presence compared to other regions. Financial development, measured by the ratio of domestic credit available to the private sector by deposit taking institutions compared to economic activity, was estimated at an average of 24 percent in 2014. The observation that the financial sector in SSA is bank-based is therefore in relation to the underdevelopment in the financial markets.

Beck, et al. (2009) compare financial structures in developing countries with those in high income countries. They note that the trend in high income countries is towards market-based financial systems, where markets are seen to deepen more than banks. However, they note that there has been no such trend in the bank-based financial systems in developing countries. A survey of the relevant literature shows that increased deregulation, liberalisation, and the advancement of information technology has changed the financial landscape across the globe (Boot & Marinč 2008). Goldsmith (1955) shows that financial intermediaries precede non-bank financial institutions (NBFIs) and stock markets in the initial stages of a country's growth. However, both NBFIs and stock markets surpass banks in size and importance as economies expand (Demirguc-Kunt & Levine 2001). Financial sectors in SSA countries are among the least developed in the world. Foreign banks have played a major role in the development of the SSA banking sector (Allen et al. 2011) while stock markets play a minimal role.

Information technologies, especially the use of mobile phones for mobile banking, are revolutionising banking in countries like Kenya, Uganda and Ghana. Thus, financial systems in SSA are experiencing changes in quality as well as quantity, leading researchers to evaluate the impact that this might have on economic growth. As banks and stock markets constitute the bulk of financial systems in SSA, we provide a detailed description of their evolution within the region. To put the regions' financial structure into perspective, we present a comparative analysis of the characteristics of financial structures of

developing regions over 1988 -2014, as well as those of the financial structures of the OECD, as a representative of high income developed countries.

3.1 Banking in SSA

Many countries in the SSA region inherited financial systems from their colonisers, and are dominated by foreign banks that were largely designed to serve colonial interests. Post-colonial governments embarked on nationalisation of existing banks, and set up new banks to address the developmental needs of their independent countries. To achieve this, interest rates were kept low and credit was directed to priority sectors (Fowowe 2013). However, by the early 1990s, after on average more than 20 years of independence, their financial systems were described in the 1990s as shallow, narrow, and undiversified (Popiel 1994). This was after financial reforms in the mid 1980s. Low lending rates, credit ceilings, and credit directed to priority areas meant that bank profit margins were low and credit was not being efficiently allocated. Many countries faced deteriorating economic conditions, macro-financial instability, fiscal imbalances, and financial distress.

The banking sector in SSA expanded rapidly from the early 2000s. Reforms, including financial liberalisation, the reduced role of government in deciding pricing, and allocating credit, and improvements in the institutional environment are among the major contributors to these changing dynamics (Marchettini et al. 2015). In the recent past, the region has experienced rapid economic growth given the prevailing favourable macroeconomic policies. Increased financial activity in SSA, coupled with improved regulation, has led to significant growth in the financial sector, with marked expansion of access to financial services. A major feature of the financial sector in SSA is the dominance of banking services, with commercial banks forming the backbone of financial services (KPMG 2015; Nyantakyi & Sy 2015; Marchettini et al. 2015). A notable feature among banking systems in Africa is their preference to purchase government securities rather than provide credit to the private sector (KPMG 2015; Allen et al. 2011). While banks do this mainly to avoid bad credit and remain profitable, it is seen as a hindrance to financial development, measured by the ratio of credit to the private sector to GDP. However, country specific conditions influence the flow of private credit. These include the size and diversification of the economy, macroeconomic conditions and the availability of natural resources (Marchettini et al. 2015). We therefore expects to see large heterogeneities in lending flows across SSA.

Foreign banks still have a strong presence in SSA, and the recent years have seen a rapid growth in Pan African banks (Marchettini et al. 2015). Reports show that foreign banks play a significant role in strengthening competition and promoting good governance and innovations in domestic banks. Foreign

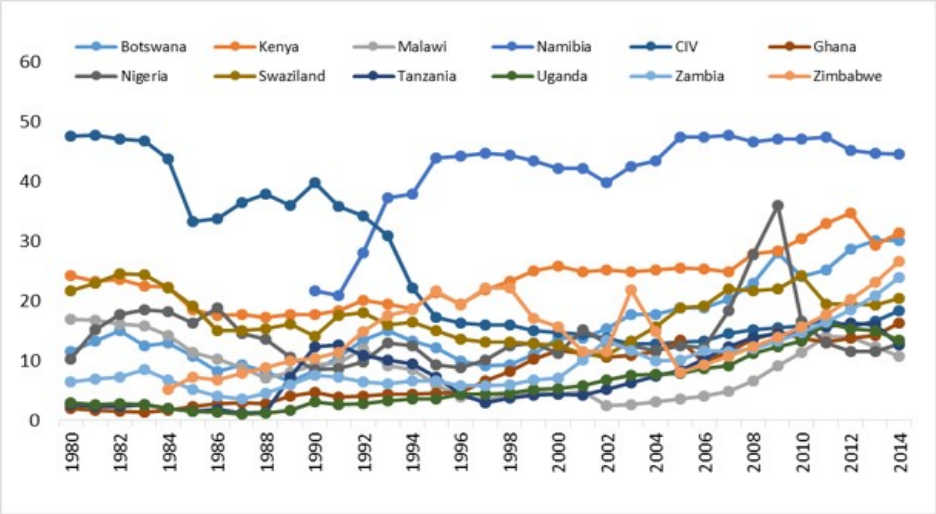
banks have also increased lending activities in SSA (Nyantakyi & Sy 2015; Allen et al. 2011). This is because foreign and private banks are considered more efficient than public domestic banks in SSA. Pan African banks, on the other hand, have been instrumental in bridging the financing gap created by the scaling back of European banks caused by the global financial crisis. The increased role of Pan African banks is also reflected in their taking the lead in the arrangement of syndicated loans in the region (Marchettini et al. 2015).

The penetration of the banking sector has deepened, albeit at a slow pace, in many countries in the region. Figure 1a shows trends in the ratio of private credit by deposit money banks to GDP for selected countries[6]. This ratio is often used as an indicator for the level of development in the banking sector. It is evident that in the late 1980s and early 1990s, there was a rapid development of financial systems in the sample countries, largely attributed to financial liberalisation policies. However, it was not until 2001 that a remarkable increase in financial development was seen in the region. Mauritius and South Africa are more financially developed than other countries in the region, as seen in figure 1b. With ratios of private credit by deposit money banks to GDP averaging at 51% and 59% respectively, their financial sectors are substantially more developed than the other countries in the sample. Financial development in South Africa dominated the region until about 2008. However, since the global financial crisis of 2007/2008, South Africa has experienced a decline in the ratio of private credit by deposit money banks to GDP, while Mauritius has continued to recorded increases. The growth in credit to the private sector has largely been attributed to an increase in prices of commodity exports from SSA and an increase in private capital flows. This is in addition to macroeconomic stabilisation. The rising trend in credit to the private sector is expected to continue, alongside stable macroeconomic environments and continued reforms in the financial sector.

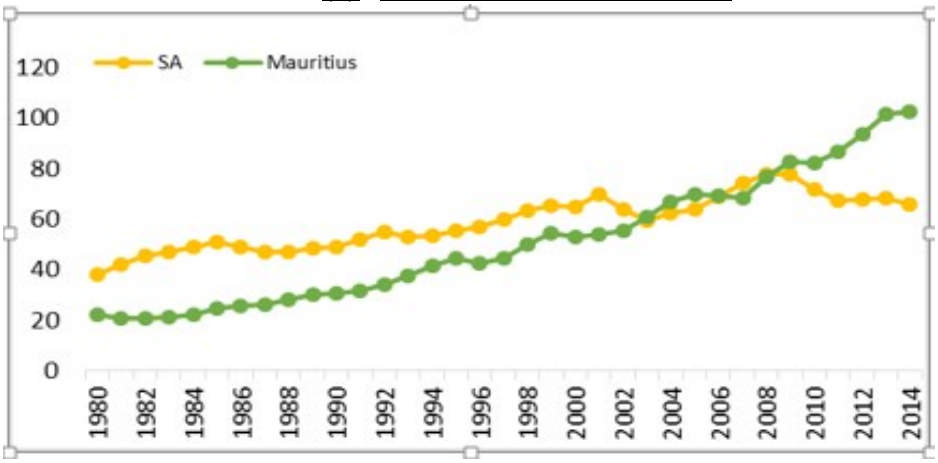
[6] The selection of countries was limited to countries with functional stock markets, to enable comparison of stock market developments

Figure 1: Ratio of Private Credit by Deposit Money Banks to GDP (%)

(a) Excluding South Africa and Mauritius



(b) South Africa and Mauritius

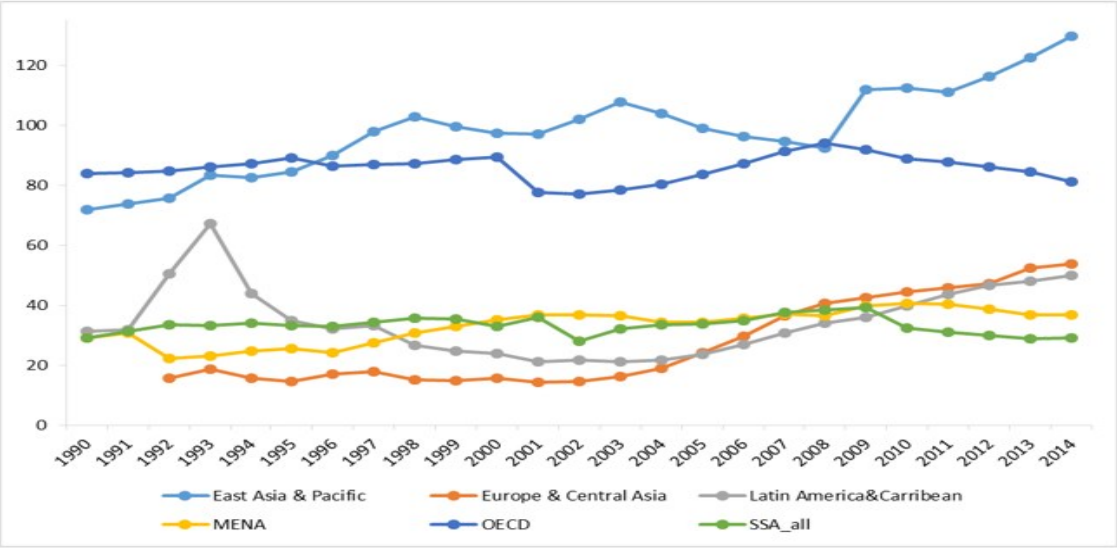


Source: Global Financial Development Database (GFDD) - 2016

Despite the growth in banking in SSA, the gap between SSA and the rest of the world, in terms of the depth of the financial sector, seems to have widened (KPMG 2015). Figure 2 shows how the ratio of private credit by deposit money banks to GDP in SSA compares to that of other developing regions, and the OECD as a representative of high income developed countries. It can be seen that countries in SSA perform worse than the OECD and developing countries in East Asia & Pacific. However, the region compares well with the Middle East and North Africa (MENA) region and performs better than Latin America, the Caribbean, Europe and Central Asia until 2009. Overall, though, the depth of the financial sector in SSA is the shallowest, and has been declining since 2009.

Reasons for the decline in the ratio of private credit by deposit money banks to GDP in SSA is the absence of strong legal institutions, and a lack of support for creditor rights. These lead to shallow financial sectors, with limited penetration of banking services (Nyantakyi & Sy 2015). To address the limited penetration of banking services, countries have resorted to innovative approaches to banking, which include mobile money accounts facilitated by the penetration of mobile telephony in the region. Kenya leads the way in mobile money accounts, which has allowed financial institutions in the country to reach a wider clientele. Other countries that have high usage of mobile money accounts include Botswana, Cote d'Ivoire, Rwanda, South Africa, Tanzania, Uganda, and Zimbabwe. The practice is, however, spreading across the region as countries have embraced it in a bid to expand financial inclusion. It is also expected that the rapid rise in Pan African banking, that is replacing the vacuum left by European banks after the global financial crisis will reverse this decline in credit to the private sector (Marchettini et al. 2015).

Figure 2: Private credit by deposit money banks to GDP (%): Comparison with other developingregions and OECD



Source: World Development Indicators, 2015

3.2 Stock markets in SSA

As noted earlier, not all countries in SSA have stock markets and many of the stock markets in SSA were only established in the late 1980s to early 1990s. Exceptions are South Africa, Zimbabwe, Kenya, Nigeria and Cote d'Ivoire[7] whose markets were established in 1887, 1946, 1954, 1961, and 1976 respectively. A number of reasons have been given to justify establishing stock markets in SSA. Besides

[7] Cote d'Ivoire currently serves as a regional stock market for the West African region

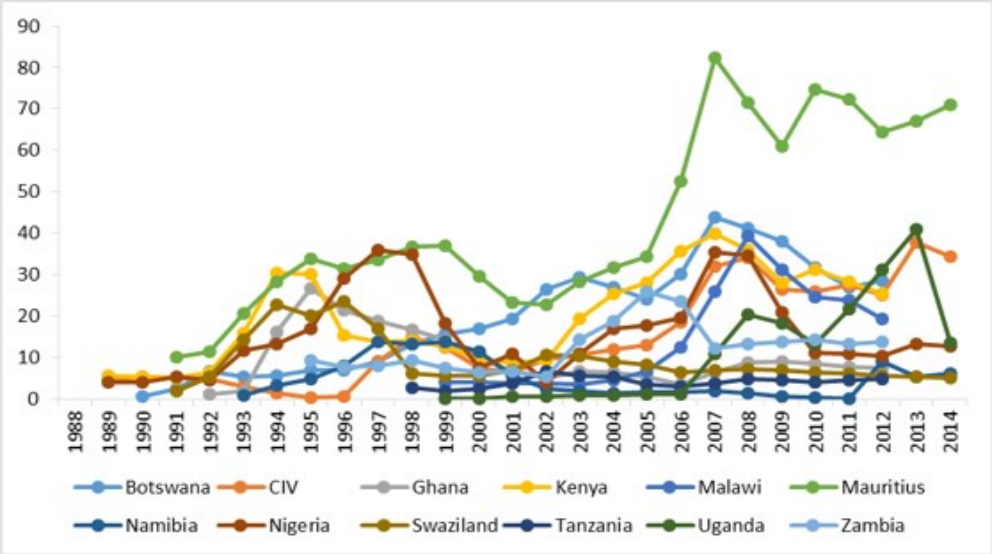
the view that establishment of stock markets is a global trend and SSA countries should not be left behind, stock market development is seen as a natural progression of a financial sector development (Singh 1991). It is also an avenue through which developing countries can attract foreign portfolio investments. Nevertheless, stock markets in SSA have not experienced the same developments as developed and emerging economies. This has partly been attributed to a weak financial infrastructure, fear of political upheavals, bureaucratic inertia with weak regulation and slow clearance procedures, limited choice of companies to invest in due to limited listings and a lack of domestic participation. Domestic participation is thought to be one way to boost credibility of stock markets and act as a cushion against external capital flows (Kenny & Moss 1998). Addressing the above issues could lead to investor confidence, thus, boosting active participation in the stock markets.

Figures 3a and 3b show the trend in market capitalisation and value traded as ratios of GDP respectively. There has been an increase in the total value of the shares listed in the various stock markets, as seen by the ratio of stock market capitalisation. For example, the ratio increased from around 7 percent to 29 percent in Botswana between 1992 and 2012. During the same period, it increased from 6 percent to 25 percent in Kenya and 1.2 percent to 8 percent in Ghana. However, there was a significant drop in stock market capitalisation for most countries in 2007/2008, which coincides with the global financial crisis. South Africa dominates other countries, with an average of 176% during the same period (see note for the figure). The average stock market capitalisation relative to economic activity for the sample countries (including South Africa and Mauritius) is 30 percent. However, it is a mere 18 percent when we exclude South Africa and Mauritius.

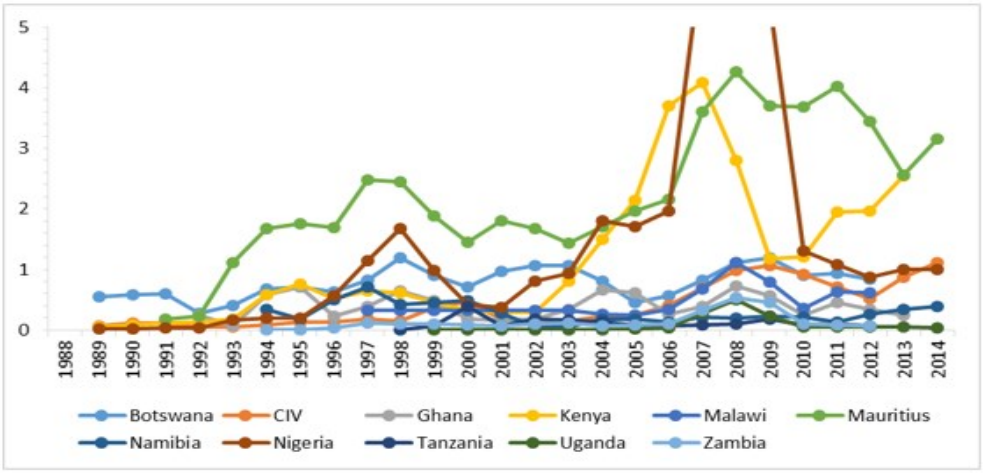
Stock market activity (measured by the ratio of stock market value traded to GDP) is also dismal in almost all markets. Figure 3b shows that, on average, stock market value traded relative to GDP is below 5 percent. South Africa is exceptional, with an average ratio of stock market value traded relative to GDP of 39 percent (not shown on graph). Kenya has an average of 1.2 percent, while in Nigeria, the average is 2.13 per cent. Another feature of stock markets in SSA is the high volatility of trades. For example, while the average for the whole period in Nigeria is 2.13 per cent, it recorded a value traded of 9 percent of GDP in 2008, but this fell to 1.3 percent in 2010. Likewise, Zimbabwe had an average value traded of 39 percent in 2002, which dropped to 2.3 percent in 2004.

Figure 3: Ratio of Stock Market Capitalisation and Value traded to GDP (%)

(a) Ratio of Stock Market Capitalisation to GDP (%)



(b) Ratio of Stock Market Value Traded to GDP (%)



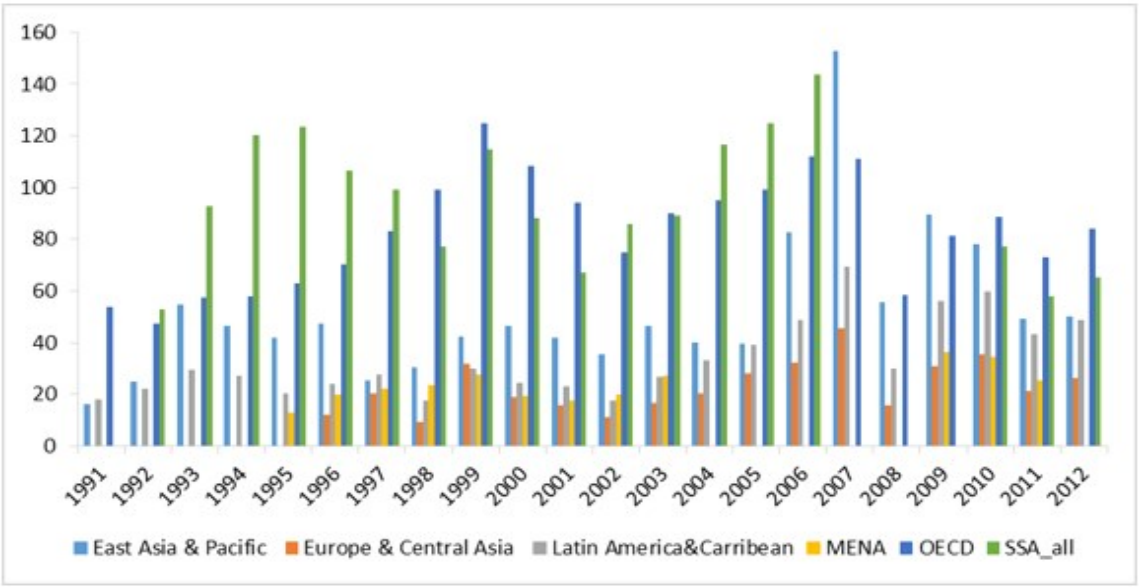
Source: Global Financial Development Database, 2016

We have excluded South Africa and Zimbabwe in fig 3a because i) South Africa has very high values and ii) Zimbabwe has two extreme data points, making the graph unreadable. In Fig 3b, we also exclude South Africa and Zimbabwe for the same reasons, and exclude Swaziland for an extreme data point in 1997 that distorts the graph. These graphs for South Africa are presented in appendix A.4. We also allow one data point for Nigeria to extend above the graph to make the graph readable. These data points, are however, not excluded from the analysis

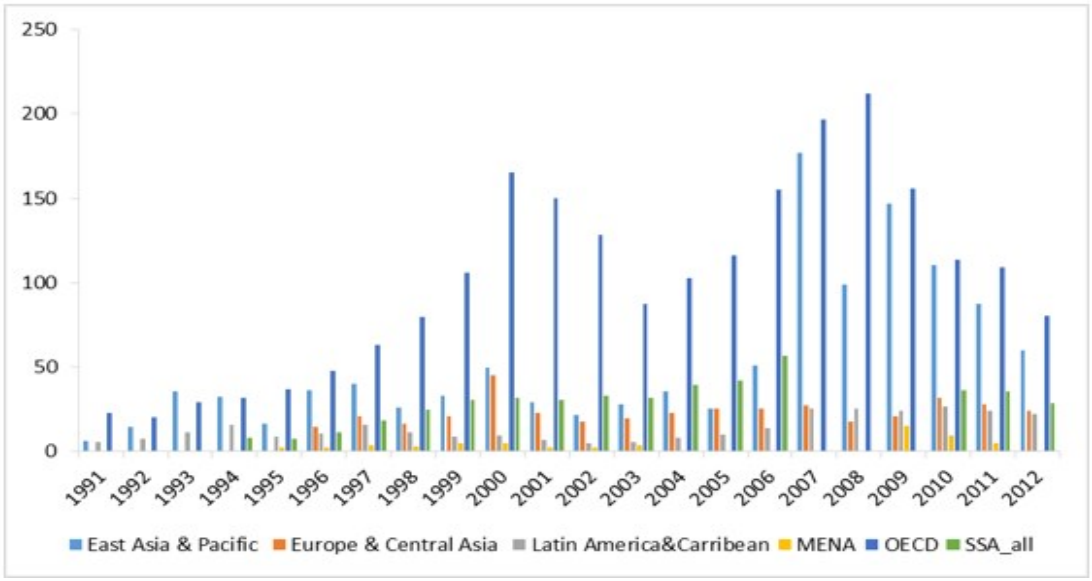
Compared to other developing regions and the OECD (see figures 4a and b), SSA seems to be better capitalised than the other developing regions but less so than the OECD. What is most notable is that even though SSA is better capitalised than East Asia and the Pacific, the latter has more active markets than SSA, as seen in the ratio of stock market value traded to GDP (figure 4b). This illustrates the observation that countries can have large but relatively inactive stock markets (Levine 1999).

Figure 4: Comparison of stock market indicators

(a) Stock market capitalisation (% of GDP): Comparison with other developing regions and OECD



(b) Stock market value traded (% of GDP): Comparison with other developing regions and OECD



Source: World Development Indicators

From the figure 4, it is evident that countries in SSA have seen a remarked increase in the size of their stock markets (as measured by the ratio of stock market capitalisation to GDP), which has been higher than other developing countries. However, excluding South Africa and Mauritius, banking sector development is more rapid, with the ratio of private credit by deposit money banks to GDP averaging 21%, compared to the ratio of stock market capitalisation to GDP, which has an average ratio of 18%.

This implies that the financial sector in the region is more bank-based. When we compare stock market activity with banking sector activity, we also find that the dismal activity in stock markets, despite their size, is an indication of more reliance on the banking sector. It is because of the underdevelopment of the stock markets in most of the countries that banks tend to play the primary role in their financial systems. Should developments in the stock markets continue at the pace recorded after 2000, there is a possibility that countries could see a move towards more market-based financial systems. However, this has to go hand in hand with a strengthened financial infrastructure, enforcement of financial laws and regulations, and macroeconomic and political stability.

The above analysis also shows that, despite the generalisations of financial sectors in SSA, there are marked heterogeneities, with South Africa and Mauritius having more developed financial systems relative to the other countries in the sample. It will therefore be important in our analysis to exclude the two countries, for a robustness check.

4 Model specification, Methodology and Data

4.1 Model specification and methodology

To empirically examine the long-run relationship between growth and financial structure, we adopt a standard growth model, following the work of Levine (2002). The standard growth model establishes a behavioural relationship among the variables of interest, from which we can derive a production function. We assume a Cobb-Douglas production function that uses capital (*K)* and labour (*L)* in the production of output (*Y)*. It takes the form;

$$Y = F(AK^{\alpha}L^{1-\alpha}) \tag{1}$$

Where *A* is a measure of technological efficiency. In order to identify the role of financial structure (FS), we augment the above equation with indicators of financial structure. Expressing equation (1) in its logarithmic form and augmenting it with the *FS* indicator gives us equation (2) below.

$$y_{it} = \beta_0 + \beta_1 FS_{it} + \beta_2 X_{it} + \varepsilon_{it} \tag{2}$$

Where; i = 1,2.....*N* and t = 1,2.....T

FS_{it} = financial structure

X_{it} = control variables

ε_{it} = the error term.

Equation (2) is our estimation equation and, from it, we are interested in both the sign and significance of β_1 as FS_{it} is our key indicator variable for financial structure. A significant β_1 implies that financial structure matters for growth. A positive and significant coefficient implies that a market based system is more important for growth than a bank based system. A negative and significant sign implies that a bank based system is more important for growth than a market based system (Levine 2002; Luintel et al. 2008).

Several indicators have been used in the literature as proxies for the banking sector and stock market development. Given the lack of consensus on the best measures of bank and stock market development, studies have relied on indicators that approximate different aspects of these two channels (Gambacorta et al. 2014). The indicator of financial structure captures the development of both the banking system and the stock market. The most commonly used indicator from the banking sector is the ratio of private credit by deposit money banks to GDP (%) (PCR). The ratio of stock market capitalisation to GDP (%) (Mktcap) as a measure of the size of the stock market, and the ratio of stock market value traded to GDP (%) (Vtraded) as a measure of stock market activity are the most commonly used indicators for the stock market (See for example Arestis et al. (2004); Beck & Levine (2002); Levine (2002); Luintel et al. (2008)).

The two components of the financial structure used in this study are financial structure size (FSsize) and financial structure activity (FSactivity) and are derived as shown below:

$$FSsize_{it} = log\left(\frac{Mktcap_{it}}{PCR_{it}}\right) \tag{3}$$

$$FSactivity_{it} = log\left(\frac{Vtraded_{it}}{PCR_{it}}\right) \tag{4}$$

Where;

$mktcap$ is the ratio of stock market capitalisation to GDP

$vtraded$ is the ratio of stock market value traded to GDP

PCR is the ratio of private credit by deposit money banks to GDP

There are different ways to obtain the overall index from the above components, including taking the first principal component as done by (Beck, Maksimovic, Demirgüç-Kunt, & Levine, (2000); Levine, (2002); Luintel et al. (2008). For this study, we use equation (5) below, adopted from D. S. Allen & Ndikumana (2000)[8]. This method is preferred to the first principal component method, as the latter

[8] The authors use the equation to obtain an aggregate measure of financial development

assumes that the direction with the largest variance is the most important. It is thus difficult to tell which component is contributing the most to the index.

$$FSindex_{it} = \frac{1}{m}\sum_{j=1}^{m}\left\{100 * \frac{FS_{jit}}{\overline{FS}_j}\right\} \quad (5)$$

Where j = 1, 2; i = 1 ,2.....,N

FS_{it} is the respective component of financial structure (size and activity)

$\overline{FS}_j$ is the sample mean of FS_{it}

m is the total number of indicators used to generate the overall financial structure. Larger values for the $FSindex$ indicate a more market-based financial system.

Establishing the determinants of growth is an open ended research agenda, and Levine & Renelt (1992) note that there is no consensus on a conditioning set of explanatory variables in growth regressions. They highlight over 50 explanatory variables identified in the literature. However, researchers generally use only a small subset of these. Growth related empirical studies predict that, besides capital and labour, as used in the Solow model (Solow 1956), there are other factors that affect growth in a country. These explanatory variables include fiscal policy variables, e.g. government expenditure, investment, trade policy indicators, e.g. exports, imports and exchange rate, and monetary and political indicators e.g. inflation, coups and revolutions, black market premium. (Mankiw, Romer, & Weil (1990) and Romer, (1990) also include human capital in their estimation. For example, in Africa the lack of trade openness, low levels of social capital, poor infrastructure, and high risk environment have been found to slow growth (Collier & Gunning 1999). Other indicators include extent of democracy and rule of law, fertility rates, life expectancy, infrastructure, ethnic strife, restrictive financial infrastructure, and human and physical capital (Kodongo & Ojah 2016; Kenny & Moss 1998). It is therefore important that our control variables include these specific indicators.

For this study, and based on data availability, we include life expectancy (*lexpectancy*) to proxy human capital, and democracy and rule of law (*polity*), government consumption (*Govcons*) to proxy for the size of government, degree of openness in a country (*Openness*), and inflation (*infl*) to proxy for macroeconomic stability. From equation (2), and incorporating our conditioning set, the empirical model to be estimated is expressed as;

$$yit = \beta_0 + \beta_1 Govcons_{it} + \beta_2 Open_{it} + \beta_3 infl_{it} + \beta_4 lepectancy_{it} + \beta_5 FS_{it} + \nu_{it} \quad (6)$$

The literature suggests that more financially developed countries tend to be more market-based. We therefore control for the level of financial development in our estimation, to check if financial development absorbs some of the effects of financial structure. This will be tested by estimating equation (7) below.

$$yit = \beta_0 + \beta_1 govcons_{it} + \beta_2 Open_{it} + \beta_3 infl_{it} + \beta_4 lepectancy_{it} + \beta_5 FS_{it} + \beta_6 FD_{it} + \upsilon_{it} \quad (7)$$

FD_{it} captures the level of financial development and, as in Levine (2002), this study makes use of the ratio of credit to the private sector by deposit money banks to GDP as a proxy for financial development.

The Auto Regressive Distributed Lag (ARDL) specification allows for a dynamic structure of the model, and is commonly used for estimating both short run and long run dynamics. To determine the appropriate lag length, we make use of the Akaike Information Criteria (AIC) and the Bayesian Information Criteria (BIC). Based on these lag selection criteria, and assuming an ARDL (1,1,1,1,1,1), equation (2-3) can be rewritten in its dynamic form to yield equation (2-5) (For notation purposes, we denote all the control variables as *X*).

$$y_{it} = \alpha_0 + \lambda_i y_{it-1} + \delta_{10} X_{it} + \delta_{11} X_{it-1} + \delta_{20} FS_{it} + \delta_{21} FS_{it-1} + \varepsilon_{it} \quad (8)$$

Expressing the above equation in its error correction form yields;

$$\Delta y_{it} = \varphi(y_{it-1} - \theta_0 - \theta_1 X_{it} - \theta_2 FS_{it}) + \delta_{10} \Delta X_{it} + \delta_{20} \Delta FS_{it} + \varepsilon_{it} \quad (9)$$

Where;

$\phi_i = -(1-\lambda)$; $\theta_0 = \frac{\alpha}{1-\lambda}$; $\theta_1 = \frac{\delta_{10}+\delta_{11}}{1-\lambda}$; $\theta_2 = \frac{\delta_{20}+\delta_{21}}{1-\lambda}$; Δ Denotes first differences; ε_{it} = the error term; and φ = Error correction term (ECT); θ = long-run elasticities, and δ_i = the short-run coefficients.

For a long-run relationship to exist, $\varphi \neq 0$ (Pesaran et al. 1999). Its magnitude represents the speed of adjustment back to the long-run after a change in one of the explanatory variables.

The above model requires that the error term, ε_{it} is independently distributed across time and across the group, and that it bears the usual assumption of zero mean and constant variance. A number of procedures have been developed that enable researchers to estimate the average long-run effects in panel data, as discussed in (Hsiao, Pesaran, Lahiri & Lee (Eds) (1999). These methods include i) Estimating separate regressions for each group and averaging the long-run coefficients over groups (Mean Group (MG) Estimation), ii) Pooling separate regressions by imposing a common slope, where the long-run relationship is estimated using fixed or random effects pooled regression, iii) Averaging the data over groups and estimating aggregate time-series regressions based on group averages, and iv) Averaging the data over time and estimating cross section regressions based on long time averages. However, these methods face a number of shortcomings. Pesaran & Smith (1995) show that the pooled and the aggregate time-series estimators are not consistent in dynamic heterogeneous panels even for large T and large N. Furthermore, Pesaran, Smith, & Im, (1996) show that the MG estimator does not take into account the panel dimensions of the data, and could therefore be seriously biased for small T, especially when T is small relative to N. Similarly, the pooled estimation methods can produce inconsistent and potentially misleading estimates of the average values of the parameters in dynamic models, unless the slope coefficients are identical.

Pesaran et al. (1999) propose an intermediate method, the pooled mean group (PMG) estimator. This, considers both pooling and averaging so that it allows the short-run coefficients to vary across countries, while restricting the long-run coefficients to homogeneity. The rationale for this estimator is that there are good enough reasons to expect the long-run equilibrium relationships between variables to be similar across groups. Its applicability in the Solow growth model is justified by the assumption that countries are exposed to the same technologies, making the long-run production function parameters similar. The estimator is based on maximum likelihood estimation and assumes that variables are either I (1) or I (0).

The PMG estimator is suitable when both the number of cross sections and time periods are large. However, Pesaran et al. (1999) consider its application when both panel dynamics (N and T) are small, and point out that the choice of the lag order is very important for such an application. These features of the PMG estimator thus make it more appealing for application in this study. Nevertheless, the homogeneity restrictions of the long-run coefficients will be tested using the Hausman specification test. This will entail comparing the MG and the PMG coefficient estimations. Pesaran et al. (1999) note that the PMG estimator is consistent and more efficient than the MG estimator, provided the homogeneity assumption holds. If this assumption does not hold, the MG estimator is more efficient. In both cases, the MG estimators are consistent.

Panel unit root test

The ARDL method does not require pretesting the data for the presence of unit roots, because the PMG estimator produces consistent results, irrespective of whether the variables are I (0) or I (1). But this is not the case if integration is higher than 1. In order to confirm the absence of I (2) variables, we use the Fisher-Augmented Dickey Fuller (ADF) and Fisher-Phillips Perron (PP) tests to test for panel unit roots. The advantage of the Fisher type test is that it does not require a balanced panel required by other tests[9]. The basic framework is given by;

$$\Delta y_{it} = \alpha_i + \rho_i y_{it-1} + \varepsilon_{it} \tag{10}$$

Where;

$H_0: \rho_i = 0 \; \forall_i$ and $H_1: \rho_i < 0$;

$i = 1,2, \ldots . . N; \; \rho_i = 0, i = N_1 + 1, N_1 + 2, \ldots . . N$

The Fisher type test entails combining the ρ values from the individual panels using the method proposed by Choi (2001) and Maddala and Wu (2001) as cited in Baltagi (2005), to obtain an overall test statistic. The test is then given by;

$$P = -2 \sum_{i=1}^{N} \ln \rho_i \tag{11}$$

The combined ρ-values from the unit root tests for each cross section are then used to test the unit root for the panel. If the ρ-value obtained is less than 0.05, then we reject the null hypothesis that the series is stationary at the 5% level of significance.

4.2 Data

The data used in this study is for a panel of 14 countries from SSA for the period 1980 - 2014, obtained from the World Bank's World Development Indicators (WDI) and the Global Financial Development Database (GFDD). As stock market data for some countries is not available for the whole time period, the actual length of data ranges from 15 to 34 years, with an average of 22 years. As noted by (Pesaran et al. (1999), the time period must be long enough to allow for time-series estimations for each country,

[9] For example, the test by Im, Pesaran and Shin (IPS), Levin-Lin-chu (LLC).

but need not be the same time period for each country. We therefore proceed with an unbalanced panel. The list of countries included in the study is provided in appendix A.2.

Our estimation includes economic and financial variables. Economic data, which constitutes our control variables, is obtained from WDI, while financial data is obtained from GFDD. The advantage of obtaining financial data from the GFDD is that it has already been adjusted to account for stock and flow variables, which has been a flaw in previous literature on financial structure and growth, e.g Levine, (2002). The main variables of interest for this study include real per capita GDP, which is our proxy for economic growth, private credit by deposit money banks to GDP (%) (PCR) from the banking sector, stock market capitalisation to GDP (%) (Mktcap), and stock market value traded to GDP (%) (Vtraded) from the stock market. Variables from the banking sector and the stock market will be used in the construction of our financial structure indicator. Our measure of democracy and rule of law (polity) is obtained from Polity IV, and is a measure of a country's governance system.
Further details about the data, sources and descriptions are provided in appendix A.1.

4.3 Descriptive statistics

As noted earlier, SSA is characterised by low levels of financial development, and this can be seen from the low ratios of the financial variables displayed in table 1. For example, the average ratio of private credit by deposit money banks to GDP (PCR) is 25% and ranges from 3% to 102%. This wide disparity is because the sample includes 5 countries[10] with averages of less than or equal to 10%, and South Africa and Mauritius, which have average ratios of 58% and 62% respectively. This is a reflection of the wide disparities in the levels of financial development in the region. The same disparities are displayed in the level of stock market development, as seen in the ratios of stock market capitalization (Mktcap) and stock market value traded to GDP (Vtraded). For example, Mktcap ranges from 0.01% to 488%. It is important to note that this extreme maximum value reflects an extreme value in Zimbabwe recorded in 2006 which will exaggerate the average stock market capitalisation. Stock market value traded, on the other hand, ranges from 0% (no activity) to the active South African stock market. The sample used in this study therefore consists of countries with different characteristics driven by different policies, and diverse historical backgrounds. The standard deviations show high variation in the real per capita GDP which further implies large differences in the income levels of the sample, which accounts for heterogeneity in our estimations.

[10] Ghana, Malawi, Tanzania, Uganda, and Zambia

Table 1: Descriptive statistics

Variable	N	Mean	SD	Min	Max
RPCGDP	323	2,082.78	2,050.86	205.43	7,116.59
PCR	323	25.06	20.41	2.59	102.54
Mktcap	323	35.78	56.53	0.01	487.82
Vtraded	323	4.58	12.39	0	75.47
FSindex	323	3.82	1.3	-0.27	7.59
Inflation	323	94.23	1,359.00	-0.81	24,411.00
Life expectancy	323	54.9	7.48	40.68	74.19
Govcons	321	15.63	5.01	2.05	30.07
Openness	323	77.01	30.79	30.89	202.85
Polity	323	2.46	5.9	-9	10

RPCGDP=Real per capita GDP in constant 2005 US dollars, PCR = private credit by deposit money banks to GDP(%), Openness=trade openness (ratio of exports + imports to GDP), Polity=measure of democracy ranging from -10 (least democratic) to 10 (most democratic), Mktcap=Stock market capitalisation to GDP(%), Vtraded= Stock market value traded to GDP(%)

The correlation coefficients (appendix A.3) display the relationship between the explanatory variables and per capita GDP. Real per capita GDP and private credit by deposit money banks (PCR), stock market value traded (Vtraded) and stock market capitalization (Mktcap) are positively and significantly correlated. This positive correlation implies that developments in the banking sector as well as in the stock markets may have a positive effect on growth. However, correlation may not always imply causation, and further analysis is required to establish if this positive correlation is indeed an indication of positive effects of finance on growth.

The results of the stationarity test shown in table 2 show that our data contains both I(0) and I(1) variables. This is an indication that we have both stationary and non-stationary variables. We employ both the ADF and the PP tests, with the ADF showing that FSindex, inflation, life expectancy, and government consumption are all stationary with real per capita GDP, PCR and openness 1st difference stationary. The Phillip-Perron, however, shows that FSindex and life expectancy are not stationary.

Table 2: Unit root test results

	ADF			PP		
Variable	Level	1st difference	Order of integration	Level	1st difference	Order of integration
RPCGDP	5.2904	-6.6646***	I(1)	5.5731	-10.6785***	I(1)
	-1.000	0.000		-1.000	0.000	
FSIndex	-2.6190***		I(0)	-0.8329	-9.7763***	I(1)
	-0.0044			-0.2024	0.000	
PCR	-1.0408	-10.9709***	I(1)	-0.6633	-12.1580***	I(1)
	-0.149	0.000		-0.2536	0.000	
INFLATION	-5.9001***		I(0)	-6.8754***		I(0)
	0.000			0.000		
LIFE EXPECTANCY	-22.0226***		I(0)	3.6064	0.7133	
	0.00			-0.9998	-0.7622	
GOVCONS	-3.0730***		I(0)	-3.0924***		I(0)
	-0.0011			-0.001		
OPENNESS	-1.2404	-10.4536	I(1)	-1.8357**		I(0)
	-0.1074	0.000		-0.0332		
POLITY	0.5594	-8.3915	I(1)	0.9919	-11.0103	I(1)
	-0.7121	0.000		-0.8394	0.000	

*** p<0.01, ** p<0.05, * p<0.1

RPCGDP=Real per capita GDP in constant 2005 US dollars, PCR = private credit by deposit money banks to GDP(%), Govcons= government final consumption expenditure to GDP(%), Openness=trade openness (ratio of exports + imports to GDP), Polity=measure of democracy ranging from -10 (least democratic) to 10 (most democratic), Mktcap=Stock market capitalisation to GDP(%), Vtraded= Stock market value traded to GDP(%)

5 Estimation results

Four sets of results using the PMG, MG and DFE estimation procedures are discussed in this section. Tables 4 and 5 depict the results including the full sample, first excluding and then including the indicator of financial development. On the basis that South Africa and Mauritius appear as outliers, results excluding these two countries are presented in tables 6 and 7, first excluding and then including an indicator of financial development.

Our sample of countries with stock markets is small and the time period of available data fairly narrow.(Pesaran et al. 1999) show that the choice of the lag order is very important in estimations with small T. This section thus covers our attempt to establish the optimal lag length using the AIC and BIC selection criteria. Table 3 shows that a maximum lag of 1 has the smallest AIC and BIC values, implying that an ARDL (1,1,1,1,1,1) is the preferred model.

Table 3: Lag selection criteria

		Including South Africa and Mauritius			Excluding South Africa and Mauritius		
Estimator	Lag selection	N	AIC	BIC	N	AIC	BIC
PMG	ARDL (1,1,1,1,1,1)	307	-1621.8	-1569.63	250	-1304.3	-1254.998
	ARDL (2,2,2,2,2,2)	307	-1371.63	-1326.95	238	-1105.55	-1056.937
MG	ARDL (1,1,1,1,1,1)	307	-1892.71	-1847.99	250	-1610.2	-1571.466
	ARDL (2,2,2,2,2,2)	307	-1610.2	-1565.52	238	-1254.6	-1216.405

Columns (1), (2) and (3) of table 4 present the first set of results. To correct for heteroscedasticity, the DFE results in column (3) have been adjusted with robust standard errors. The MG and DFE results (columns 2 and 3) indicate that the error correction term is negative and significant at the 1 percent significance level. This confirms that there is cointegration. The PMG results (column 1) are, however, inconsistent with the MG and the DFE results, with the results indicating an insignificant error correction term. The Hausman specification aids in selecting the preferred model, and the results shown at the bottom of the table reject the null hypothesis of simultaneity bias of the DFE that could arise due to the relationship between the error term and the lagged dependent variable. This implies that the DFE results are preferred to the MG results.

The results show that financial structure has no significant effect on growth, implying that financial structure does not matter for long-run growth. These results are consistent with existing literature (see Levine 2002; Beck & Levine 2002) which suggests that there is no economic significance of classifying a country's financial system as either bank-based or market-based. The control variables (of column 3) have the expected signs and significance. For example, inflation has a negative and significant effect on growth and a 10 percent increase in inflation leads to a 0.03 percent decline in growth. This is significant at 1 percent. An improvement in life expectancy, which is a proxy for human capital, has a positive effect on growth at 1 percent significance level, and likewise, an improvement in political governance will lead to a positive effect on growth. This is similar to findings by Kodongo & Ojah (2016), who show that democracy and rule of law have a positive and significant effect on growth, moreso in SSA. Government expenditure has a negative and significant effect on growth and a 10 percent increase in government expenditure leads to a 6 percent decline in growth.

Table 4: Financial structure and economic growth for the full sample excluding financialdevelopment

VARIABLES	PMG (1)	MG (2)	DFE (3)
FSINDEX	0.008	0.0353	-0.0825
	(0.0103)	(0.0259)	(0.0719)
Inflation	0.0000158	0,00861	-0.00034***
	(0.0000)	(0.0083)	(0.0001)
Life expectancy	1.636***	2.503**	2.525***
	(0.1600)	(1.1560)	(0.8370)
Govcons	0.301***	0.936	-0.599*
	(0.0799)	(0.8400)	(0.3240)
Openness	0.458***	0.0156	0.481
	(0.0999)	(0.5860)	(0.3820)
Polity	0.00973*	0.00847	0.0976***
	(0.0051)	(0.0074)	(0.0350)
ECT	-0.0573	-0.550***	-0.0374***
	(0.0371)	(0.1040)	(0.0123)
Constant	-0.161	-1.175	-0.108
	(0.1000)	(1.3980)	(0.1250)
Hausman	3.61	0.02	
Prob>chi2	0.7295	1.0000	
Observations	307	307	

*Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1*

RPCGDP=Real per capita GDP in constant 2005 US dollars, FSIndex =conglomerate measure of financial structure comprising of FS_activity and FS_Size, Govcons= government final consumption expenditure to GDP(%), Openness=trade openness (ratio of exports + imports to GDP), Polity = political governance

Columns (1), (2) and (3) of table 5 depict results, including an indicator of financial development. The ratio of credit to the private sector by deposit money banks to GDP has been used in the literature to measure financial development (see King & Levine 1993; Levine 2002). However, we suspect that there could be a high correlation between the financial structure indicator and the measure of financial development. However, the correlation coefficient results (appendix A.3) show that this is not the case, and the ratio of credit to the private sector by deposit money banks to GDP (PCR) is thus used. Furthermore, PCR represents the productive aspect of finance that is used for investment purposes and is therefore more closely linked to economic growth than other variables that have been used in the literature to measure financial development. These include the ratio of liquid liabilities to GDP, the ratio of broad money to GDP (M3/GDP), and the ratio of deposit money bank assets to GDP (see, for example, Allen & Ndikumana 2000).

The PMG, MG and DFE results are depicted in columns (1), (2) and (3) respectively of table 5. Like in the previous estimation, the DFE results are corrected for heteroscedasticity with robust standard errors. The PMG and DFE results depict an insignificant effect of financial structure on growth, consistent with

the results shown in table 4. Column (2) however depicts a significant a significant effect of financial structure on growth. The Hausman specification test aids in establishing the most preferred model based on efficiency and consistency of the estimates.

Table 5: Results on financial structure and economic growth for the full sample including financialdevelopment

VARIABLES	PMG	MG	DFE
	(1)	(2)	(3)
FSindex	-0.00612	0.0405***	-0.0521
	(0.0065)	(0.0149)	(0.0783)
PCR	-0.139***	-0.0363	0.082
	(0.0222)	(0.1830)	(0.2200)
Inflation	-0.0000219	-0.00452	-0.000351**
	(0.0000)	(0.0028)	(0.0001)
Life expectancy	2.328***	0.567	2.565**
	(0.0987)	(0.8540)	(1.1710)
Govcons	0.132***	0.0111	-0.604*
	(0.0185)	(0.2230)	(0.3600)
Openness	0.0687**	-0.0116	0.47
	(0.0277)	(0.0912)	(0.4630)
Polity	0.0251***	0.0167*	0.0879**
	(0.0073)	(0.0089)	(0.0408)
ECT	-0.160*	-0.601***	-0.0356**
	(0.0943)	(0.1560)	(0.0144)
Constant	-0.532	0.459	-0.118
	(0.3350)	(1.7960)	(0.1490)
Hausman	7.65	0.00	
Prob>chi2	0.3647	1.0000	
Observations	307	307	307

*Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1*

RPCGDP=Real per capita GDP in constant 2005 US dollars, FSIndex =conglomerate measure of financial structure comprising of FS_activity and FS_Size, Govcons= government final consumption expenditure to GDP(%), Openness=trade openness (ratio of exports + imports to GDP), Polity = political governance

As shown in the table, the Hausman test indicates that the PMG results are more efficient than the MG results, and the null hypothesis of no difference between PMG and MG cannot be rejected. Likewise, the Hausman test between the MG and the DFE indicates that the DFE is preferred to MG.

Despite the consistent results showing insignificant effects of financial structure on growth, the results also show that financial development has a negative and significant effect on growth (column 1). This is inconsistent with existing views, which postulate that the provision of financial services is what matters for economic growth, and not whether these services are provided by banks or stock markets. The expectation from literature, therefore, would be a positive and significant effect of financial development on growth, and an insignificant effect of financial structure. This expectation supports the financial

services view. We argue that, while the results on column 1 of table 5 are contrary to expectations, it has been shown that a restrictive financial infrastructure can be a barrier to development (Kenny & Moss 1998). Given the low levels of financial development in SSA, it is therefore not surprising to see a negative effect of financial development on growth. A well functioning financial sector is a necessary condition for positive gains to be felt on the economy. Furthermore, emerging evidence points to limited support for the relationship between financial sector development and growth in Africa (Menyah et al. 2014; Gries et al. 2009). Moreover, Favarra (2009) concludes that the relationship between financial development and growth is at best weak, and that finance matters for growth at the intermediate level, where financial sectors are relatively well development.

The results also indicate that an improvement in life expectancy and political governance has a positive and significant effect on growth (columns 1 and 3). Inflation on both columns has the expected negative sign, but it is insignificant from the PMG results. Likewise, trade openness has the expected positive sign from the PMG and DFE estimations, implying that it has a positive effect on growth. However, DFE results (column 3) depict an insignificant effect.

The error correction term is negative and significant in all the estimations, albeit with different speeds of adjustment. The negative and significant coefficient implies that there is cointegration with the PMG results, showing that 16 percent of the disequilibrium is eliminated in each short-term period. The DFE results in column 3, however, depict a slower rate of convergence to long-run equilibrium at 3 percent.

Excluding South Africa and Mauritius yields results consistent results with those shown in tables 4 and 5. These results are depicted in columns (1), (2) and (3) of table 2-6. Financial structure still shows an insignificant effect on growth from all three estimations (PMG, MG and DFE). The Hausman specification test shows that PMG is preferred over MG and that DFE is preferred over MG. The DFE results have been corrected for heteroscedasticity with robust standard errors. In all the estimations, the error correction term is negative and significant, implying that there is cointegration. Comparing the DFE results in tables 4 and 6 (column 3 in both tables), reveals that the results in table 6 depict slightly smaller magnitudes, with a faster speed of adjustment to the long-run equilibrium. While results in table 4 indicate a 4 percent adjustment speed, results in table 6 indicate a 5 percent adjustment speed.

Table 6: Financial structure and economic growth excluding South Africa and Mauritius

VARIABLES	PMG	MG	DFE
	(1)	(2)	(3)
FSindex	0.0132	0.0192	-0.0821
	(0.0111)	(0.0276)	(0.0555)
Inflation	1.57E-05	0.0115	-0.000236***
	(0.0000)	(0.0090)	(0.0001)
Life expectancy	1.519***	1.837*	2.492***
	(0.1630)	(1.0600)	(0.6850)
Govcons	0.307***	1.118	-0.418*
	(0.0840)	(0.9910)	(0.2320)
Openness	0.468***	-0.127	0.204
	(0.1020)	(0.6350)	(0.2900)
Polity	0.0113**	0.0107	0.0680***
	(0.0052)	(0.0083)	(0.0229)
ECT	-0.0754*	-0.567***	-0.0518***
	(0.0403)	(0.1180)	(0.0151)
Constant	-0.170*	-1.145	-0.118
	(0.0966)	(1.4260)	(0.1370)
Hausman	4.37	0.02	
Prob>chi2	0.6261	1.000	
Observations	250	250	250

*Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1*

RPCGDP=Real per capita GDP in constant 2005 US dollars, FSIndex =conglomerate measure of financial structure comprising of FS_activity and FS_Size, Govcons= government final consumption expenditure to GDP(%), Openness=trade openness (ratio of exports + imports to GDP), Polity = political governance

The signs and significance of the control variables are consistent with those obtained when we include South Africa and Mauritius. For example, an improvement in life expectancy and political governance has a positive and significant effect on growth. Including South Africa and Mauritius therefore does not alter the DFE results. However, the PMG results (column 1) depict a negative and significant error correction term, which is inconsistent with the results in table 4 that exclude South Africa and Mauritius. Nevertheless, the insignificant effect of financial structure on growth is consistent with previous estimations.

The final set of long-run results are presented in table 7, which exclude South Africa and Mauritius, but include financial development. As in previous results, financial structure has an insignificant effect on growth, as shown in columns (1) and (3) of table 7. Even though the results in column (2) show a significant effect of financial structure on growth, the Hausman results indicate that the PMG results (column 1) are preferred to the MG results (column 2), and that the DFE results (column 3) are preferred to the MG results. Comparing table 7 and table 5, the results indicate a faster adjustment speed to the long-run when South Africa and Mauritius are excluded, and financial development is included. The effect of financial development is found to be insignificant in the long-run. The results are inconsistent

with the financial services view that predicts a positive and significant effect of financial development on growth and an insignificant effect of financial structure on growth.

The short-run results show that financial structure is consistently insignificant in 10[11] of the 14 countries (appendix A.5 – A.7). In Zimbabwe, financial structure has a significant effect on growth, implying that financial structure matters in the short-run, as depicted in all the tables. The positive coefficient implies that the stock market is more conducive to growth in Zimbabwe than the banking sector. This is different for Malawi, where financial structure also has a significant effect on growth in the short-run, but the banking sector is found to be more conducive for growth than the stock market. It can be argued that the stock market in Malawi is young (established in 1996) compared to that of Zimbabwe (established in 1946). Activity in the stock market in Malawi is also very low (at less than 1 percent) with stock market capitalisation of less than 10 percent (see figures 3a and 3b). Financial structure is also found to be significant in Swaziland, but this is only after including financial development in the estimation (appendix A.5 and A.7). In both tables, the positive sign implies that the stock market is more conducive to growth than the banking sector.

Overall, the long-run results do not support the theories of financial structure. Specifically, the results do not support the bank-based view, the market-based view, or the financial services view. (See table 8 for a summary of the long-run results). Financial structure does not matter for economic growth in the long-run, and this is consistent across all the estimations. Similar conclusions are found in Levine (2002) and Beck & Levine (2002).

[11] Botswana, Cote d'Ivoire, Ghana, Kenya, Mauritius, Namibia, South Africa, Tanzania, Uganda, and Zambia

Table 7: Financial structure and economic growth excluding South Africa and Mauritius andincluding financial development

VARIABLES	PMG (1)	MG (2)	DFE (3)
FSindex	6.69E-05	0.0371**	-0.0777
	(0.0026)	(0.0169)	(0.0588)
PCR	-0.00527	-0.0615	-0.0511
	(0.0094)	(0.2070)	(0.1530)
Inflation	-3.34e-05*	-0.00324	-0.000247**
	(0.0000)	(0.0031)	(0.0001)
Life expectancy	1.687***	0.495	2.657***
	(0.0267)	(0.9830)	(0.6600)
Govcons	-0.00801***	0.0876	-0.431**
	(0.0029)	(0.2520)	(0.2180)
Openness	0.0836***	-0.0141	0.247
	(0.0151)	(0.1050)	(0.2670)
Polity	-0.000123	0.0200*	0.0688**
	(0.0012)	(0.0105)	(0.0278)
ECT	-0.241**	-0.629***	-0.0498**
	(0.1090)	(0.1890)	(0.0225)
Constant	-0.129*	0.124	-0.146
	(00683)	(21190)	(0.1040)
Hausman	6.38	0,00	
Prob>chi2	0.4967	1,000	
Observations	250	250	250

*Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1*

RPCGDP=Real per capita GDP in constant 2005 US dollars, FSIndex =conglomerate measure of financial structure comprising of FS_activity and FS_Size, Govcons= government final consumption expenditure to GDP(%), Openness=trade openness (ratio of exports + imports to GDP), Polity = political governance

Table 8: Summary of the long-run results

	Including South Africa and Mauritius		Excluding South Africa and Mauritius	
Variable	PMG results		PMG results	
	Without FD	With FD	Without FD	With FD
FSINDEX	Not significant	Not significant	Not significant	Not significant
FD	na	-	na	Not significant
Inflation	Not significant	Not significant	Not significant	-
Life expectancy	+	+	+	+
Govcons	+	+	+	-
Openness	+	+	+	+
Polity	+	+	+	Not significant
ECT	Not significant	-	-	-

Robustness check

Our results are robust to various sensitivity checks that include estimating the equations using the different components of financial structure (appendix A.4), sample grouping and exclusion/inclusion of financial development. From the summary on table 2-8, our results show that financial structure is consistently insignificant in all the four estimations, leading us to conclude that financial structure does not matter for the sample countries in our study. The PMG estimates in appendix A.4 also show that financial structure does not matter. These results were obtained from the individual components of financial structure (FS_activity and FS_size). Even though the FS_activity appears significant, the error correction term is not significant, and therefore we conclude that there is no long-run relationship. The results also show that FS_size has an insignificant effect, in line with the results obtained using the FSindex.

6 Conclusion

The effect of financial structure on growth has been widely researched, with inconclusive results. There has, however, been very little research on the effect of financial structure on growth in SSA, mainly because of the scarcity of data. Moreover, many stock markets in SSA are young compared to stock markets in developed countries. Using data from the recently updated GFDD, an extensive dataset of financial system characteristics for economies across the globe, this study tries to fill this gap in the literature by providing empirical evidence from SSA.

The study was carried out using data from 14 countries covering 1980 – 2014. Using dynamic panel estimation methods, financial structure was found to have an insignificant effect on growth in the long-run. This supports existing literature that shows that financial structure does not matter for growth, implying that there is no economic significance in classifying a country's financial system as either bank-based or market-based. The growth control variables used in the study were also found to have the expected sign and significance. For example, an increase in life expectancy and improvement in political governance were found to have a positive effect on growth, while high inflation was found to have a negative and significant effect on growth.

Including financial development, or excluding Mauritius and South Africa as outliers in the model did not alter the results. The results that financial structure does not matter were consistent across all the long-run estimations. As has been noted in the literature, stock markets in SSA are mainly a replication

of stock markets in the west, and therefore their establishment was not to meet the financial needs of the region. This could explain why financial structure does not matter in the long-run in the SSA region.

Financial structure was also found to be consistently insignificant in the short-run for 10 of the 14 countries (Botswana, Cote d'Ivoire, Ghana, Kenya, Mauritius, Namibia, South Africa, Tanzania, Uganda, and Zambia). Furthermore, while a market-based system was found to be more conducive to growth in Zimbabwe, a bank-based system was found to be more beneficial for growth in Malawi. This finding from the short-run estimates implies that forcing equality of parameters by assuming homogeneity (as was done for the long-run results) may lead to misleading generalisations about the effect of financial structure on growth based on regional studies.

The heterogeneous results found in the short-run provide evidence that results can vary considerably across countries depending on the institutional characteristics of the countries, as well as other country circumstances. The literature on cross country growth regressions reveals some scepticism around the robustness of econometric results derived from cross country regressions, and points out that there are econometric advantages in examining results from time-series analyses, as they provide useful insights from details that are hidden in averaged out cross country regressions. (see Levine & Renelt 1992; Arestis et al. 2001; Jones 1995 among others).

These results have important policy implications. While finance is important for economic growth, it is important for governments in SSA to focus on developing the banking sector to a level where it is able to support the financial needs of the economy, especially for small and micro enterprises, which are the engine for growth in the region. These enterprises have been shown not to participate in stock markets, because they do not meet the listing requirements. They therefore do not benefit from the existence of a stock market. However, the London Stock Exchange Alternative Investment Market (AIM) has in the past offered a platform for the listing of smaller growing firms from SSA looking to raise capital through Initial Public Offers (IPOs) (Tyson 2015). The Exchange has also established partnerships with regional exchanges in SSA to provide technical support for capital market development in the region. Most recently, stock markets in SSA have begun establishing market segments that cater for SMEs. For example, Kenya, Zambia and Ghana opened up market segments for listing of SMEs in 2013, 2015 and 2013 respectively.

For example, the Johannesburg Stock Exchange in South Africa set up the AltX market for SMEs in 2003, the Mauritius Stock Exchange set up a development and enterprise market for SMEs in 2006,

Kenya, and Ghana[12] opened up market segments for the listing of SMEs in 2013, and Zambia did the same in 2015.

In countries with underdeveloped banking sectors, the priority should be to develop the banking sector first, and later on develop the stock market, with a focus on the alternative investment market segments targeted for SMEs. It is important to remove the bottlenecks that have hindered the banking sector from contributing to growth.

A limitation of this study is the lack of a large enough sample size, due to data limitations. This restricted the analysis to 14 countries in a region that consists of 48 countries. As more data becomes available from countries with existing stock markets, and as countries expand access to finance, further research will be needed on the economic benefits of bank-based vs market-based financial systems in SSA.

The study did not incorporate information from the recently established alternative investment market segments in some stock markets in the region, established to cater for SMEs in the region, again due to data limitations.

[12] The Growth and Enterprise Market (GEM) in Kenya, Lusaka Stock Exchange Alternative Market in Zambia and Ghana Alternative Market (GAM) in Ghana

Appendix A

A.1 Variable definition and data sources

Variable abbreviation	Description	Source
RPCGDP	Real per capita GDP (constant 2005 USD)	WDI, 2016
PCR	Private credit by deposit money banks to GDP (%)	GFDD, 2016
Mktcap	Stock market capitalisation to GDP (%)	"
Vtraded	Stock market total value traded to GDP (%)	"
Inflation	Inflation, Consumer price (annual %)	WDI, 2016
Life Expectancy	Life expectancy at birth (years)	"
Govcons	General government final consumption expenditure (% GDP)	"
Openness	Trade (% GDP)	"
Polity	A measure of the system of a country's system of governance. It ranges from -10 (total autocracy) to 10 (total democracy)	Polity IV

WDI =World Development Indicators and GFDD = Global Financial Development Database

A.2 Sample means of main variables

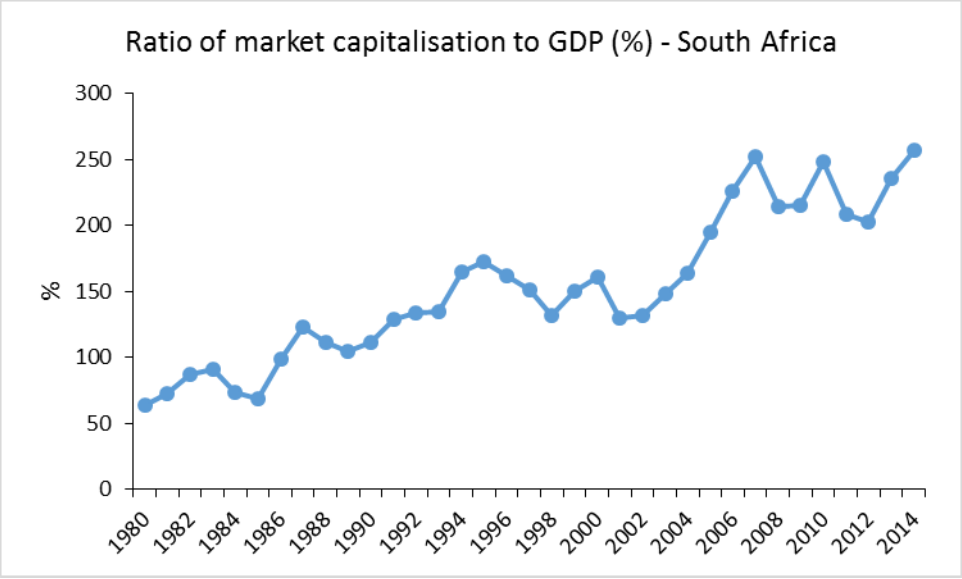
Country	Period	RPCGDP	PCR	Mktcap	Vtraded
Botswana	1990 - 2014	5,120.04	17.53	20.56	0.8
Cote d'Ivore	1989 - 2014	1,008.72	19.37	14.68	0.39
Ghana	1992 - 2014	513.78	10.34	9.76	0.39
Kenya	1989 - 2014	546.28	24.66	20.71	1.23
Malawi	1999 - 2014	235.93	7.11	16.38	0.52
Mauritius	1991 - 2014	4,929.19	62.8	42.86	2.25
Namibia	1994 - 2014	3,552.10	44.53	5.07	0.28
Nigeria	1989 - 2014	722.13	13.6	15.92	1.49
South Africa	1980 - 2014	5,302.59	58.68	152.11	28.53
Swaziland	1994 - 2014	2,302.29	16.9	9.57	2.64
Tanzania	1998 - 2014	456.94	10.05	4.1	0.11
Uganda	1999 - 2014	353.56	10.09	10.95	0.09
Zambia	1995 - 2014	731.7	8.46	12.84	0.14
Zimbabwe	1988 - 2014	557.28	16.83	76.34	8.9

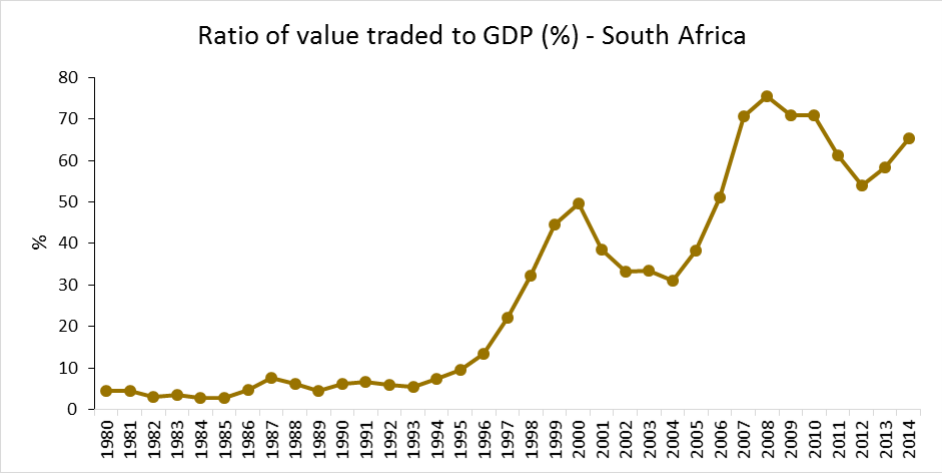
A.3 Correlation coefficients

	RPCGDP	Fsindex	PCR	Mktcap	Vtraded	Inflation	Life expectancy	Govcons	Openness	Polity
RPCGDP	1									
Fsindex	0.01	1								
PCR	0.7517*	0.02	1							
Mktcap	0.3213*	0.8274*	0.4615*	1						
Vtraded	0.3811*	0.7529*	0.5297*	0.7705*	1					
Inflation	-0.06	0.1138*	0	0.08	0.09	1				
Life expectancy	0.4629*	-0.1394*	0.5414*	0.1513*	0.2031*	-0.1	1			
Govcons	0.4628*	-0.09	0.3419*	0.02	0.1704*	-0.2336*	0.2363*	1		
Openness	0.4426*	-0.08	0.2652*	0.02	0.02	0.02	0.1902*	0.1739*	1	
Polity	0.4071*	0.1747*	0.3838*	0.3087*	0.4256*	-0.0682	0.5324*	0.1404*	0.0507	1

* denotes p<0.05

A.4 Ratio of stock market capitalization and Value traded to GDP for South Africa





A.5 Long-run Estimation results using different components of FS_activity and FS_size

Estimation results using FS_Activity				Estimation results using FS_SIZE			
VARIABLES	PMG	MG	DFE		PMG	MG	DFE
	(1)	(2)	(3)		(4)	(5)	(6)
FS_Activity	0.107***	0.053	-0.011	FS_Size	0.000353	0.0322*	-0.0956
	(0.0328)	(0.0592)	(0.0704)		(0.0021)	(0.0192)	(0.0711)
Inflation	-0.00741***	0.0047	-0.000372**	Inflation	-1.90E-05	0.00764	-0.000363***
	(0.0024)	(0.0054)	(0.0002)		(0.0000)	(0.0273)	(0.0001)
Expectancy	0.851***	2.723**	2.632***	Expectancy	1.672***	2.175	2.399***
	(0.1690)	(1.2650)	(0.8050)		(0.0140)	(4.0470)	(0.8420)
Govcons	0.404***	0.798	-0.637*	Govcons	-0.00860***	-3.411	-0.634*
	(0.1230)	(0.6790)	(0.3720)		(0.0025)	(2.4730)	(0.3430)
Openness	0.368***	-0.0436	0.426	Openness	0.0889***	-1.305	0.512
	(0.1290)	(0.4030)	(0.3580)		(0.0106)	(2.2230)	(0.3970)
Polity	0.00818	0.0316	0.0930**	Polity	4.45E-05	-0.0148	0.0969***
	(0.0062)	(0.0267)	(0.0389)		(0.0011)	(0.0202)	(0.0355)
ECT	-0.0377	-0.455***	-0.0362**	ECT	-0.189**	-0.523***	-0.0360***
	(0.0275)	(0.1190)	(0.0163)		(0.0955)	(0.1020)	(0.0122)
Constant	0.0408	-0.264	-0.12	Constant	-0.114**	-1.178	-0.0982
	(0.0371)	(1.3890)	(0.1610)		(0.0566)	(1.3750)	(0.1250)
Hausman		12.64	0.00	Hausman		10.44	0.03
Prob>chi2		0.0492	1.000	Prob>chi2		0.1074	1.000
Observations	311	311	311	Observations	311	311	311

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

A.6 Individual country short-run estimation results controlling for the level of financial development

Variables	Botswana	Cote d'ivore	Ghana	Kenya	Malawi	Mauritius	Namibia	Nigeria	South Africa	Swaziland	Tanzania	Uganda	Zambia	Zimbabwe
ECT	-0.025	-0.256***	0.0751**	-0.0278	-0.113***	-0.00899	0.0703	-0.133**	0.0578***	-0.0438***	-1.325***	-0.289***	-0.105**	-0.116***
	(0.0195)	(0.0589)	(0.0349)	(0.0392)	(0.0304)	(0.0115)	(0.0688)	(0.0581)	(0.0202)	(0.0111)	(0.2100)	(0.0628)	(0.0471)	(0.0263)
D.FSindex	0.0613***	0.0243	-0.0019	-0.00316	-0.0259**	0.00832	0.0048	0.0355*	0.00597	0.00435***	0.00986*	-0.00396	-0.00883	0.0358**
	(0.0231)	(0.0153)	(0.0060)	(0.0116)	(0.0130)	(0.0149)	(0.0095)	(0.0215)	(0.0194)	(0.0017)	(0.0059)	(0.0033)	(0.0129)	(0.0143)
D.PCR	0.0817*	0.048	-0.0727**	-0.0661	-0.0627	-0.0281	-0.0111	-0.0202	-0.0164	0.0806***	0.0705***	0.0838**	0.0116	-0.0311
	(0.0443)	(0.0843)	(0.0302)	(0.0534)	(0.0397)	(0.0640)	(0.1120)	(0.0365)	(0.0643)	(0.0126)	(0.0265)	(0.0355)	(0.0304)	(0.0358)
D.Inflation	0.00792***	-0.00214**	-0.000324	-0.000873**	-0.00435***	-0.000195	-0.00134	-0.000632	-0.00228	0.000344	0.000884	0.000576	-0.000688	5.17e-06**
	(0.0015)	(0.0008)	(0.0003)	(0.0003)	(0.0010)	(0.0013)	(0.0051)	(0.0005)	(0.0016)	(0.0003)	(0.0006)	(0.0004)	(0.0006)	(0.0000)
D.Expectancy	-0.0504	-3.597***	-0.412	0.671*	2.907***	1.216	0.49	6.683***	-0.391	0.187	-0.359	-2.239*	0.623	-0.852**
	(0.1810)	(1.1230)	(1.1320)	(0.4040)	(0.8600)	(1.3000)	(0.4630)	(2.0580)	(0.2630)	(0.1420)	(1.2970)	(1.2220)	(0.5570)	(0.4030)
D.Gov	-0.234***	-0.0335	0.0914***	-0.0299	0.0539*	-0.171**	0.00676	0.0157	-0.0385	-0.0543***	-0.0889***	-0.024	-0.0224**	0.0258
	(0.0590)	(0.0475)	(0.0236)	(0.0548)	(0.0312)	(0.0700)	(0.0872)	(0.0306)	(0.0934)	(0.0135)	(0.0243)	(0.0147)	(0.0097)	(0.0314)
D.Openness	0.416***	0.0411	-0.0077	-0.00734	0.0242	-0.0898*	-0.0936	-0.0931**	0.157***	-0.0317**	-0.0599***	0.0129	0.0397	-0.0193
	(0.0621)	(0.0840)	(0.0303)	(0.0362)	(0.0249)	(0.0507)	(0.1160)	(0.0384)	(0.0435)	(0.0129)	(0.0201)	(0.0341)	(0.0372)	(0.0732)
D.Polity	-0.0277	-0.00595**	-0.00284	-0.00339**	0.0252***	Omitted	Omitted	-0.00617	-0.00413	Omitted	omitted	-0.00986***	-0.00468**	-0.00303
	(0.0219)	(0.0029)	(0.0033)	(0.0016)	(0.0049)	0.0000	0.0000	(0.0071)	(0.0082)	0.0000	0.0000	(0.0034)	(0.0023)	(0.0117)
Constant	-0.0159	-0.608***	0.314**	-0.0816	-0.533***	0.0171	0.141	-0.368**	0.0669**	-0.0502**	-4.721***	-0.977***	-0.288**	-0.346***
	(0.0298)	(0.1580)	(0.1310)	(0.1270)	(0.1280)	(0.0215)	(0.1170)	(0.1630)	(0.0273)	(0.0209)	(0.6290)	(0.2250)	(0.1280)	(0.0821)
Observations	307	307	307	307	307	307	307	307	307	307	307	307	307	307

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

A.7 Individual country short-run estimation results estimated, excluding South Africa and Mauritius

Variables	Botswana	Cote d'ivore	Ghana	Kenya	Malawi	Namibia	Nigeria	Swaziland	Tanzania	Uganda	Zambia	Zimbabwe
ECT	-0.0395	-0.319***	0.0964***	-0.0159	-0.0804***	0.0984*	-0.0428	-0.0821***	-0.0391	-0.331***	0.0325	-0.183***
	(0.0292)	(0.0595)	(0.0372)	(0.0525)	(0.0261)	(0.0588)	(0.0385)	(0.0248)	(0.0432)	(0.0568)	(0.0312)	(0.0382)
D.FSindex	0.0362*	0.0126	-0.0031	0.00475	-0.00653	0.00531	0.0335	-0.00062	0.00208	-0.00760**	-0.00425	0.0399***
	(0.0205)	(0.0146)	(0.0061)	(0.0114)	(0.0096)	(0.0092)	(0.0229)	(0.0022)	(0.0080)	(0.0031)	(0.0115)	(0.0121)
D.Inflation	0.00813***	-0.00204**	-0.000302	-0.000808**	-0.00287***	-0.00133	-0.000725	0.000175	-0.00088	-0.000233	-0.000241	2.10E-06
	(0.0016)	(0.0008)	(0.0003)	(0.0004)	(0.0007)	(0.0048)	(0.0006)	(0.0005)	(0.0008)	(0.0004)	(0.0007)	(0.0000)
D.Expectancy	0.0846	-4.404***	-0.128	0.874***	2.396***	0.236	6.604***	0.812***	0.4	-0.532	1.805***	-1.588***
	(0.2300)	(1.0430)	(1.1760)	(0.2860)	(0.4640)	(0.4780)	(2.0550)	(0.2910)	(0.8400)	(1.1980)	(0.3970)	(0.4680)
D.Gov	-0.194***	-0.045	0.108***	-0.0213	-0.00202	0.0328	-0.00166	-0.0357*	0.0176	0.00506	-0.00273	0.0138
	(0.0561)	(0.0484)	(0.0274)	(0.0553)	(0.0232)	(0.0866)	(0.0306)	(0.0210)	(0.0269)	(0.0134)	(0.0106)	(0.0276)
D.Openness	0.361***	-0.0474	-0.0311	-0.0284	-0.00782	-0.077	-0.104**	-0.0202	0.028	-0.0634*	0.0393	-0.0729
	(0.0599)	(0.0733)	(0.0293)	(0.0365)	(0.0218)	(0.1120)	(0.0431)	(0.0192)	(0.0264)	(0.0336)	(0.0384)	(0.0664)
D.Polity	-0.0238	-0.00607**	0.000666	-0.00338**	0.0326***	Omitted	-0.00514	Omitted	Omitted	-0.00618**	-0.00554**	-0.00181
	(0.0232)	(0.0027)	(0.0035)	(0.0016)	(0.0055)	0.0000	(0.0075)	0.0000	0.0000	(0.0026)	(0.0025)	(0.0106)
Constant	-0.00934	-0.604*	0.312**	-0.0345	-0.318***	0.146	-0.0951	-0.0913	-0.0797	-0.860***	0.0686	-0.474***
	(0.0475)	(0.3160)	(0.1470)	(0.1370)	(0.0791)	(0.1130)	(0.0853)	(0.0856)	(0.1040)	(0.2870)	(0.0703)	(0.1630)
Observations	250	250	250	250	250	250	250	250	250	250	250	250

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

A.8 Individual country short-run estimation results estimated, excluding South Africa and Mauritius, and controlling for the level of financial development

Variables	Botswana	Cote d'ivore	Ghana	Kenya	Malawi	Namibia	Nigeria	Swaziland	Tanzania	Uganda	Zambia	Zimbabwe
ECT	-0.0308	-0.222***	0.0623***	0.00346	-0.147***	0.0302	-0.120**	-0.0509***	-0.262	-0.740***	-1.233***	-0.183***
	(0.0238)	(0.0755)	(0.0224)	(0.0658)	(0.0368)	(0.0948)	(0.0527)	(0.0135)	(0.2400)	(0.1210)	(0.0825)	(0.0324)
D.FSindex	0.0600**	0.0162	-0.00229	0.00132	-0.0250**	0.00346	0.0274	0.00400**	-4.70E-05	-0.00244	0.00723**	0.0326***
	(0.0233)	(0.0185)	(0.0055)	(0.0109)	(0.0125)	(0.0099)	(0.0218)	(0.0016)	(0.0079)	(0.0031)	(0.0033)	(0.0126)
D.PCR	0.0837*	-0.00401	-0.0665**	-0.06	-0.0656*	-0.0268	-0.0318	0.0740***	-0.0278	0.0269	-0.00254	-0.0507
	(0.0454)	(0.1000)	(0.0288)	(0.0536)	(0.0381)	(0.1260)	(0.0367)	(0.0125)	(0.0359)	(0.0334)	(0.0108)	(0.0323)
D.Inflation	0.00808***	-0.00209**	-0.000267	-0.000899**	-0.00448***	-0.000969	-0.000653	0.00039	-0.00071	0.000747*	-0.00109***	7.08e-06***
	(0.0015)	(0.0010)	(0.0003)	(0.0004)	(0.0010)	(0.0052)	(0.0005)	(0.0003)	(0.0008)	(0.0004)	(0.0001)	(0.0000)
D.Expectancy	-0.0744	-0.827	-0.912	0.908***	2.834***	0.676	9.212***	0.0935	1.106	-4.854***	-4.321***	-1.147***
	(0.1760)	(1.0350)	(1.0550)	(0.2190)	(0.8270)	(0.5960)	(2.2470)	(0.1280)	(0.9610)	(1.4800)	(0.4230)	(0.3700)
D.Gov	-0.233***	0.0283	0.0809***	-0.0338	0.0660**	-0.0112	0.0178	-0.0491***	0.0235	-0.00177	0.00102	0.0224
	(0.0589)	(0.0547)	(0.0224)	(0.0573)	(0.0305)	(0.0875)	(0.0304)	(0.0134)	(0.0300)	(0.0148)	(0.0031)	(0.0280)
D.Openness	0.414***	0.0115	-0.00257	-0.0118	0.0212	-0.0952	-0.0929**	-0.0318**	0.0144	0.00228	-0.0229*	-0.0403
	(0.0626)	(0.1020)	(0.0289)	(0.0367)	(0.0240)	(0.1190)	(0.0385)	(0.0131)	(0.0314)	(0.0317)	(0.0125)	(0.0657)
D.Polity	-0.0262	-0.00249	-0.00296	-0.00332**	0.0271***	Omitted	-0.00379	Omitted	Omitted	-0.00720**	-0.000479	-0.00546
	(0.0222)	(0.0034)	(0.0031)	(0.0016)	(0.0047)	0.0000	(0.0067)	0.0000	0.0000	(0.0029)	(0.0007)	(0.0105)
Constant	0.0609*	-0.00272	0.1000***	0.0112	-0.280***	-0.00536	-0.0632**	0.0503***	-0.251	-0.733***	-0.324***	-0.112***
	(0.0315)	(0.0150)	(0.0237)	(0.0513)	(0.0528)	(0.0881)	(0.0275)	(0.0120)	(0.2470)	(0.1360)	(0.0834)	(0.0236)
Observations	250	250	250	250	250	250	250	250	250	250	250	250

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

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