Measures of Financial Development

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By

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1 Introduction

The subject of financial development has received a great deal of attention, both theoretically and through empirical research. Earlier work focussed on the relationship between financial development and economic growth, with both policy makers and academics seeing financial liberalisation and the development of financial systems as a way to quickly improve the welfare of a country's citizens. Practically the steps taken to liberalise and develop financial systems have had mixed results, indicating the pitfalls of any 'one size fits all' approach to development. Still, there is almost unanimous acceptance of a strong linkage between the financial system and the wider economy.

Financial development in Africa is also of particular interest given the economic challenges that many African countries face (and related issues such as poverty). Financial development can act as a lever to spur economic growth and ultimately the welfare of much of the continent. However, it is widely recognised that African financial systems are under-developed. Allen et al. (2013) show that even compared to other developing economies, African financial systems score significantly lower across most measures of development.

More recent studies have therefore shifted focus towards answering questions related to the determinants and drivers of financial development itself. Given the accepted benefits of an effective financial system, what policies and interventions can be put in place to assist with financial development?

Ultimately, any inquiry into the realm of financial development is constrained by the study's ability to select the appropriate indicators for, and accurately measure the financial system. Even under ideal circumstances this can be challenging, as there is certainly no consistent view as to how best measure financial development. Approaches have changed over time, from traditionally focussing on simply the size and depth of a financial market to more modern indicators related to stability and financial inclusion – more aligned to the long term welfare outcomes in the economy rather than merely measuring the properties of a system. In reality, studies have to account for inconsistent and often missing data sets, especially for developing economies (which tend to be the focus of research into development).

The assertion of La Porta et al. (1998) that measuring the size of financial markets "is a bit tricky" somewhat understates the challenges related to the measurement of financial systems. This study aims to explore the theory and empirical studies related to financial development, its impact on economic growth in Africa and the various ways to measure financial markets and institutions.

The rest of this report is structured as follows; Section 2 contains the context and case for the study and lays out the objectives for the research. It also provides a summary overview of the key functions of financial systems as a reference for the rest of the paper.

Section 3 provides a comprehensive review on the literature around three core areas (1) The relationship between financial development and economic growth, (2) the determinants of financial development and (3) the approaches to measuring financial development. Section 4 contains the discussion on this study's methodology and hypotheses. Section 5 discusses the key results and findings from the analysis. Section 6 provides a conclusion and recommendations for future research, followed by the Appendices.

2 Research Case and Objectives

2.1 Research Context

Lingering poverty and income inequality in developing countries remain an area for academics, development practitioners and policy makers. The ability of economic development and (sustainable) industrialisation to address these challenges is widely accepted, with the link between financial development and economic development and growth is well covered in existing literature (King and Levine, 1993a; Levine and Zervos, 1997; Outreville, 1999; World Economic Forum, 2012 etc.). Financial development leads to more optimal allocation of capital (from domestic savings and other sources) whilst reducing risk and lowering transaction costs (Adnan, 2012).

Given the recognition of the value of financial development, in both advanced and emerging economies, it is important to understand what constitutes financial development, its underlying drivers and how it is measured and assessed. The literature is varied in its approach to developing a benchmark or index for financial development both in terms of the framework for what factors to measure and the statistical methodology followed.

The measurement of financial development is of particular interest given its potential implications for policy decisions – choosing one measurement or indicator over another might lead to a different emphasis from a policy perspective. It is therefore important to have a good understanding of the different approaches to assessing financial development at the country level.

From a purely academic perspective, choosing the appropriate indicators and measures for financial development for any study is important given the impact this will have on results. For example, Adu et al. (2013) find that provision of credit compared to liquid money supply as a measure for financial development leads to different outcomes when examining the relationship between economic growth and financial development. Gregorio and Guidotti (1995) make use of the ratio of private sector credit to GDP, and argue that this focus on the banking sector skews their findings on relationship between financial development and economic growth in higher income countries (where financial development tends to occur outside the banking sector).

In developed markets, non-banking activity represents a significant proportion of financial activity (Financial Stability Board, 2013). Differences in the efficiencies of these sectors would account for large differentials in returns and their respective impact on economic growth and perhaps even overall welfare in an economy – capturing their performance would add useful insight into any analysis or benchmarking exercise. In the case of developing countries, the lack of stock exchanges makes trying

to measure efficiency through stock market metrics futile. Studies of financial development need to be cognisant of their targeted countries and should attempt to use measures appropriate for the financial systems in questions.

Much of the empirical work in the literature is limited by its high level cross-country analysis, and numerous studies point to the fact that the dynamics of financial development differ widely across different economies. Demetriades and Hussein (1996) argue that cross-sectional approaches do not allow for country level details and those findings related to financial developments represent an "average". This study aims to provide some insight into the key factors of financial development and the relationship between this development and economic growth on a country by country basis for a sample of African economies.

2.2 Research Questions

Within this context, this study aims to address the following questions;

1. What are the appropriate measures for financial development in African economies?
2. Does a relationship exist between financial development and economic growth in Africa?

2.3 Research Objectives

1. Conduct an extensive review of the literature on financial development – specifically approaches to its measurement, its determinants and linkages between financial development and economic growth.

Using a sample of 15 African countries, the study aims to;

2. Examine which factors account for the most variation in financial development.
3. Determine whether a relationship exists between financial development and economic growth.

The research hopes to add to the existing literature in a number of ways. Firstly, the chosen dataset focuses exclusively on African economies and spans a relatively recent time period (1999 to 2011). In this way, the study hopes to add an 'updated' view of modern African financial systems. Specifically, the research will analyse which indicators account for the most variance in the measures of financial development in Africa.

Secondly, the research aims to build on the extensive literature around the relationship between financial development and economic growth through the use of Principal Component Analysis. The

approach establishes a more accurate measure for the level of development of selected African financial systems. Most studies tend to use a single or handful of indicators for financial development, and for Africa in particular, there are few cross country studies that apply the Principal Component approach.

2.4 Functions of a Financial System

Adequately describing the workings of a financial system in any detail would merit a full study in its own right. The section aims to provide a short summary of the functions of the financial sector commonly cited in the literature in order to lend some context to the later sections.

Financial systems consist of markets and "institutional units" (economic entities such as households, businesses and governments). These elements interact (typically in a complex manner) to mobilise funds and provide means and facilities for the financing of commercial activity (IMF, 2006).

Whilst financial systems vary dramatically in terms of their size, efficiency, structure and other characteristics, they all ultimately exist to perform the same functions within an economy. Merton and Bodie (2004) succinctly describe the purpose of financial systems as facilitating the "allocation of resources, across space and time, in an uncertain environment". This short passage alludes to the risk mitigation and management role that financial systems play in "uncertain" markets. It also speaks directly to the allocation of capital to investments – a core mechanism in the channel between financial development and economic growth.

The emergence of financial systems – markets, contracts and institutions – occurs almost naturally as a result of "market frictions" in the real economy (Levine, 1997). Čihák et al. (2013) propose that the main functions of a financial system are;

- Enhance the quality of information about market participants and therefore improve resource allocation. This entails collecting or producing and processing information about possible investments and allocating capital accordingly
- Exert sound governance and oversight on market participants, improving the performance of these agents
- Allow for effective management and diversification of risk
- Pool and mobilise savings to productive investments
- Facilitate trade by reducing the barriers to exchanging goods and services

These functions are cited as the primary purpose of financial systems in much of the literature (Adnan, 2012; Sirri and Tufano, 1995; Laurenceson and Tang, 2005 etc.).

2.4.1 Savings Mobilisation

The mobilisation or pooling of savings refers to the collection of savings from separate individuals into a single pool for investment. Practically this may involve a bank collecting deposits or perhaps a pension fund collecting and reinvesting its contributions.

Levine (1997) notes that there are transaction costs (collecting funds from a range of different savers) and information asymmetry costs (demonstrating to individuals that they should trust an institution with their savings) involved in the mobilisation of savings, and that financial institutions grow to leverage economies of scale in order to overcome these frictions.

2.4.2 Acquiring Information and Allocating Resources

Individual savers will rarely have the time or perhaps even ability to effectively collect and assess information about prospective investments. These information asymmetries mean that savers are unlikely to invest in activities where information is not easily available and understandable, meaning that high information costs can restrict the follow of capital to productive projects. Financial institutions therefore emerge in response as specialists in collecting and assessing investment information – 'economising' information gathering costs rather than each individual having to develop the expertise themselves (Levine, 1997).

Greenwood and Jovanovic (1990) argue that the specialisation of firms in acquiring and processing information on investments, allows them to more efficiently allocate capital to these opportunities. This process in itself is can be costly.

2.4.3 Monitoring Managers and Exerting Corporate Control

Beck et al. (2008) note that monitoring and corporate governance limit the scope for moral hazard and wasteful use of resources.

In addition to the 'ex ante' cost of acquiring information and allocating funding to investments, financial systems exert 'ex post' (after the financing has occurred) control and governance over an investment – also at a cost. Various principal-agent arrangements between not only shareholders but also outside lenders (such as banks or pension funds on behalf of their respective depositors or beneficiaries) work to enforce appropriate care and actions that are in the best interests of the financiers (Levine, 1997). This cost could not be feasibly carried by individual investors.

2.4.4 Risk Management

The lowering of transaction costs and reducing information asymmetries lowers the risk of investments. Being able to work through a financial institution or directly participate in an equity market allows investors to easily move their finance and reduces liquidity risk.

Financial systems work to reduce liquidity risk and idiosyncratic risk (Levine, 1997) through their other functions of pooling funds, and by diversification of investments and liquidity and maturity transformation.

2.4.5 Facilitating Exchange

At a basic level, money acts as a medium of exchange in transactions which greatly reduces the costs of bartering and trade (Williamson and Wright, 1994). Financial institutions and markets allow for even greater efficiencies in exchanges, promoting trade and wider economic activity.

3 Literature Review

3.1 Financial Development and Economic Growth

The seminal work of Schumpeter (1911) is widely cited in the literature as the initial seed for the modern discussion around the relationship between financial development and economic growth – although some studies such as Levine (1997) cite sources as early as the 1800s. Whilst the early contributions from the literature tend agree on the on the existence of a positive relationship between financial development and economic growth, the emphasis around the channel of transmission varies (Gregorio and Guidotti, 1995).

Schumpeter (1911) argues that financial development spurs technological innovation and production, leading to higher economic growth rates and Hicks (1969) contends that the financial system played a significant role in the industrialisation process in England. Robinson (1952) argues that the causality flows in the other direction – from economic growth to financial development – and asserts that "where enterprise leads, finance follows". The work of McKinnon (1973), Shaw (1973) and Levine (1997) provides a great deal of insight into the mechanisms and levers that underpin the relationship between financial development and economic growth and explain the nature of the causality. The theories that underpin these arguments in the most part are logically sound, and much of the later literature is comprised of studies that look to lend empirical support to the discussion.

This section continues by providing a summary of the main theoretical approaches and arguments around the relationship between financial development and economic growth. It then presents an overview of empirical studies from the literature against the proposed theory. The section concludes with some comments on the theory and empirical findings.

3.1.1 Theoretical Approaches

Much of the literature and empirical analysis is concerned with the direction of the channel between economic growth and financial development. The question of whether a relationship exists at all is perhaps glossed over from a theoretical perspective (although a fair amount of attention is given to this question in the empirical analysis). Literature reviews such as Demirgüç-kunt and Levine (2008) have concluded that the existing body of evidence suggests a clear "positive, first-order relationship between financial development and economic growth", in other words, the presence of a well-developed financial system has a positive, causal effect on the long term economic growth of an economy.

Given this question of causality, there is a broad split in the theory. One side advocates the 'supply leading' approach – where the supply of financial services (and the development of a financial system)

drives future economic growth, whilst the other camp proposes a 'demand leading' theory, where economic growth leads to increased depth of the financial sector. The former supply side theory receives much more attention in literature, with a focus on the functions that the financial system provides, and how these act as mechanisms in fostering economic development.

3.1.1.1 Demand Led Hypothesis

The demand led mechanism argues that economic growth leads to a greater demand for financial services (increased demand for credit, more savings etc.) with the financial system then growing to meet this demand. This implies that financial development is passive in response to growth within the real economy (King and Levine, 1993a).

As an economy develops there is an increase in the demand for existing and new types of financial services and the emergence of new financial institutions, markets and their related services is a response to this demand from savers and investors in the real economy. The relative under-development of financial markets and institutions in developing economies is simply a result of the lack of demand for these services within those countries. Under the demand leading theory, higher growth rates of national income mean that the real economy demands more external funding (Patrick, 1966). This implies a (probably fair) assumption the growth cannot be financed from earnings and retained profits alone.

Patrick (1966) argues that the provision of financial services should come about automatically in response to demand for them. Patrick assumes that entrepreneurship in the financial sector is highly elastic relative to the opportunities for profit (entrepreneurship is used broadly here, and in practice it is likely that these opportunities would be perused by existing financial institutions that expand their operations and development new products etc.).

This echoes the earlier work of Robinson (1952), where the author argues that the supply of finance "is rarely a serious hindrance" to economic growth. As growth accelerates and profits increase accordingly, Robinson maintains that the supply of finance will grow to meet greater demand. King and Levine (1993a) describe Robinson's view as having finance act as the "handmaiden to industry", and propose that this view stems from the mechanics of the neo-classical growth model, where financial markets and institutions have a small effect on the rate of investment in physical capital and that in turn, investment has only a minor impact on economic growth.

The demand leading hypothesis perhaps assumes that economies can access international sources of finance to rapidly scale the supply in times of high demand. Whilst this is not an unrealistic assumption, it should be noted that the existence of exchange and capital controls would likely act as a dampener it any rapid scaling of the supply of finance from external sources.

3.1.1.2 Supply Led Hypothesis

Spineanu-Georgescu (2011) argues that economic asset growth requires the existence of adequate financial services. Broadly, the supply led hypothesis proposes that it is the functions provided by the financial system – savings mobilisation, managing risk, governance etc. – that drive innovation and capital accumulation, which are the ultimate levers for economic growth (Schumpeter, 1911; King and Levine, 1993b). In this way, the financial system and supply of financial system functions exert a positive influence on economic growth.

3.1.1.3 Functional Drivers

Much of the literature on financial development and economic growth highlights how the functional elements of financial systems act as mechanisms for the channels of economic growth (Levine, 1997 etc.).

Through the provision of these functions or activities, the financial system works to reduce market failures and frictions and thereby promote economic growth. The reasoning is that markets are inherently imperfect and prone to distortions or failures. Transaction costs and information asymmetries can lead to misallocation of capital, credit rationing and under-investment – ultimately stifling economic growth and the wider welfare of a country. Financial markets and institutions – whether motivated through profits or government intervention – act to reduce or remove these market failures and promote growth (Čihák et al., 2013).

An effective capital allocation process facilitates growth in the real economy by transferring resources from low-growth to high growth sectors, almost as a form of financial natural selection. This encourages new entrepreneurship in these high-growth sectors, further driving growth (Patrick, 1966).

King and Levine (1993a) describe how financial institutions invest in productivity enhancing activities, firstly by evaluating prospective entrepreneurs and then funding the best opportunities (acquiring information and allocating capital). The authors argue that financial institutions are able to research and evaluate prospective entrepreneurs more effectively and cheaply than individual investors (through economies of scale and the specialisation of staff and processes). Capital markets can also play an evaluation function, as these markets reveal the value of projects based on analysis from rational investors. Of course practically investors do not always behave rationally, however it is still plausible that equity markets can provide some insight into the true value of investments.

King and Levine (1993a) assert that this evaluation and selection of entrepreneurs (which is done more efficiently through institutions than individuals) lowers the cost of investing in productivity enhancing projects or sectors and stimulates economic growth. This echoes the sentiment of Goldsmith (1959),

who argued that financial institutions influence economic growth by making savings (or credit creation) available to the most viable prospective borrowers.

Financial institutions are also more effective at mobilising savings for investment (through maturity and risk transformation) than individual investors. By allow individuals to hold diversified portfolios (through various deposit and household investment products), the pooling process acts to diversify risk at the household level. This reduction in risk means that more savers are willing to 'lend' out their money via financial institutions, increasing the pool of funding for investment. The aggregation of savings into larger amounts facilitates production or investment processes that might otherwise be constrained at smaller scales if individuals or smaller groups were the only contributors (Levine, 1997).

Savings mobilisation therefore allows for more effective resource allocation by improving liquidity and risk diversification for households, as well as allowing for projects to reach larger scales with more funding (Sirri and Tufano, 1995). Finance for higher yielding projects at larger scales would raise output and economic growth rates.

3.1.1.4 Capital Accumulation

The seminal work of McKinnon (1973) and Shaw (1973) is widely cited in the literature and asserts that the financial sector of an economy has an impact on economic development. Both authors focus on the value of financial liberalisation in unlocking economic development (and the dampening effects of financial repression).

Shaw (1973) argues that a deep and liberalised financial sector allows for a better and greater allocation of savings into productive investments, by widening the market in which projects compete for funds.

McKinnon (1973) argues that the liberalisation of financial markets in developing countries will drive greater economic growth and that financial deepening leads to greater economic activity. McKinnon discusses the implications of very low or even negative real interest rates in many developing countries (characteristics of repressed financial systems) for economic growth. Low or negative real interest rates act to discourage saving, often leading to limited liquidity and availability of credit. This in turn means that the financial capital needed by entrepreneurs and industry is in short supply or even completely unavailable, constraining the ability of these agents to produce and add value to the economy.

Businesses in developing economies often lack access to short term finance for working capital or investment, therefore being forced into using less productive technologies (McKinnon 1973). McKinnon (1973) describes how a poor farmer, with no access to external finance, would only be able to make small incremental investments into his production processes (using more fertilizer etc.).

Relying only on his own savings, the farmer cannot (at least in the short or medium term) invest into radically new technologies (mechanising the farm's production for instance) which ultimately constrains economic growth. It is the indivisibility of many investments (especially large capital investments often associated with unlocking economic opportunities) that constrains the ability of entrepreneurs to "self-finance".

McKinnon (1973) argues that foreign investment or funding from government tends to be channelled to capital intensive industries at rates below market level (either due to interest rate differentials across countries or due to government subsidies). This leads to over-investment in capital intensive technologies. Whilst this may have been a characteristic of foreign and public investment in the 1970s, this study would argue that today governments provide finance to a range of sectors – often being labour absorbing rather than capital intensive in an attempt to address unemployment. Further, international finance is focussing on other areas for investment, such as the growing consumer market in developing economies.

Overall, McKinnon's (1973) view is that the flow of external finance, facilitated by the depth and effectiveness of the financial system, is a channel for greater economic growth. Demetriades and Hussein (1996) point out that under the McKinnon and Shaw school of thought, it is the provision of credit from banks that act as the mechanism for enhancing economic growth (as effective banks make better capital allocation decisions when supplying credit, improving investment quality). Given this, one would expect the provision of private credit to exert a positive causal effect on real GDP.

3.1.1.5 Innovation and Productivity Improvement

Levine (1997) argues that the two channels through which financial development affect economic growth are capital accumulation and technological innovation, with each channel being based on a broad model for economic growth. Through capital accumulation, the financial system either alters the rate of savings or reallocates savings among different capital producing technologies. Financial systems can also impact growth by altering the rate of technological innovation.

King and Levine (1993a) discuss the "endogenous growth model" (where factors impacting growth are endogenous to the system rather than the traditional exogenous shocks) in which entrepreneurship and innovation are drivers of economic activity and growth, and draw on the early work of Schumpeter (1911) to argue that financial institutions and markets allocate capital to these entrepreneurial activities.

King and Levine (1993a) argue that "the nexus of finance and innovation [is] central to the process of economic growth" and the authors claim that innovation is the direct driver of economic development, with the financial system playing a supporting function. The theory they propose holds that innovation allows entrepreneurs and businesses to produce goods and services at a cost

temporarily lower than that of competitors (the innovation improves productivity which lowers the cost per unit of output). King and Levine's model therefore sees the financial system as the "lubricant" for innovation and productivity improvement – the true engine of economic growth.

The endogenous growth model stresses that the transmission mechanism between financial development and economic growth is the through innovation and productivity growth (King and Levine, 1993a). The assumption then is that financial institutions allocate capital to *productive* assets or investments. The ever increasing complexity of financial products and markets might require that this assumption is examined more closely.

Whilst financial innovation can have many benefits, Ang and Mckibbin (2005) argue that too much financial innovation and development can lead to excess volatility and have a destabilising effect on the wider economy. Derivative products such as collateralised mortgage obligations (CMOs) are not necessarily productive or productivity enhancing. This is not to say these instruments have no value, as they perform a risk and maturity transformation function for market participants. To extend the CMO example, investment into CMOs will not generate any activity beyond the further origination of loans and the financial engineering required to create the products. There is not even an explicit link to the construction of new houses, as existing stock could be recycled through the housing market. Whilst the returns on these products may be relatively high, the direct or indirect impact on economic growth would appear minimal.

King and Levine (1993a) are clear that their model "does not focus on the precise form of contracts and institutions" that would drive this productivity enhancing investment. Empirical studies into the endogenous growth model should therefore attempt to account for quality or type of investment decisions made by institutions. The choice of indicators for financial development, such as the provision of credit rather than banking asset values may be an appropriate way to manage this.

The figure 3.1 in the appendix, adapted from the work of Levine (1997), provides an overview of the supply lead theories, whereby the functions of the financial system drive economic growth through innovation and capital accumulation.

3.1.1.6 Bi-Directionality and Stage of Growth

The literature does not make much effort to refute either side of the demand or supply led theory. This is perhaps an indication of the acceptance that in reality, the channels and mechanisms between finance and growth are likely to be more complex than described in the traditional theoretical models, with feedback occurring across channels. Building on the efforts of Patrick (1966), more recent literature (Baliamoune-Lutz, 2013 etc.) acknowledges the likely hood that the relationship is bi-directional and that changes in either the financial sector or wider real economy are likely to impact the other.

In economies where financial systems are at an appropriate level of financial development, Patrick (1966) argues that the supply leading mechanism is likely to be the initial seed for "real innovation-type investment" within and across sectors of an economy. However, as an industry reaches a level of development, the demand led mechanism becomes more prevalent, and the industry's need for financial services driving growth in the financial sector. This brings about a sequential dynamic, where the level of development of a real sector, would in part determine the causal interaction for growth between that sector and the financial system. This theory has come to be known as the 'Stage of Growth Hypothesis', where the directionality of the relationship between finance and growth varies over time.

In smaller developing economies, financial institutions may initially be unable to profitably finance new and innovative high-growth sectors. Patrick (1966) suggests that there are numerous ways in which financial institutions can leverage the necessary capital and mitigate risks to undertake these new investments. These include access to government subsidies (Patrick points to state owned banks in many countries) and low reserve requirements. Patrick (1966) argues that financial institutions may initially choose to invest in less risky and lower growth (but still profitable) sectors such as agriculture and over time reallocate the returns and shift the loan portfolio to support the high-growth sectors. This seems to blend the demand led (where finance initially follows real growth) and the supply led hypotheses, and Patrick (1966) asserts that in actual practice, both supply lead and demand lead mechanism are likely to be at work in an economy.

The view of Levine (1997) that the functions of a financial system (allocating capital etc.) remain fixed over time, but the quality of these functions changes, lends some support to this theory. Even though the activities of a financial system remain broadly the same, the scale and efficiency with which the functions are performed may have implications for the mechanism and direction of the relationship between finance and growth.

3.1.1.7 Other considerations

As beneficial as effective financial intermediation can be for economic growth, a poorly functioning system can also act to dampen development. Financial repression limits the services provided to savers and new investments and therefore can have a restrictive impact on the system's ability to support growth (King and Levine, 1993a). Chamley and Honohan (1990) discuss the impact of both direct and indirect taxation on the financial system in five African countries and find that total financial intermediary taxation in some African countries amounted to 7% of their GDP during the 1980s. Examples of direct taxes (usually as a result of repressive or inefficient policies) include forced lending to governments and state owned entities, interest rate ceilings, and high and non-interest bearing reserve requirements (Chamley and Honohan, 1990). Higher tax rates increase the cost of innovation and productivity improvement, thereby lowering the economic growth rate. More generally, any

exogenous shock that increases the transaction costs or decreases the size of the financial sector would have a negative impact on economic growth. King and Levine (1993a) use the example of a drop in the enforcement of property rights as deterring investment and negatively affecting growth.

Baliamoune-Lutz (2013) points out the importance of financial inclusion in strengthening any transmission channel between financial development and economic growth and notes that in countries with high income inequality, the wider gains of financial reforms are limited due to lower income groups engaging in financial activities in a mostly informal way. In these cases, much of the benefit of financial development is collected by the relatively small middle and upper level income groups with access to formal institutions, leading to greater inequality rather than reducing it.

Limited access to credit or banking facilities means that populations need to rely on informal savings to invest in education or entrepreneurial activities (Demirgüç-kunt and Klapper, 2013). A more educated or entrepreneurial labour pool would have a clearly positive impact economic performance and general welfare in a country. These mechanisms would further support an argument that financial inclusion exerts a positive influence on economic growth.

Goldsmith (1959) argues that differences in a country's "financial organisation" and "financial habits" influence both the direction and speed of economic development. Goldsmith (1959) describes the mechanisms through which the financial system can impact economic development, focussing on the influence of money and other financial assets. Monetary impact on the economy is channelled through movements in the price level. Goldsmith does not mention the effect that money has on interest rates, but this would also serve as a channel for money to affect economic growth (most modern central banks practice some sort of monetary policy in an attempt to influence the wider economy). Regarding financial assets, Goldsmith argues that domestic savings is one the key factors in economic growth, and that a large part of savings is accumulated in financial assets. The availability and public confidence in financial products is therefore a determinant in the level of savings in an economy.

Goldsmith (1959) also notes that the "scale of values of a society", referring to the cultural and social make up of a country (Goldsmith argues that this due to religious and philosophical influences) is responsible for low levels of economic growth in developing countries.

Despite the numerous theoretical explanations, there has long been recognition around the uncertainty of the direction of the causality between financial and economic development. Patrick (1966) pointed out that the positive association between the two areas was insufficient to establish the direction of causality, with McKinnon (1988) stating "Although a higher rate of financial growth is positively correlated with successful real growth … what is the cause and what is the effect?"

3.1.2 Empirical Approaches and Findings

The bulk of the recent empirical work aims to establish the nature of causality between financial development and economic growth. Earlier studies aimed to ascertain if a relationship between the real and financial sector existed at all. Goldsmith's (1959) early work concludes that a "rough parallelism" exists between economic and financial development, and that in some countries, periods of high economic growth are accompanied by above average rates of financial development. Fry (1978) presented one of the first empirical studies of work of McKinnon (1973) and Shaw (1973) and found that financial conditions were significant in the economic development process.

In general, early empirical studies into causality suffered from a lack of sufficiently long time-series data, especially for developing economies. Gupta (1984) used quarterly industrial output observations in an attempt to increase sample size (national accounts data are typically reported annually) and found largely that the direction of causality runs from financial to real development. Demetriades and Hussein (1996) argue that the span of the time-series is more important than the number of observations and also critique Gupta's use of broad money stock as a measure of financial development – stating that this speaks more to the impact of monetary policy on industrial output than the impact of financial deepening on economic growth.

Demirgüç-kunt and Levine (2008) find that private credit to GDP has a positive effect on long-term economic growth. However, Čihák et al. (2013) noted that some economies with the highest historical credit ratios (namely Cyprus, Ireland, Spain, Netherlands and Portugal) have experienced a banking crisis since 2008. This would indicate that high a private credit to GDP ratio is not always a clear indicator of eventual economic performance or soundness of the financial system. Thorough country level analysis would need to assess the liquidity within the banking industry to really determine the potentially beneficial impact of abundant credit from the financial sector.

King and Levine (1993a) conduct a study across 77 countries with data from 1960 to 1989. The authors find that financial development indicators are positively and significantly correlated to the other growth indicators and conclude that financial development is strongly linked to economic growth. Specifically, it is shown that economies with initially high levels of liquid liabilities to GDP grew faster over the subsequent decades.

Demetriades and Hussein (1996) critique the work of King and Levine (1993a), arguing that the financial development indicators for a given country are correlated across time, and therefore the initial value of an indicator will be a good proxy for its current level – which was omitted from the King and Levine model. In addition the cross-section approach does not allow for different countries to exhibit different directions of causality – this means the findings of supply led causality can only be viewed as an 'average' rather than for any specific country.

The work of Demetriades and Hussein (1996) finds empirical evidence of a stable long term relationship between financial development and economic growth for 13 countries from a sample of 16. Even countries that underwent policy changes that could have led to structural breaks in the relationship between real GDP and financial development were still found to have a stable long run relationship between finance and growth. The financial development indicators used are bank deposits to GDP and private credit to GDP, with the authors finding that the first measure has a stronger relationship to real GDP per capita. This is contrary to the view that Demetriades and Hussein (1996) initially hypothesised that credit is the main channel through which financial development spurs economic growth.

When examining the issue of causality, the Demetriades and Hussein (1996) study does not reach a clear conclusion on the direction of the relationship between finance and growth. It is found that countries exhibit a range of possible states (in some cases more than one depending on the method used); financial development causes economic growth, a reverse causal relationship, or no evidence of causality in either direction. In the case of South Africa and Mauritius (the only African countries in the sample), it is found that no causal relationship existed. Overall, the study finds little empirical support for the pure view of financial development leading to economic growth. Rather, the reverse is seen to be true, with economic development seemingly causing financial development. Evidence also suggests that in most cases there is some form of bidirectional causality between financial development and economic growth.

Demetriades and Hussein (1996) go on to argue that differences in institutional quality and policy implementation will influence the nature of the relationship between the financial system and the wider economy – this leads them to the conclusion that there can be no "wholesale acceptance" of either view around financial development and economic growth.

Using a sample of 98 countries with data from 1960 to 1985, Gregorio and Guidotti (1995) find a generally positive relationship between financial development and long term economic growth. The authors find that the positive influence of financial development is due more to the improved efficiency of investment rather than the volume of investment – this may have implications for the choice of financial development indicators, where measures of efficiency are a better predictor for economic growth than financial depth.

In the case of Latin American economies however, Gregorio and Guidotti (1995) find that the relationship between financial intermediation and economic growth is negative. The authors argue that this is due to the period of highly experimental financial liberalisation that these countries undertook in the 1970s and 1980s (in which many of the policy interventions ultimately failed).

More recently, Čihák et al. (2013) observe that financial development has a positive impact on economic development and stability, and argue that economies that have better developed financial systems experience greater economic growth and faster reduction in poverty levels.

In one of the earlier studies into the direction of causality between finance and growth in the literature, Jung (1986) finds evidence for finance driving economic growth in a sample of low income countries, whilst the causal direction tends to run from economic growth to financial development in more developed countries. Gregorio and Guidotti (1995) also note that impact of finance on growth is stronger for low and middle income countries than higher income economies. These findings all seemingly support the Stage of Growth theory, where it is the initial supply of financial services spurs growth in less developed markets.

Using money supply and credit to GDP as measures of financial development, Carby et al. (2012) set out to test the Stage of Growth hypothesis using time series data spanning from 1946 to 2011 from Barbados. The authors find that in the short term, causality ran unidirectionally from economic growth to financial development. In the long term however, causality is found to be bidirectional. Of course the study of only one economy limits the ability to make any general claims about the relationship between finance and economic growth with respect to Stage of Growth.

Following a more comprehensive approach, Calderón and Liu (2002) use a sample pool of data from 109 developing economies from 1960 to 1994 to test the direction of causality between finance and growth. Across the sample, the authors find that financial development and economic growth exhibit a bi-directional relationship, where the longer the sampling period, the greater the impact of finance on growth. It is also found that financial deepening has a greater impact on growth in developing countries than in developed ones – this lends support to Patricks (1966) Stage of Growth theory. Calderón and Liu (2002) also find that financial development drives growth through two primary channels, namely productivity growth and more rapid capital accumulation. It is found that productivity growth has the stronger effect on economic development. This seems to be strong evidence in support of the supply led model, where innovation, productivity improvement and capital accumulation are supported by the financial system and ultimately lead to economic growth.

In contrast to these results support the prevailing theory, there are several studies that find unusual relationships between growth and finance across countries. Baliamoune-Lutz and Ndikumana (2007) find that for several African countries, the relationship between financial development and economic growth is non-existent or even negative. The authors note however that this is unlikely to be causal, and is rather a result of correlation to other indicators in the study. Other studies such as Assane and

Malamud (2010) find that in Sub-Saharan African countries of French colonial origin, the contribution of financial development to economic growth is negative, or at best insignificant.

A Baliamoune-Lutz (2013) study finds causality from financial development to income level, as well as bidirectional causality and reverse causality. The author notes a difference in results compared to the Demetriades and Hussein (1996) study and suggests that this is due to differences in the time period of the data as well as choice of lag length. This observation shows just how sensitive the results of such studies can be to differences in methodology and data sampling choices.

Demetriades and Hussein (1996) find that causality patterns between financial and economic development differ across countries and highlight the dangers of drawing conclusions from studies that statistically treat economies homogeneously. The work of Baliamoune-Lutz (2013) expands on this view, and finds that the causal relationship between financial development and economic growth can differ not only across countries in general (which might intuitively make sense), but also between countries within the same region and with similar levels of development (given the seeming 'control' for developmental and geographic influences, this seems less intuitive).

The Baliamoune-Lutz (2013) study finds bidirectional causality between financial development and income in South Africa, but only unidirectional causality in the case of Mauritius. Further, private credit to GDP (from banks and non-banks) is found to have a negative long-run impact on income in South Africa and a positive long-run impact in Mauritius. Given the relatively similar levels of financial development of both these economies (Gelbard and Leite, 1999), one might expect a common relationship between financial development and income. Similarly, the work finds differences in the relationship between financial development and income for countries with relatively underdeveloped financial systems such as Ethiopia and Togo. This contradicts the Stage of Growth hypothesis put forward by Patrick (1966) as well as the empirical findings of Calderón and Liu (2002) and others.

3.1.3 Comments on theory and empirical findings

It is clear that there is a great deal of variance in the results across studies. The reason for such varied findings in the literature is likely linked to three factors;

1. The choice of methodology and statistical approach in conducting the different studies
2. The choice of measure for financial development
3. Timescale and quality of data, particularly for studies in developing economies

Demetriades and Hussein (1996) note that even in their own studies, the use of several different types of causality tests leads to contradictory results for the same economies. The authors also point out that findings are usually country specific, and that the findings for one economy cannot be used to

infer the relationship between economic and financial development within another country. Baliamoune-Lutz (2013) points out that depending on the data frequency, country or region sampled and choice econometric model, empirical findings can show finance causing growth, growth causing finance, bidirectional causality or no causality at all.

The literature contains a wide range of different statistical techniques and methodological approaches. Jung (1986) conducts causality tests using a Vector Autoregression regression framework. Huang (2010) uses Bayesian Model Averaging and Extreme Bound Analysis to measure the relationship between financial development and other factors. King and Levine (1993b) make use of regressions to test the relationship between finance and growth. Others, such as Demetriades and Hussein (1996) make use of cointegration and Granger causality tests.

Given that all of these approaches are constrained by their respective shortcomings (although each would certainly also have advantages), the range of approaches is likely to be a cause of the varied empirical findings in the literature. It is unlikely however that any single approach will become universally recognised as the only correct approach to these types of study (which is good, as improvements to existing approaches and new innovations are needed to expand the body of knowledge).

With respect to the selection of data, Adu et al. (2013) and Ang and Mckibbin (2005) highlight the need for country specific samples. Levine (1997) argues that the financial structure of an economy (the mix of institutions, markets, financial contracts etc.) varies from country to country and changes as countries develop. This would impact a general cross country assessment using relatively few indicators. Baliamoune-Lutz (2013) even asserts that given the consistently mixed results in the literature, that cross-sectional models are not appropriate for the study of the relationship between financial development and economic growth.

There seems to be an need to find an optimal 'trade-off' between broad stroke country analysis, whereby much of the relevant detail is lost, and approaches which focus too narrowly on only a single country and thereby limit the ability of the findings to be extrapolated or used for more general theory and modelling. Perhaps a regional or even-sub regional approach would yield the best results, where the selection of countries is sufficiently similar that insights into financial development are applicable for the entire group – although the findings of Baliamoune-Lutz (2013) show that even this approach can be ineffective.

3.2 Drivers and Determinants of Financial Development

Given the wide acceptance of importance of financial development in economic growth, Baltagi et al. (2008) assert that the "frontier of the literature" is moving towards answering why some economies are more financially developed than others, and what factors contribute to the rate of development of financial systems.

The literature covers a wide spectrum of variables that can account for financial development over time, from trade openness, legal system, native language and even predominant religion (Stulz and Williamson, 2001). This section of the research aims to provide an overview of the determinants for financial development.

3.2.1 Policy and Political Environment

The political environment in a country will almost certainly influence its level and rate of financial development (Demirgüç-kunt and Levine, 2008). Governments can directly influence the ownership and control of financial institutions and markets. Government policy and regulation can also be used to limit foreign participation and the general openness of an economy to trade and financial transactions. More broadly, stable macro-economic policies would act to support the functioning of a financial system, both directly and via demand for financial services from a growing real sector. Demirgüç-kunt and Levine (2008) argue that monetary and fiscal policies affect the taxation of financial intermediaries and the provision of financial services. The authors also note that high levels of government borrowing can crowd out private investment by increasing the yields on government debt and absorbing the majority of savings in the economy.

Beyond direct policy and regulation, political stability would also be likely to influence investor confidence. Detragiache, Gupta and Tressel (2005) find that in lower income countries, political instability and corruption have a negative impact on financial development. Politics also shape the economic ideology of a country, with implications for the financial system. Roe (2000) argues that governments with socialistic or strong redistributive policies account for more variance in the development of financial markets than a country's legal system.

Rajan and Zingales (2003) study the impact of political regimes on financial development and argue that "interest group politics" incentivise the restriction (or even reversal) of financial development. In a relatively closed economy, incumbents in both the real and financial sectors of an economy will leverage either the limited trade or financial flows to protect their market positions. These large businesses will lobby and work to limit financial development in order to protect their incumbent status. Through the opening of both financial and trade markets, there is no longer any incentive for incumbents to limit the development of the financial system.

Trade openness is often cited as an important determinant for financial development, however the literature is not unanimous on the actual effect of trade policy on the financial system. Svaleryd and

Vlachoes (2002) find that there is a positive interdependence between liberal trade policies and financial development. Conversely, Ang and Mckibbin (2005) show that in the case of Malaysia, greater trade openness has a negative impact on the domestic financial system.

Chinn and Ito (2005) find that financial openness fosters equity market development conditional on a threshold of legal development, supporting the views of McKinnon (1973) and others that financial liberalisation is required for development. Ozkok (2010) argues that indicators of financial openness are split between "de jure" measures such as legal restrictions and capital controls, and "de facto" measures of stock and flow variables, and that the de facto measures are more impactful on the development of a financial system than the environment 'on paper'.

Empirically, Rajan and Zingales (2003) find that both trade and financial openness are required for financial development, and that without simultaneous opening of the current and capital accounts, an economies financial system will not grow (and may even experience repression).

Baltagi et al. (2008) note that the work of Rajan and Zingales (2003) is a departure from the proceeding literature, which advocates for a sequenced approach to market liberalisation – with countries required to first liberalise trade and then only move for financial openness (McKinnon, 1991 etc.). Baltagi et al. (2008) conduct empirical analysis to show that both trade and financial openness are statistically significant determinants of financial development. Contrary to the arguments of Rajan and Zingales (2003), Baltagi et al. (2008) find that either trade or financial openness can impact financial development (rather than both being necessary). Baltagi et al. (2008) also note that for low income countries that are have relatively closed capital and current accounts, liberalisation can act as an effective stimulus for financial development. However, it is found that in low income countries that are already relatively open, further liberalisation has little impact on financial development.

Patrick (1966) notes the importance of institutional and policy factors in facilitating the development of the financial system. He points to examples of early nineteenth century France, where restrictive banking legislation and religious objections to loans and interest charges limited the development of the financial sector. Similarly, in modern countries where the environment is restrictive, the development of the financial system will be stifled even in the presence of high economic growth rates.

3.2.2 Influence of Legal Systems

La Porta et al. (1997) argue that differences in the development of financial systems (as measured by their size and efficiency) are in part due to differences in the legal environment of their respective countries. Protection of legal rights and their enforcement for creditors and investors means that financiers are more likely to provide capital to entrepreneurs and businesses. This higher propensity

to participate (due to the legal system) means that more savings are directed into financial markets and institutions, thus spurring their growth and development. La Porta et al. (1997) also argue that legal systems influence the quality of the terms of finance. For capital markets this means higher valuations and for debt markets, lower interest rates. Favourable terms therefore encourage entrepreneurs to borrow more frequently or at higher amounts (or both), driving greater demand for financial services and products. In essence the legal system works to reduce the risk of investment for financiers, and in this way the legal environment serves to develop the financial system.

La Porta et al. (1997) find that differences in the strength of legal rights and their enforcement tend to depend on the origin of a country's legal system. It is noted that most country's inherited their legal system from European colonisation, and that today, these systems remain largely unchanged at their core. This certainly seems true for the case of Africa, where the European powers administered modern African countries as provinces of their home states. La Porta et al. (1997) find that countries with common law (British) legal systems provide the best enforcement of property rights for investors, whilst countries of French legal origin have the poorest protection for investors.

The work of Assane and Malamud (2010) shows that for key indicators of financial development, countries of British legal origin outperform those of French colonial background. The authors propose that British colonies where given relatively more autonomy whilst French colonies operated under a more centralised model and that this in part explains the difference in the levels of development.

In an extensive analysis, Huang (2010) finds that common law countries have a smoother and more gradual progression of financial development, whilst civil law countries are seen to experience surges in financial development the 1970s and late 1990s, but a decline in the late 1980s. Huang (2010) does not hypothesise as to why civil law countries have experienced this volatility in financial development, but it is perhaps linked to stability and assurance for investors that a legal system provides. During times of global economic or political uncertainty, civil law countries experience greater disinvestment than their common law counterparts.

3.2.3 Institutional Development

Linked to the importance of property rights is the strength of the institutions that govern and enforce the laws of a country. Herger, Hodler, and Lobsiger (2007) point out that the prospect for enforcing financial contracts is dependent on the willingness of the state to protect investors from being dispossessed. Institutions also enforce governance and oversight for the financial system, and a well-developed institutional environment means that this function can be executed more efficiently.

In their "Settler Mortality Hypothesis", Acemoglu, Johnson and Robinson (2001) argue that differences in institutional quality are a result of the colonisation strategies of the European powers. Regions that

that experienced high mortality rates amongst the initial European settlers (due to disease, conflict with local populations and other environmental factors) had weaker institutions established in these territories. The rationale is that colonies in these regions served merely to extract resources and therefore institutions were put in place to maximise income rather than provide strong governance. Conversely, colonies where settlers experienced low mortality rates developed institutions that were more aligned to their home country and focussed on governance and preventing excessive power for the state.

Beck et al. (2003) argue that the differences in institutional quality, determined initially by what purpose a territory was colonised for, impacts that current size of capital markets in those countries. Huang (2010) finds that whilst institutions, policy and geographical factors are all significant for financial development, institutional factors play a more fundamental role than the other categories.

3.2.4 Cultural Differences

Stulz and Williamson (2001) assert that a country's culture (defined as a system of beliefs that shape the actions of individuals within a society) impact financial development through the level of support that the culture provides for financial market interactions. Cultures may place less emphasis on the importance of investor rights, or foster an environment where the use of markets is not as important (such as conducting business within extended family units).

Since culture cannot be clearly measured in itself, Stulz and Williamson (2001) use religion and a county's dominant language as a proxy. It is argued that beliefs and social norms can more easily be communicated among countries and regions that share a language, and that similar culture is likely to be shared by countries with a common language. Stulz and Williamson (2001) find that investor protection is significantly related to culture. Specifically, countries with a Catholic culture offer significantly weaker creditor rights than other countries, even when controlling for legal background and income per capita. It is found that openness reduces the influence of religion on creditor rights, indicating that trade openness is a stronger factor in determining financial development.

With respect to religion, Stulz and Williamson (2001) argue that "historically, religions have had a lot to say about the rights of creditors". The authors go on to discuss how the medieval Catholic Church banned 'usury' – the receiving of interest from loans. This policy would clearly have hampered the growth of and development of early financial institutions and markets. The advent of the Protestant Church, who viewed the payment of interest as a normal part of commerce, allowed for the establishment of modern day debt markets and other financial institutions. Stulz and Williamson (2001) argue that these differing attitudes towards creditor rights have persisted sufficiently across time to explain differences in financial development in the late 20th and early 21st centuries.

Huang (2010) finds that the proportional fractionalization of a county's religious beliefs is significantly related to the efficiency of its financial system. This builds on the work of Alesina et al. (2002) who argue that lack of cohesion along ethnic and religious lines within a country can lead to political instability, poor development of institutions and ultimately to poorer economic performance. This is an interesting insight, and certainly relevant for studies focussing on Africa where ethnic and cultural diversity has resulted in numerous conflicts in the past. However, in building a model to measure the drivers of financial development, institutional indices and indicators that more closely follow economic performance (perhaps GDP per capita) will be better measures than religious factionalism. This argument is based on the preference to measure 'outcomes' that are less far removed from financial development (such as real economy performance) rather more primary level input factors (such as ethnic diversity).

3.2.5 Geography and Initial Endowments

Huang (2010) finds that geographic indicators tend to be leading indicators for the development of institutions (both financial and in other areas). The author shows the proximity to the coast or navigable rivers and proximity to "capital-goods-supplying centres" have a positive influence on financial development.

This echoes the findings of Gallup, Sachs and Mellinger (1999), who show that after controlling for institutional and economic policies, differences in geography account for variance in economic development. Gallup, Sachs and Mellinger (1999) argue that coastal regions experience significantly higher levels of development than landlocked countries due to a greater ability to trade externally. In addition countries in tropical geographies, experience less development than economies in temperate zones due to limitations on agricultural productivity and higher incidence of disease. Whilst the Gallup, Sachs and Mellinger (1999) study focuses on economic development, it is reasonable to assume that these factor would also influence financial development (even if only indirectly through greater economic activity).

Initial endowments of natural resources can also influence the eventual level of financial development. Huang (2010) argues that initial endowments shape the cultures of a region, with "diffuse" resource endowments (such as wheat, livestock etc.) requiring more collaboration and leading to better social cohesion than "point source" endowments (oil, gold etc.) which can promote conflict. Ultimately these differences go on to shape the institutional and cultural environment in which the financial system develops.

3.2.6 Other Determinants

Allen et al. (2013) argue that macro-economic factors and what the authors describe as "exogenous determinants" (such as population and population density) are plausible determinants for financial

development. The authors find that population density has a large impact on measures of banking sector development. Perhaps the increasing uptake of mobile banking technologies will mean that population density is less important for banking development in the future.

Huang (2010) finds empirically that population size, GDP per capita growth and physical land area of a country are found to be positive determinants for financial development. Population, GDP per capita and in some cases, land mass (of course not all large countries are densely populated), are likely to be leading or proxy indicators for market size or at least potential in an economy. Large domestic markets enable growth and development, which requires access to capital – leading to the formation and on-going development of equity and other capital markets. It may be useful to determine a single indicator to capture this market potential which more closely follows the consumerism or economic growth in a region. It is likely that GDP or income per capita will be the best proxy for this, and indeed Huang's empirical findings show that the log of GDP per capita accounts for much of the variance in stock market development.

Allen et al. (2013) include an indicator for human capital development in their approach, arguing that a larger and more educated work force will facilitate the expansion of financial services. Ozkok (2010) makes use of similar indicators for the educational quality of a country.

The nature of exports is also found to impact financial development. Beck (2002) shows that countries with higher portions of manufacturing exports to GDP have better developed financial systems whilst Huang (2010) finds significant differences in financial development between countries that export manufactured goods versus primary goods exporting countries.

Allen et al. (2013) choose to include "offshore centres" in their model for the drivers of financial development. The authors assert that the financial sectors of offshore centres are typically larger than their economies would other warrant and that economies that act as hubs for international business are likely to have more developed financial systems.

3.2.7 Comment on Policy Implications

It must be noted that the literature tends to group its findings on the determinants of financial development when there are actually two separate types of leadings indicators. Some indicators seem to be significant more because of the history of recent human development rather than having an implicit causal relationship with financial development. From a policy perspective, it is important to distinguish what can be done practically to drive financial system development from what simply has a historical empirical connection.

For example, Huang (2010) finds that the "EURFRAC" indicator – a measure of the proportion of the population that speaks a European first language (adapted from Hall and Jones, 1999) is a significant indicator for financial development. It could be argued that while empirically it is true Western countries are typically far more financially developed than non-European (or Western) countries, it's not clear that having a European language population has any real causal benefit for the development and advancement of a financial system. Rather, the historically greater economic development in Europe led to the greater financial development that we see today.

Policy makers should therefore endeavour to support those factors that will directly support the development of a financial system, rather than focus on those areas where correlation exists, but without any prospect of short term causality.

3.3 Measures of Financial Development

Much of the literature speaks of financial development in terms of the few indicators used as measures in the study. Adnan (2013) describes financial development as the "policies, factors and institutions that lead to efficient intermediation and effective financial markets". Adopting a wider view would likely be useful when selecting indicators to measure financial development. Čihák et al. (2013) note that there are "serious shortcomings" associated with the measurement of financial systems. Particularly, access to good data is an inhibiting factor, with many studies using the banking sector size as a proxy for the overall system, when of course it is just one component and size is not a measure of efficiency or stability.

If the aim of a financial system is ultimately to improve the efficiency of transactions in the economy and effectively allocate savings, then when one speaks of financial development, they are implying that these functions are done more effectively than in a less developed system. However, many of the measures related to aspects of size and volumes, which do not speak the efficiencies of these markets and even less so to the ultimate impact on the welfare of a country's inhabitants.

Many studies in the literature propose to measure the development of a financial system against the broad goals of financial markets and institutions (Allen et al., 2013; Beck et al., 2008; Merton and Bodie, 2004; Saci and Holden, 2008 etc.). The absence of direct measures to capture and compare the performance (in terms of the functions of financial systems discussed in the previous sections) of financial systems across countries means that indicators must be constructed that indirectly measure the goals of a financial system. For example, financial depth or size is not a goal in itself, but is a proxy for the extent of services provided by the financial system (Čihák et al., 2013).

Čihák et al. (2013) develop measures for both institutions (including banks and other institutions) and markets (equity and bond) using four broad characteristics of financial development;

- The size (or depth) of financial institutions and markets
- The degree of inclusion of, or access to financial institutions and markets
- The efficiency of financial institutions and markets in providing the relevant financial services
- The stability of financial systems

In additional to the characteristics of financial systems, the literature tends to distinguish between financial institutions and financial markets (capital and debt markets). These are then discussed in terms of their size and influence over the rest of the economy.

This review of the literature will use these common approaches to categorising the measures as a structure for the discussion. The review will also highlight the frequently used indicators for financial development from other studies.

3.3.1 Financial institutions

Beck et al. (1999) propose that financial institutions can be grouped into three broad categories – central banks, deposit money banks and other financial institutions (the literature also refers to the latter as non-bank institutions).

The first group, central banks, includes central banks and institutions that perform functions of monetary authorities. Beck et al. (1999) site the Exchange Stabilization Fund of the United States Treasury Department as an example (the Exchange Stabilization Fund is separate to the US Treasury Department, but intervenes in the foreign exchange market as oppose to the central bank intervening directly). Expanding the definition is important, as it is likely that many countries Treasury Departments' have divisions that play some function in monetary policy. The second category, deposit money banks, comprises commercial banks and other financial institutions that accept transferable deposits as liabilities, such as demand deposits (World Bank 2014). The final group, other financial institutions, includes institutions that act as financial intermediaries without incurring liabilities usable as means of payment. Characteristics of this category include financing themselves mainly through the issuing of negotiable bonds and acceptance of money deposits but not providing transferable deposit facilities.

Beck at al. (1999) note that data on banking institutions tends to be far more complete and accurate compared to non-banking institutions, which is often fragmented or non-existent – especially in developing markets. Despite issues around data availability, the size of the non-banking sector means it should not be ignored, with the global value of non-bank financial intermediation growing by $5

trillion in 2012 to reach $71 trillion in 2013 (Financial Stability Board, 2013). This poses a serious challenge to studies wishing to examine this component of financial systems.

3.3.1.1 Size of Financial Institutions

Measures of the size of financial intermediaries can be taken both relatively – comparing institutions within a system to each other – or in absolute terms by relating the measures to GDP. Beck et al. (1999) propose comparing the asset values ('assets' here represents total claims on domestic non-financial sectors and can be interpreted as the total domestic financial intermediation that the respective financial institution performs) of each of the three groups of intermediaries against the total value of all three categories. The three proposed measures are;

- Deposit Money Bank assets to Total Financial assets
- Central Bank assets to Total Financial assets
- Non-Bank assets to Total Financial assets

The Total Financial assets term above is simply the sum of Deposit Money Bank, Central Bank and Non-Bank asset values.

Ang and Mckibbin (2005) argue that commercial banks are more likely to find profitable investments opportunities and that resources in central banks are less efficiently allocated. However this fails to account for the value that non-banking institutions such as pension funds and insurance companies can add in terms of capital allocation.

Beck et al. (1999) find that central banks play a more active role in low-income countries' financial systems and that their relative importance decreases as income rises, with other financial institutions gaining importance (typically deposit money banks). This would have implications for the choice of indicator depending on the economy in question. Central bank indicators would capture more information about the financial system in low income countries (Beck et al., 1999), whilst deposit money bank indicators would be more appropriate for high income countries. An alternative is to always use an aggregate approach of total banking (deposit plus central) assets and credit as a measure.

It is noted that the lack of data related to non-banking institutions has led many studies to use deposit money bank assets to deposit money plus central bank assets (excluding non-banking activities), where total assets held by deposit money banks as a share of the sum of deposit money bank and central bank claims on domestic real sector. Kind and Levine (1993) among other make use of this indicator, which is commonly reported on in databases on financial statistics (World Bank, IMF etc.).

Ultimately these relative measures provide insight into the potential effectiveness of capital allocation from the financial system. Prevailing theory asserts that commercial banks would allocate capital to more effectively than the state. It would be of interest to observe the relative changes in the difference between commercial banking and central bank assets over time. This change might indicate the changing efficiency of the financial system, as control of assets in the economy shift towards either arguably more productive allocators (the commercial banks) or perhaps towards the central bank. The proportion of assets held by non-bank institutions would perhaps indicate the a system is increasingly effective at pooling savings and allocating the funds – whilst these entities do not take deposits, they would function much like banks with respect to mobilising savings, acquiring information, allocating the savings and monitoring investments.

Measuring the size of financial intermediaries against the economy as a whole provides insight into how large a role is played, and the relative importance of, financial services in an economy. Three common indicators are;

- Deposit Money Bank assets to GDP
- Central Bank assets to GDP
- Non-Bank assets to GDP

Where assets are defined by Beck et al. (1999) to include claims on the whole non-financial/real sector of the economy, including government and public entities.

Like the 'relative' measures, the above indicators give a view of the capital held by institutions with differing ability to allocate funds productively. Expressing the measures in terms of an economy's GDP adds the additional insight of the relative importance of the financial sector within the economy and allows for cross country comparisons.

3.3.1.2 Other Financial Institutions

It is useful to disaggregate the 'non-bank' or 'other financial institutions' when examining financial systems. This allows for a more nuanced analysis and if necessary, research can focus on the relevant sub-sections of the category (subject to data availability or perhaps the structure of the financial system in question).

Beck et al. (1999) propose five categories for other financial institutions;

1. *Bank-like Institutions*

   These institutions are made up of intermediaries that accept deposits without providing transfer facilities (such as hedge funds or savings banks).

2. *Insurance Companies*

This includes both long term (life) and short term (non-life) insurance activities. However, most datasets exclude funds managed by government or social security schemes.

3. *Private Pension and Provident Funds*
   As with insurance companies, pension fund activities are exclusive of government pensions.

4. *Pooled Investment Schemes*
   These are financial institutions that invest on behalf of their shareholders in certain types of assets of markets (such as mutual funds or real estate investment schemes).

5. *Development Banks*
   These institutions receive their capital mainly from governments or international development organisations and funds.

In practice, particularly for studies focussed on developing economies, this level of disaggregation is not common. Data typically only exists separately for the insurance industry, and this means that the insurance sector tends be used as a proxy for all other non-bank institutions.

The fact that non-bank institutions are often governed by different regulations means that their impact on the wider economy will likely differ from that of commercial banks. Compulsory insurance and pension schemes inflate the flow savings to these non-bank entities and regulation over investment mandates (particularly for pension funds) mean that the ability of these institutions to freely allocate capital might be constrained. Hedge funds can engage in far riskier activity than most commercial banks, with implications for the stability of the wider financial sector.

The actual impact of these differences will vary across countries but it is important to note that the non-bank sector will not provide the 'functions of financial systems' in exactly the same way as the deposit taking institutions. When possible, separate measurement of non-banking institutions is therefore preferable.

3.3.1.3 Measures of size of other financial institutions

As with banking intermediaries, ratios of total assets to GDP give an indication of the size of these other financial institutions relative to the rest of the economy. It may also be appropriate to take relative measures against the size of only the financial system (assets to total asset ratios) or perhaps even within one of the sub-categories themselves – subject to data availability (for example insurance assets to total assets of other financial institutions). Claims on the private sector relative to GDP will also be a useful measure of the activity of other financial institutions. In general, data on assets or private sector claims tends to be very limited for non-banking institutions (Čihák et al., 2013).

The insurance industry in particular has its own measures used in several studies (Adnan, 2013; Beck et al., 1999 etc.). Measures of the insurance industry found in the literature are;

- Assets of the Insurance Sector
- Insurance Penetration
- Insurance Density

Where assets measure the size of the insurance market, taken as assets of the insurance industry to total financial assets or GDP. This can give insight into the market structure and the relative importance of the insurance sector in the financial system. This would have implications to risk exposures and would perhaps need to inform policy and regulatory decisions for the economy in question.

The other two measures capture the activity of the insurance industry, with Insurance Penetration being a measure of total insurance premiums paid to GDP and Insurance Density being a measure of total insurance premiums paid per capita.

It should be noted that with all measures, both life and non-life insurance data have been used in different studies. Beck et al. (1999) focus on only life (or long term) insurance data for all indicators, whilst Adnan (2013) makes use of both life and non-life premiums to GDP in the research. There is not a clear benefit to measuring one insurance type over the other and the choice is likely due to data availability – ideally the two would aggregated.

Whilst is does not appear commonly in the literature, a possible indicator of non-bank development over time could be obtained by measuring the difference between Private Credit by Deposit Money Banks to GDP, and Private Credit by Deposit Money Banks and Other Financial Institutions to GDP. This would show the proportional growth in depth of the non-banking sector over time (although this would also capture any growth from the central bank).

3.3.2 Measures of financial system structure

Levine (1997) argues that studies of financial development need to take a view of the overall financial structure, rather than just focussing on single measures such as monetary aggregates or a particular type of institution. Levine asks the question “what is the relationship between financial structure and the functioning of the financial system?”

The structure and composition of the market is commonly measured using market concentration ratios for the banking sector. Bank concentration indicators are typically calculated as the assets of three largest commercial banks as a share of total commercial banking assets – although some

measures take the top 5 banks in the market (World Bank, 2014). The reasoning behind this measure is that highly concentrated markets could lose efficiency over time due to a lack of competitive pressure – this could mean that capital allocation decisions are well below the optimal level. Beck et al. (1999) also suggest that highly fragmented (low concentration ratios) markets might be evidence of an undercapitalised banking sector.

Measurement of foreign involvement in the banking sector is of interest due to several pieces of empirical evidence for the impact that foreign participation has on a domestic banking sector. Demirgüç-Kunt et al. (1998) find that greater foreign bank penetration improves domestic banking efficiency and leads to enhanced economic growth. Clasessens, Demirgüç-Kunt and Huizinga (1997) show that increased foreign participation leads to lower profitability and overhead expenses for banks across an economy.

It is likely that the involvement of international banks in a domestic sector has a greater impact on the industry's competitiveness than the introduction of additional domestic players. Banks able to expand from their original markets are likely to be efficient and competitive whilst also being able to leverage economies of scale in their operations. Given these greater efficiencies there is an argument to be made that foreign participation in financial markets improves the allocation of resources. Foreign institutions may also improve savings mobilisation as their reputation and international brand may motivate savers to deposit more – although of course the converse may also be true, and domestic savers may be hesitant to place their trust in foreign banks.

Montes (1999) also argues that financial systems with international participation are more developed than those with a purely domestic focus, given the expertise that these international players bring to the market. Of course this might not always be true and it is conceivable that foreign banks might have had an opportunity to expand internationally due to some sort of market protection or certain economic conditions in their domestic environment. Still, the evidence around the efficiencies that foreign participation brings to the domestic banking sector makes it a worthwhile measure. Two commonly used measures are;

- Foreign Banks among Total Banks
- Foreign Bank Assets to Total Assets

Where foreign banks to total banks represent the number of foreign owned banks to the number of the total banks in an economy (usually as a percentage). A foreign bank is typically defined as a bank where 50% or more of its shares are owned by foreigners (World Bank, 2014). Foreign bank assets to total bank assets is the ratio of foreign owned banking assets to the total banking assets in the domestic financial system.

Laurenceson and Tang (2005) note the importance of international financial services companies (banks in particular) in establishing an international financial hub. Whilst the presence of international companies (both financial and otherwise) is likely to be closely correlated to an economy's financial development, their presence alone does not speak to levels of financial access or inclusion. It is conceivable that a city could have a high concentration of international financial intermediaries, but that little of this activity trickles down to the broader population. If the aim of financial development (from a policy perspective at least) is to raise the level of welfare in an economy, then prevalence of international financial players, and intermediation of foreign capital will only serve as a partial measure of financial development at best.

A measure for the level of public ownership in the deposit money banking sector is proposed by Beck et al. (1999). Private versus public ownership is of interest to researchers and policy makers for the banking system and wider economy. There are likely to implications for the efficiency of banks depending on their ownership structure. The proposed indicator for public participation is the share of publically owned commercial bank assets to total banking sector assets (with a bank being classified as publicly owned if greater than 50% of its equity is held by government or public entities).

For developing countries (and perhaps Africa in particular) the investment mandate and focus may also be different depending on ownership type. Publicly owned banks are likely to be incentivised towards investment in more socially aligned and developmental projects, rather than a pure focus on financial return. These sorts of institutions may also have a greater appetite for risk than privately held banks. This difference in approach would possibly be captured in the banking efficiency measures (such as net interest margins being lower for developmentally focussed banks). However, the ultimate welfare impact is likely to be greater for these institutions at the expense of immediate financial return.

Beck et al. (1999) find a negative correlation between country level income and concentration in the banking sector, indicating greater competition in high income economies. It is also found that in low and lower-middle income countries, foreign bank participation is higher, both in terms of number of firms as well as asset ratios,. The authors however do not suggest what impact this has had on improvement of the banking system in these markets, and it is likely that the high level of foreign participation is more due to a lack of domestic participants (with the foreign players exploiting the market opportunity). Public involvement in the banking sector is also shown to be significantly higher in low income countries compared to lower ratios in middle and high income countries. Studies should aim to account for these observations when selecting financial development indicators for countries of varying income levels.

Baliamoune-Lutz (2013) argues that banking sector measures are more appropriate for developing countries given the relatively low activity rates in domestic stock markets. Most of the formal savings and borrowing also moves through the banking sector (although in the case of Africa, it must could be argued that the size of the informal sector is significant, which may skew empirical findings). In addition, non-bank entities in Africa are often still largely managed by the government. Baliamoune-Lutz (2013) also points to a lack of data in stock market and non-banking sectors as a motivation to focus on banking indicators.

3.3.3 Capital Markets

Three indicators are commonly used in the literature to measure size and efficiency of stock markets (Allen et al., 2013; Levine et al., 2013 etc.);

- Capitalization to GDP
- Total Value Traded to GDP
- Market Turnover Ratio

The first measure captures the total value of all listed shares in a stock market as a percentage of GDP. This gives a good indication of the size of the exchange relative to the overall economy. Stock market capitalisation is an extremely common measure in the literature (Adnan, 2013; Ang et al., 2005; Gelbard and Leite, 1999; Ozkok, 2010 etc.).

Total value traded is the total value of all traded shares in a stock market exchange in a given period, as a percentage of GDP. This provides insight into the liquidity of the market, with more liquid markets theoretically being more effective allocators of capital, rewarding good investments whilst punishing poor performers. It should be noted that many African exchanges are highly illiquid (Jefferis and Smith, 2005) and this would have implications for the ability of these markets to allocate capital effectively and ultimately improve economic performance.

Finally, the market turnover ratio measures the total value of shares traded during the period divided by the average market capitalization for the period. This is another indicator of efficiency, which controls for the size of the stock market (useful for studies in African economies where exchanges tend to be very small). A small exchange with lots of trading activity will have a higher turnover ratio compared to a large exchange with low trading volumes.

For less developed economies, the value of a capital market can be dominated by a small number of firms, which can complicate analysis. La Porta et al. (1997) incorporate the number of Initial Public Offerings (IPOs) into their research, as well as average capitalisation value per firm (total capitalisation divided by the number of listed companies). The use of IPO figures adds a sense of how active the real

economy is in raising finance from stock exchanges, and whether the markets are fulfilling a wider role of resource allocation for the economy, or simply turning over the value of a few listed firms.

Measures of the depth of financial markets are typically split between stock (equities) and debt (bonds). Čihák et al. (2013) assert that Outstanding Volume of Private Debt Securities to GDP is a common and useful measure for bond market size.

Beck et al. (1999) also propose the use of indicators for the bond market, as well as measures of primary equity and bond market activities (i.e. initial public offerings and debt issues);

- Private and Public Bond Market Capitalization to GDP
- Equity Issues to GDP
- Long Term Private Debt Issues to GDP

Where private and public bond market capitalization to GDP measures the total amount of outstanding debt securities issued by both public and private organisations to GDP. Similar to the stock market indicators, this gives an understanding of the relative importance and level of development of the domestic debt market. Equity and long term private debt issues to GDP measures new equity issues (or new long term private debt issues) to GDP. These indicators give insight into the level of activity and size of domestic primary equity and debt markets specifically.

It should be noted that these last three indicators are probably not appropriate for comprehensive African country analysis, due to a lack of data and the lack of a developed domestic equity or debt market in the region.

3.3.4 Characteristics of Financial Systems

Many studies in the literature propose to measure the development of a financial system against the broad goals of financial markets and institutions (Allen et al., 2013; Beck et al., 2008; Saci and Holden, 2008 etc.).

The absence of direct measures to capture and compare the performance (in terms of the functions of financial systems discussed in the previous section) of financial systems across countries means that indicators must be constructed that indirectly measure the goals of a financial system. For example, financial depth or size is not a goal in itself, but is a proxy for the extent of services provided by the financial system (Čihák et al., 2013).

3.3.4.1 Financial Depth

Shaw (1973) describes financial deepening as the accumulation of financial assets at a faster rate relative to non-financial assets and total output. A 'deep' system would therefore be one in which the proportion of financial to non-financial assets is high.

The use of monetary aggregates can be used to provide a very broad indicator for financial depth. Liquid Liabilities to GDP is a commonly used measure in the literature (Adnan, 2013; Beck et al., 2008; Huang, 2010; Levine, 1997; Jung, 1986 etc.), but whilst it captures the depth or overall size of a financial system, it does not distinguish between different types of institutions and markets.

Liquid liabilities, also known as broad money supply or M3, are a measure of the liquid wealth within an economy. King and Levine (1993b) argue that not all studies or sources of data make use of the same definition of liquid liabilities (see the appendix for the formal World Bank definition). This can lead to mis-measurement or an emphasis on an unintended aspect of the financial system. Of course, in developing countries the data available to construct a complete aggregate of broad money supply might not be available – particularly those amounts held by non-banking institutions.

Gregorio and Guidotti (1995) note that whilst popular, the use of monetary aggregates can pose some problems in measuring financial development. Specifically, if measured using a more narrow definition of liquid liabilities (such as M1 rather than M3), the presence of a large amount of liquidity in an economy may be indictor that the financial system is not allocating resources effectively to investments (or that there is a lack of attractive investment opportunities). Gregorio and Guidotti (1995) follow the view of King and Levine (1993b) in using only M3 to GDP (or at least M2) for a measure of financial depth.

Ang and Mckibbon (2005) argue that monetary aggregates reflect the level of transactions or liquidity but not the efficiency of allocation which would ultimately deliver wider economic benefits. Adnan (2013) also critiques the use monetary aggregates, arguing that they overlook the openness of an economy (where an open economy is often found to be more financially developed and exhibit higher economic growth rates as per Rajan and Zingales, 2003 etc.) and also fails to account for levels of public borrowing, which has implications for the efficiency and effectiveness of resource allocation.

In all, whilst monetary aggregates are still widely used in studies of financial development, their shortcomings mean that in most cases they are (and should be) supplemented with other indicators.

Beck et al. (1999) describe the "activity" of financial institutions with respect to the provision of credit. In the sense that a larger institution can typically provide more services, common measures for the depth of the financial system are;

- Private Credit by Deposit Money Banks to GDP
- Private Credit by Deposit Money Banks and Other Financial Institutions to GDP

Where private credit represents banking claims in the private sector and captures the financial intermediation with the private, non-financial sector. Both indicators focus on credit issued by intermediaries other than the central bank to the private sector – not government and public entities (Beck et al., 1999).

Private credit to GDP (specifically, domestic private credit to the real sector by deposit money banks – although some measures include private credit from non-bank institutions) is a widely used measure of financial depth in the literature (Adu et al., 2013; Ang and Mckibbin, 2005; Gelbard and Leite, 1999; Ozkok, 2010 etc.). Gregorio and Guidotti (1995) argue that the ratio of credit to the private sector and GDP is a better measure than monetary aggregates in that it more accurately represents the volume of funds channelled to productive activities, thereby being a closer predictor of the influence of financial development on growth and the ultimate welfare of an economy.

One of the primary functions of financial intermediation (namely savings mobilisation to productive investments) is therefore captured with these indicators. Adnan (2013) goes so far as to argue that "efficient allocation of credit is the main feature of a developed financial system". These indicators alone however do not capture the efficiency with which the capital is being allocated, and the fact that credit to government is usually excluded might mean that the measures are excluding financial intermediation to potentially productive and welfare enhancing government investments. However, some might argue that the private sector is better placed to evaluate investments and allocate capital. This is more a question of political economy, and depending on the outlook, a measure of credit provision to either both public and private investments or only private would be appropriate.

Demetriades and Hussein (1996) make use of bank claims on the private sector to GDP as a financial development indicator, and point out that the use of both bank deposit and bank credit measures can yield additional insights – bank deposits may be increasing whilst provision of credit remains flat, perhaps due to increasing reserve requirements dictated by regulators or at certain levels of interest rates. Conversely, credit may be increasing whilst deposits remain constant, perhaps indicating lower reserve ratio requirements.

The use of Total Banking Assets to GDP as an indicator, beyond Private Credit to GDP, includes credit to the public sector (government and state owned entities) as well as other bank assets besides just credit. Čihák et al. (2013) argue that this makes total banking assets to GDP a more comprehensive measure of financial sector (or at least banking sector) depth, but point out that data for this indicator is less available than the more commonly used private credit to GDP.

3.3.4.2 Financial Access

The use of financial inclusion as an indicator of development is not common in the literature (although its prevalence in growing in more recent work such as, (Demirgüç-kunt and Klapper, 2013) but is a useful indicator of potentially greater welfare impact of financial systems with higher degrees of access – more citizens being able to access and benefit from financial services.

Theoretically, more inclusive financial systems spread the benefits of risk mitigation and lower transaction costs to more of the population, whilst increasing the pool of savings for allocation. Access to financial services can also encourage investment from the wider local population rather than having to rely on international sources or concentrated domestic savings (Demirgüç-kunt and Klapper, 2013).

Proposed measures for financial access are usually presented in terms of population. Data on Bank Accounts, ATMS or Bank Branches per portion of the population (typically 1,000 or 100,000) are available but suffer from certain limitations (Čihák et al., 2013). Bank branches for example are becoming less prevalent with the increasing provision of online banking services. Bank accounts per portion of the population may be over represented in the data, as one person may have multiple accounts within or across banks. In Africa, the lack of existing infrastructure means that innovative ways to provide access to services are becoming more and more prevalent. Whilst payments through mobile devices and other technology enabled means of financial access are very likely to be beneficial to economies and should be encouraged, the present a challenge to researchers in terms of accounting for their use (to be fair, more recent surveys and reports such as the Global Findex include questions about method of access and alternatives to formal accounts – such as mobile money).

Differentiating between access and use of financial services is important, with access typically describing supply of services and use referring to demand. Of course, these categories are not also so clear cut, and supply constraints, especially in rural areas or low income countries, might imply much lower demand for financial services in these regions than would exist if the services were more available.

Demirgüç-kunt and Klapper (2013) conduct some extensive cross-country analysis on levels of financial inclusion and access. Three broad indicator areas are used in the study, namely ownership and use of bank accounts, savings behaviour and borrowing activities. The authors argue that accounts at a formal financial institutions is relatively simple to define and observe, making it a relatively more reliable indicator for financial inclusion.

Savings and borrowing behaviours are much harder to measure and define, with the concept of savings being subjective and differing across countries and cultures. Borrowing activities can also be difficult to measure, with considerable activity in the informal sector.

In measuring access to stock or debt markets, a proxy of market concentration is typically used (Čihák et al., 2013). The reasoning is that high market concentrations could indicate that smaller businesses struggle to enter these markets (perhaps through regulatory constraints around initial public offerings or simply a lack of real sector activity to drive exchange listings). Indicators in this category include the percentage of market capitalisation or value traded outside of the ten largest listings on the exchange, the ratio of domestic debt to total securities and the ratio of new corporate bond issues to GDP.

3.3.4.3 Financial Efficiency

The efficiency of financial intermediaries is related to their ability to effectively provide the necessary functions and services that underpin development in the real economy. Čihák et al. (2013) list overhead and other cost ratios, net interest margins, non-interest income ratios and lending-deposit spreads as measures for institutional efficiency. It is noted that profitability and efficiency are not necessarily strongly related, and inefficient financial institutions can operate very profitably in times of economic upswing (Čihák et al., 2013). Under-developed and uncompetitive markets are also likely to shield inefficient financial institutions, and measures of efficiency should be reviewed in conjunction with indicators of market size and concentration for perspective.

Čihák et al. (2013) point out that in a small number of developed economies, data are available to perform complex measures of institutional efficiency using neural networks and data envelopment analysis – of course the data needed for this are not currently available for most countries.
Commonly used efficiency measures for financial markets are;

- Stock Market Turnover Ratio
- Bid-Ask Spread (for debt markets)

More advanced (and far less common) ratios include;

- Price Synchronicity
- Private Information Trading
- Real Transaction Cost

Price synchronicity is calculated as the degree of co-movement of individual stock returns. The measure aims to show the “information content” of equity prices, with the expectation being that more efficient markets provide better quality information about individual investments. Private information trading shows the percentage of firms trading on private information and has been proposed as another measure of financial market efficiency (although it is not clear how this is defined or consistently measured). The real transaction cost approximates the transaction cost associated with trading a particular security – lower transaction costs would indicate a more efficient market (Čihák et al., 2013).

3.3.4.3.1 Measures of banking efficiency

Measurement of the banking sector's efficiency is useful in determining how well savings are being mobilised and allocated to investors. Two commonly used measures of banking efficiency are;

- Bank Net Interest Margin
- Bank Overhead Cost to Total Assets

Where the net interest margin is the accounting value of a bank's net interest revenue as a share of its average interest-bearing (total earning) assets. Overhead costs refer to operating expenses of a bank as a share of the value of all assets held (World Bank, 2014). Both of these measures give insight into the efficiency with which banks are run. Interest margin indicates the return on investment from its assets and captures the bank system's management of risk and quality of investment screening. Overhead cost is a proxy for the operational efficiency of the banking system.

Demirgüç-kunt and Levine (2008) note that in situations where interest rates are relatively high – perhaps due to high levels of government borrowing or changes in monetary policy – that the demand and allocation of resources to the private sector will be limited whilst bank profitability is not necessarily effected (and may even improve). This demonstrates the importance of a holistic view to measuring financial development, as certain indicators fail to capture the true state of the system.

3.3.4.4 Financial Stability

A more stable financial system would theoretically be more beneficial to the wider economy, with fewer shocks or disruptions that can impact the real economy or other parts of the financial system. Beck et al. (1999) highlight the negative impact of financial crises on a country's economy and the welfare of its citizens and argue for the importance of a stable financial sector. Like financial inclusion, measures of the stability of a financial system are relatively new in the literature.

Proposed measures for financial stability include;

- Bank Z Score
- Bank Liquidity Ratios (or non-bank Liquidity Ratios)
- Ratios of Non-Performing Loans

The bank Z score is a measure of an institution's solvency risk, calculated using ratios of equity capital and returns to assets and the volatility of returns (using the standard deviation of return on assets as a proxy). A higher Z score implies a lower risk of insolvency. The Z score is popular due to its simplicity and the relative accessibility of its input data (compared to sometimes harder-to-find market level data). The Z score also allows for comparisons of solvency risk across different categories of institutions (banks versus insurance companies etc.). Criticism of the Z score is its reliability on

accounting data, which can be smoothed or manipulated. In addition, the indicator focuses on individual institutions and fails to factor in linkages within the sector and contagion risk that a single default can add to the industry as a whole (Čihák et al., 2013).

Appropriate liquidity reserves would mean that institutions are better able to withstand sudden shocks related to withdrawals and demand for deposits (such as bank runs). Institutions or systems with higher liquidity ratios can therefore be considered less risky and more stable. High ratios of non-performing loans might function as an indicator of current or near term financial instability.

Čihák et al. (2013) propose that "excessive credit growth" could be a leading indicator of instability in a financial system, or even a banking crisis. It is noted however, that it is difficult to determine objectively and ex-ante, what constitutes excessive rather credit growth rather than healthy growth. Financial market stability tends to be measured using stock market (or sovereign bond market) volatility ratios, but other indicators include Skewness of Returns (with a negative skewness likely to produce larger negative returns and be less stable) or even vulnerability of markets to manipulation – defined as the percentage of exchange listed firms that are susceptible to manipulation (Čihák et al., 2013).

Much of the prominent research on financial development fails to factor risk into its analysis. Given the importance of a stable financial system and the role that the wider economy plays in this stability, it might useful to somehow account for the systemic risk in financial systems. The use of country credit ratings might be a way to approach this, where the standard indicators are adjusted to factor in credit risk.

3.3.5 Alternative Approaches to Measuring Financial Development

Adnan (2013) describes two broad groups for measuring financial development. The first being measures of the observed outcomes of financial development and the second measuring the inputs into the system such as the business, political and institutional environment (or more specifically, the proxy measure for these). The discussion above has dealt with the 'direct' measures of financial development, whilst Adnan's input indicators are covered under the Drivers and Determinants of Financial Development section. Adnan's (2013) approach aims to determine the 'potential' level of financial development, given the determining inputs, rather than measure the functional activities or characteristics of the system directly. Allen et al. (2013) make use of this approach to measure the "gap" between 'potential' financial development and 'actual' as measured by direct indicators. This sort of analysis has interesting applications for policy development and would allow governments to benchmark the development of their financial systems against an expected level given the wider environment. Any 'gaps' would therefore indicate a need for further study into potential bottlenecks in the system.

An alternative approach to measuring financial development might be to benchmark the financial system in question against the Efficient Market Hypothesis (EMH), with systems that more closely represent the perfectly efficient form being more developed. Whilst there are numerous studies into the degree with which markets perform efficiently (Jefferis and Smith, 2005 etc.), the literature on financial development does not seem to draw in EMH as a measure of development. This is likely due to the fact that theory focuses on capital markets rather than the broader financial system.

4 Methodology and Hypotheses

4.1 Methodology – Data Selection

4.1.1 Country Selection

As mentioned in the work of Baliamoune-Lutz (2013), Africa makes for an interesting choice of sample countries given the broad range of stages of financial development in economies across the continent.

Table 4.1 – Sample Countries with Selected Attributes

Country Name	GNI per capita (constant 2005 US$)	Income Group	GDP (constant 2005 US$)	Legal System Origin	Implemented open trade policy by 1994?
South Africa	$ 5 082.16	Upper middle income	$ 247 051 562 311	British	Yes
Mauritius	$ 5 047.80	Upper middle income	$ 6 283 796 155	French	Yes
Botswana	$ 4 848.93	Upper middle income	$ 9 931 223 496	British	Yes
Namibia	$ 3 526.85	Upper middle income	$ 7 261 366 631	British & German	Yes
Tunisia	$ 3 055.68	Upper middle income	$ 32 282 960 678	French	Yes
Morocco	$ 1 923.21	Lower middle income	$ 59 523 857 868	French	Yes
Egypt	$ 1 245.96	Lower middle income	$ 89 685 724 889	French	No
Côte d'Ivoire	$ 899.31	Lower middle income	$ 16 363 437 145	French	No
Nigeria	$ 708.39	Lower middle income	$ 112 248 324 602	British	No
Zambia	$ 570.78	Lower middle income	$ 7 178 556 336	British	Yes
Kenya	$ 523.44	Low income	$ 18 737 895 400	British	Yes
Ghana	$ 495.74	Lower middle income	$ 10 731 883 141	British	Yes
Tanzania	$ 366.89	Low income	$ 14 141 916 592	British	No
Uganda	$ 304.56	Low income	$ 9 013 834 490	British	Yes
Malawi	$ 210.08	Low income	$ 2 754 995 876	British	No

Sources: The World Bank, CIA World Fact Book, Wahab (2012), Sachs and Warner (1995)

The choice of sample countries for this study are shown above in Table 4.1 along with some accompanying data to give a sense of the variance of the economic environment and underlying factors that might impact the level of financial development. GDP and GNI per capita figures are from 2005 – the mid-range of the dataset time series. The countries are ranked by Gross National Income per capita.

The selection of countries for the sample aims to achieve a good spread across income levels and geographies to avoid any regional conditions that might impact financial development or other economic factors. Beyond this, availability of data was the primary constraint in country selection, with the majority of African countries lacking sufficient data observations over any significant time period.

As discussed in the literature (La Porta, 1998; Huang, 2010 etc.), the origin of a countries legal system is shown to have some impact on the level of financial development and the broader economic environment. Nine of the sample countries derive their legal system from the common law British system (with Namibia having a blend of common law and German constitutional law). The remaining five sample countries derive their legal systems from French origin.

Countries that implemented policies to promote open trade by 1994 may possibly have experienced greater economic growth and financial development through increased trading activities. Sachs and Warner (1995) judge a country to have a closed trade policy if it has at least one of the following characteristics:

1. Nontariff barriers covering 40% or more of trade
2. Average tariff rates of 40% or more
3. A black market exchange rate that is depreciated by 20% or more relative to the official exchange rate, on average, during the 1970s or 1980s
4. A socialist economic system
5. A state monopoly on major exports

10 of the sample countries had experienced trade reform by 1994.

Table 4.1 shows the huge variance amongst incomes in African economies, with the highest GNI per capita (South Africa) being more than 24 times greater than the lowest (Malawi) in the sample. This range will be useful in examining the relationships between financial development and economic growth given the theories in the literature that the level of development can impact the relationship between growth and finance.

Geographically, the selection represents a wide range of locations, covering Northern, Southern, Eastern and Western countries on the African continent.

4.1.2 Financial Development Indicator Selection

Data for financial development indicators were sourced the World Bank Global Financial Development Database. This database provides a wide range of financial and macroeconomic indicators at a country level. Data were selected to cover the time period 1999 to 2011. This study aims to add to the existing literature by using this relatively recent sample of data.

The selection and theoretical justification of financial development indicators has been based on findings from across the literature. In total, 17 indicators were selected to cover the various elements of financial development – both the more traditional measures as well as those perhaps more related to welfare (access to financial services and the stability of the financial system).
The 17 indicators are listed below in Table 4.2.

Table 4.2 – Selected Indicators of Financial Development

1) Bank concentration (%)	10) Stock market capitalization to GDP (%)
2) Bank net interest margin (%)	11) Stock market total value traded to GDP (%)
3) Bank overhead costs to total assets (%)	12) Stock market turnover ratio (%)
4) Deposit money bank assets to deposit money bank assets and central bank assets (%)	13) Private credit by deposit money banks and other financial institutions to GDP (%)
5) Foreign bank assets among total bank assets (%)	14) Insurance company assets to GDP (%)
6) Life insurance premium volume to GDP (%)	15) Bank Branches per 100, 000
7) Liquid liabilities to GDP (%)	16) Account at a formal financial institution (% age 15+)
8) Nonlife insurance premium volume to GDP (%)	17) Bank Z-Score
9) Private credit by deposit money banks to GDP (%)	

Table 4.3 below presents the selected indicators in the style of the Čihák et al. (2013) "4 x 2 matrix" to show their respective relevance for a specific aspect or 'characteristic' of the financial system.

Table 4.3 – Selected Indicators for PCA as Related to the Financial System

	Institutions	**Markets**
Depth/Size	Liquid liabilities to GDP (%)	Stock market total value traded to GDP (%)

	Nonlife insurance premium volume to GDP (%) Life insurance premium volume to GDP (%) Private credit by deposit money banks and other financial institutions to GDP (%) Private credit by deposit money banks to GDP (%) Deposit money bank assets to deposit money bank assets and central bank assets (%) Insurance company assets to GDP (%)	Stock market capitalization to GDP (%)
Access	Bank Branches per 100, 000 Account at a formal financial institution (% age 15+)	
Efficiency	Foreign bank among Total Banks (%) Bank overhead costs to total assets (%) Bank net interest margin (%) Bank concentration (%)	Stock market turnover ratio (%)
Stability	Z-Score	

The decision to include such a high number of variables is based on the use of Principal Component Analysis in the study, which reduces the 'dimensionality' of a high number of variables into a few new indicators that account for most of the variance in the data sample (this approach will be discussed in more detail later). The intention is to capture a holistic view of the entire financial system (thereby avoiding some of the shortfalls in other approaches that have narrowly focussed on two or three indicators).

Despite aiming for as wide a range of indicators as possible, it is clear that the focus of the selected indicators is towards financial institutions rather than markets. This is due primarily to the lack of data for equity or debt markets in almost all African countries and also follows the literature in favouring banking indicators for African studies (Allen et al., 2013; Baliamoune-Lutz, 2013 etc.). Within the institutional variables, the sample indicators cover all four of the key characteristics identified in the literature (namely; depth, access, efficiency and stability).

It might be argued that there is a level of duplication or redundancy for indicators of institutional depth, with seven indicators in this category. The intention is to use the Principal Component Analysis to determine whether one or more of these indicators are prominent in capturing the variance of the financial system. The same rationale is true for the 4 indicators included for institutional efficiency.

It should be noted that non-bank development indicators for financial development is made up only of insurance industry data (ratios of premiums to GDP and total industry asset values to GDP). This is due to data availability, but still represents a shortcoming of the model. Ideally this would include data from other non-bank institutions (pension funds etc.).

Access to capital market data is very limited, with only South Africa and to a lesser extent Egypt, Mauritius and Morocco having data on capitalisation and turnover rations outside of the top 10 largest companies. This is probably indicative of the very small size of the other markets, with some not even having 10 listings in total, let alone a meaning number outside of the top 10. The selection of capital market indicators only covers the characteristics of depth and efficiency (excluding access and stability).

Data on stock price volatility over time is also scarce. The value of this measure is also questionable. Stock market prices are dependent on many exogenous factors, even more so for African markets are highly vulnerable to foreign investment trends and capital flows. The 2008 financial crisis would also mean that much of the data within the observation period is affected by the turmoil felt by global financial markets (although it can be argued that Africa was the most insulated of all the regions with respect to the 2008 crisis).

The inclusion of measures related to access and stability is relatively uncommon in other studies. Bank branch and formal account penetration levels provide some insight into the inclusion of the financial systems and therefore the potential welfare benefits (as well as the potential strength of transmission mechanisms for economic growth) in the sample countries. Bank z-score (measuring solvency risk) is an indicator of stability of the sector.

It is worth noting that some studies such as Adnan (2013) include indicators of foreign direct investment (FDI) to GDP as measures of financial development. FDI however does not necessarily capture investment into the financial system (which would have implications for its development). Adnan's rationale is that the indicator "measures the strength of FDI based productivity due to the technological transmission and new skills of management in the economy". This seems to be a measure of potential efficiency based on the inflow of skills and technology rather than a direct measure of financial development. Perhaps FDI to GDP would be a more suitable lagged predictive indicator for future financial development. This study chose to include foreign bank assets as a proportion of total bank assets with an aim to provide a more direct measure foreign participation in the country's financial system (although of course this only measures the banking sector and may exclude large foreign participation in other segments of the financial system, notably equity markets).

4.1.3 Missing observations

For 'Account at a formal financial institution', Namibia and Morocco were missing values all together. An average for the rest of Africa was used as a proxy for these missing observations. There was also only one entry for all countries – a 2011 observation. This was extended (taken as constant) for all years back to 1999.

For 'Bank branches per 100,000 adults', Cote d'Ivoire and Malawi both had no data available. An average for the rest of Africa was used as a proxy for these missing observations. Most countries only had data from 2004 onwards (Tunisia had from 2001 onwards). Observations were taken as a rolling average back to 1999.

The 'Bank concentration %' indicator had missing observations across several countries. In this case, observations were extended on either end of the time series. For example, if the last observation was 2009, then it is assumed that the bank concentration level remained static and was used for the outer two years. Similarly, if data are missing from the initial years (1999 to 2000 for example), then the earliest observation was used for these missing values. Where data are missing in-between two ranges of observations, the average of the boundary observations are used for the missing values.
For all other indicators, missing observations at either end of the country sample were filled in using an average of the preceding/subsequent 3 values. The extrapolated value is then used in the average for the next missing observation, to create a sort of 'rolling' extrapolation.

4.2 Methodology – Measures of Financial Development

4.2.1 Principal Component Analysis

The complexity and multitude of variables for measuring financial development has led to the increasing use of Principal Component Analysis (PCA) in the more recent literature on financial development (see Adnan, 2013; Saci and Holden, 2008; Adu et al., 2013 etc.). PCA allows for a reduction in the dimensionality (the number of variables) of complex sets of data and produces an often simpler picture that can reveal underlying dynamics within a system (Shlens, 2003).

Whilst PCA has been more commonly used historically in fields such as ecology, given the high number of possible indicators and ways to measure financial development, it is clear as to why PCA has become a popular tool for examining financial systems. Studies such as this one wish to include newer measures of financial development related to access and inclusion or the stability along with more traditional indicators such as monetary aggregates will find PCA particularly useful.

PCA uses the tools of linear algebra to compute a "change of basis" (Shlens, 2003). Given a 'cloud' of data points (the term cloud conjures images of a three dimensional dataset, but of course PCA allows

for analysis of datasets with any number of variables, which cannot be visualised so easily), the PCA creates new axes or basis that account for the maximum variability in the data. These re-expressed axes extend through the centroid of the dataset points and are created such that the square distances to all the data points are minimised (Palmer, 2014). Identifying gradients with the most variance allows researchers to discern which variables are relevant (accounting for the most variance in the data) and which can be seen as redundant or simply 'noise'.

The PCA computation is based off either a correlation or covariance matrix. The correlation matrix is simply the covariance matrix that has been standardized by setting all variances equal to one. Correlation matrixes are used in conventional factor analyses with variables differing in units of measure - this avoids the problem of 'comparing apples and oranges'. Covariance matrices are appropriate when all variables use the same units of measure (Allen, 2002). Clearly, given the wide range of unit's and measures for the various indicators of financial development, the correlation matrix is the appropriate base for the PCA in studies attempting to analyse financial systems and accordingly this study uses the correlation matrix for PCA.

The PCA produces outputs known as 'eigenvectors' and 'eigenvalues'. These describe the re-expressed dimensions (the new axes) within the data set. There will be an eigenvector and eigenvalue for each variable in the original data set. A large eigenvalue can be interpreted as showing the dimension within the data set that accounts for the high amount of variance in the data. In most cases, the first (and sometimes second and third) principal components are far larger than the rest of the group – the PCA has reduced the number of explanatory dimensions in the data, with one principal component accounting for the majority of the variance.

The eigenvectors, often referred to as the component loadings or factor loadings in the PCA output, represent the correlations between the underlying variables and the principal component (IDRE, 2014).

One of the advantages of PCA is that the principal component outputs are orthogonal to each other (Palmer, 2014). This means that the principal components are uncorrelated, and this allows for the use of other statistical approaches that might otherwise be undermined if the data showed correlation. Note however that the principal components may represent a composite of several underlying indicators that are correlated.

A disadvantage of PCA is that it assumes linearity in the dataset. Shlens (2003) notes that complex systems are "almost always nonlinear" and that often the main features of these systems is due to this nonlinearity. However, he goes on to assert that locally linear approximations can usually provide

good enough approximations for nonlinear terms. This study will accept the assumption of linearity in the data.

Summary of potential pitfalls of PCA:

1. Linearity of dataset. Assumes the dataset to be linear combinations of the variables.
2. There is no guarantee that the directions of maximum variance will contain good features for discrimination.
3. Assumes that components with larger variance correspond to interesting dynamics and lower ones correspond to noise.

4.2.2 Approach for Assessing Measures of Financial Development

This study conducts a PCA for a sample of 15 African countries, using 17 selected measures of financial development. The resulting principal components can be used for further analysis, with a single variable representing the overall financial system for each country. In addition, the component loadings from the PCA can shed light as to which indicators are responsible for the majority of the variance in the data.

Gretl software was used as the statistical tool to conduct the PCA. When extracting the significant principal components from the overall PCA, only components with eignenvalues greater than the overall mean were selected. In most cases this led to three components being extracted, however there were some exceptions across countries.

The component loadings of the PCA output are examined, linking the underlying indicators back to the principal component. The component loadings are ranked, with the highest (closest to 1) and lowest (closest to -1) being highlighted as significant for the principal components.

4.3 Methodology – Financial Development and Economic Growth in Africa

This analysis tests a sample of fifteen African economies for the existence of a relationship between economic development and financial development over the period 1999 to 2011.

The following regression model is used to test the relationship for each country observation '*i*';

$$GDPPC_i = \beta_{0i} + \beta_{1i}\,(FD) + \beta_{2i}\,(InstDev) + \beta_{3i}\,(Trade) + \varepsilon_i$$

Where *GDPPC* is the natural logarithm of per capita Gross Domestic Product measured in local currency, β_0 is the constant for the equation, *FD* is the measure of financial development as

determined by the Principal Component Analysis in the previous section. *InstDev* is an index measure of the level of institutional development adapted from the World Bank Worldwide Governance Indicators (2013). *Trade* is an indicator of the trading activity in the economy measured as the percentage of imports and exports to GDP and ϵ is the error term for the equation.

The regression analysis will test the **β** coefficient for each term of the model. The null hypothesis ($\mathbf{H_0}$) is that the **β** is equal to zero, implying that the respective independent variable does not have a significant relationship to the dependent variable – GDPPC. The alternative hypothesis ($\mathbf{H_1}$) states that **β** is not equal to zero and therefore that the respective term does have a significant relationship with the dependent variable. Formally;

$$\mathbf{H_0: \beta_{ki} = 0}$$

$$\mathbf{H_1: \beta_{ki} \neq 0}$$

Where k is the respective term for the explanatory variable and i is the country observation. The model follows the literature (King and Levine, 1993a etc.) by including other variables commonly associated with economic growth in the model as a control. The influence of trade and the level of governance and institutional development are both commonly accepted to exert an influence on an economy's development (Allen et al,. 2013; Huang, 2010; Shaw, 1973 etc.).

King and Levine (1993a) and Demetriades and Hussein (1996) make use of real GDP per capita as the indicator for economic development. The latter study makes uses domestic currency rather than US Dollar denominated amounts to avoid interference from exchange conversions and differences in national accounting processes. The authors also argue that GDP per capita is a more reliable measure than total GDP, as the latter can suffer from estimation errors which also effect population estimates and that these errors are tend to offset each other. Following these arguments, this study makes use of GDP per capita in domestic prices (Local Currency Units) as a measure of economic development.

The Institutional Development indicator is based on the 'KKM indicator' used widely in the literature (Allen et al., 2013; Beck et al., 2008; Huang, 2010 etc.) and was created by taking the average scores for six institutional development indicators (Voice and Accountability, Political Stability and Absence of Violence/Terrorism, Government Effectiveness, Regulatory Quality, Rule of Law and Control of Corruption) over the period 1998 to 2011. Each indicator was averaged over the period and all six were then averaged to give a total for each country observation. The six aggregate indicators are based on 31 underlying data sources reporting the perceptions of governance of a large number of survey respondents and expert assessments worldwide (Kaufmann, Kraay and Mastruzzi, 2010).

A measure for trade has also been included and follows the literature in arguing that trade flows impact economic growth (Adnan, 2013; Allen et al, 2013 etc.). The indicator for trade takes the net imports and exports as a ratio to GDP.

4.4 Hypotheses

4.4.1 Measures of Financial Development

This study expects to find that the underlying indicators most closely correlated to the first principal component of financial development will be those that relate to the size of the banking sector. Beyond this, indicators of financial efficiency will feature prominently.

It is expected that indicators that relate to financial inclusion or stability, whilst being important characteristics of the financial system, will not be captured in the PCA. Measures of the size of the stock market and non-banking institutions are also expected to be relatively uncorrelated to the principal components.

Specifically, this study expects that the following indicators for financial development will be found to be most correlated to the first Principal Component;

1. Private credit by deposit money banks and other financial institutions to GDP (%), and
2. Deposit money bank assets to deposit money bank assets and central bank assets (%)

With respect to the second Principal Component, this study expects the following variables to be most strongly correlated;

1. Bank overhead costs to total assets (%)
2. Foreign bank among Total Banks (%)

It must be noted that there is perhaps a level of self-selection bias in this portion of the study, as the majority of the indicators related to the banking sector. However, it is expected that the other indicators will still have some level of correlation to the Principal Component and therefore account for a level of the variance.

4.4.2 Financial Development and Economic Growth in Africa

The hypothesis of this study is that there is a relationship between economic development and financial development in African countries regardless of region, legal origin and income level.

Whilst African financial systems are relatively underdeveloped, the role they play in mobilising savings and providing access to credit are likely to drive economic performance. The prevalence of natural

resource extraction and investment into infrastructure also means that certain sectors are large enough to drive demand for financial services and products.

The direction or causality between finance and growth is therefore likely to be bidirectional, with the benefits of effective financial institutions driving economic growth and economic growth increasing the demand for new and existing types of financial services and products. The magnitudes of the effects are likely to be dependent on other factors ranging from institutional quality and legal origin to cultural traits and policy decisions. It makes sense that given the financial system is one component of the greater economy, that the two systems are implicitly connected and feedback into each other.

Statistically, the hypothesis is that β_1 will be significant in the regression model for each country observation, indicating that a relationship exists between financial development and economic growth. This study will not empirically determine the direction of causality between financial and economic development, but seeks to assess whether a relationship exists over the recent sample period (1999 to 2011).

5 Results and Interpretation

5.1 Measures of Financial Development

Table 5.1 shows the eigenvalue outputs of the PCA for all sample countries (see appendix – the tables discussed in this section have been moved to the appendix for ease of reference). For each country, the first three principal components are listed, with the individual and cumulative total of explanatory variance listed.

The eigenvalues themselves do not provide much comparative information across countries. What is of interest is the variance accounted for in the Proportion column (and the running total in the Cumulative column). These numbers show the amount of variance within the total dataset captured by the respective principal component. In the case of Botswana, the first component accounts for just less than half of all variance in the dataset. This one component can therefore act as a reasonable proxy for the entire financial system (or more accurately the 17 indicators of financial development that were inputs for the PCA). Staying with the Botswana example, the second and third components are seen to account for a further 22% and 16% (rounding up) respectively. In total, the three components account for over 85% of the variance in the dataset.

Uganda's first component has the highest explanatory value, at just over 65% whilst Zambia has the lowest – just over 34%. For all countries, the average first explanatory proportion for the first principal component is 49%, with the median being 49.98%. This shows the power of PCA to reduce dimensionality, with one indicators being able to capture so much variance from the original set of 17. The second principal components explain on average an additional 20% of the variance in the data. The cumulative explanatory values of all three components have an average of 82% and a median of 84%. In all, the PCA appears to have been successful in capturing an appropriate portion of the variance in the sample data.

Table 5.2 shows selected eigenvectors (component loadings) for each country sample for the first principal component. Only indicators with an absolute value of 0.3 for the eigenvector are included (Uganda is the exception, as this sample did not have any component loadings greater than 0.3, in this case the top five largest absolute values have been included). This approach leaves only the indicators that have a relatively strong correlation to the principal component (either positive or negative).

Table 5.3 provides a summary of the number of times a specific indicator has been included in the selection (i.e. has a correlation of greater than 0.3 or less than -0.3). The provision of credit to the private sector (from both banks and other financial institutions) clearly dominates in the first principal component. Interestingly, the bank concentration ratio is found to have a significant correlation to the

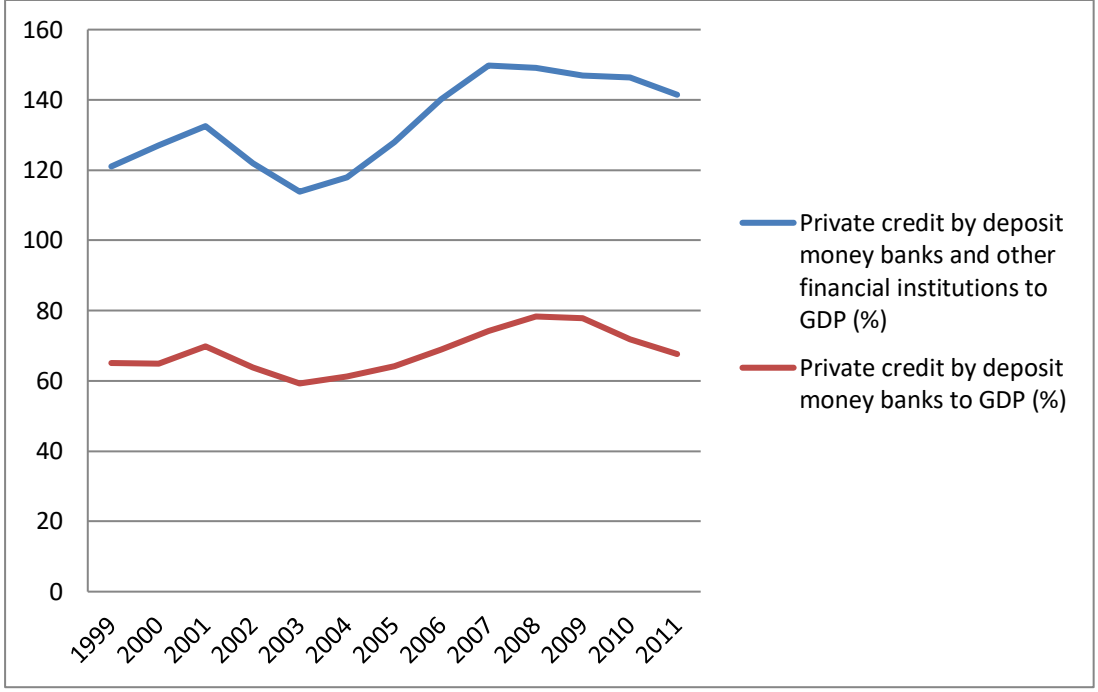
first principal component in a relatively high number of the samples. In most cases, this indicator has a negative correlation to the first component. This seems to make intuitive sense, as a concentrated banking sector would typically be a characteristic of lesser financial development.

The stock market capitalisation ratio also features prominently. Whilst it should be expected that stock market size is strongly correlated to financial development, what is of interest is that the country samples where this indicator showed high correlation have relatively small and inactive stock exchanges. The samples where stock market capitalisation is found to have a high correlation are Botswana, Cote d'Ivoire, Malawi, Namibia, Tunisia, Uganda and Zambia – the absence of South Africa and somewhat Egypt is unexpected. Perhaps it is a reflection of the low level of overall financial development in the aforementioned countries that their stock market capitalisation is still so significant.

Beyond provision of credit, market capitalisation and bank concentration – liquid liabilities to GDP, insurance company assets to GDP and life premium volumes to GDP were also found to be significant in several of the country samples. The latter two indicators are measures of non-banking institutional size. It is of interest that liquid liabilities to GDP – such a traditionally popular measure for financial development – is not found to be more significantly correlated to the first component. Perhaps it is simply the case that credit provision is more relevant than the monetary aggregates for financial development.

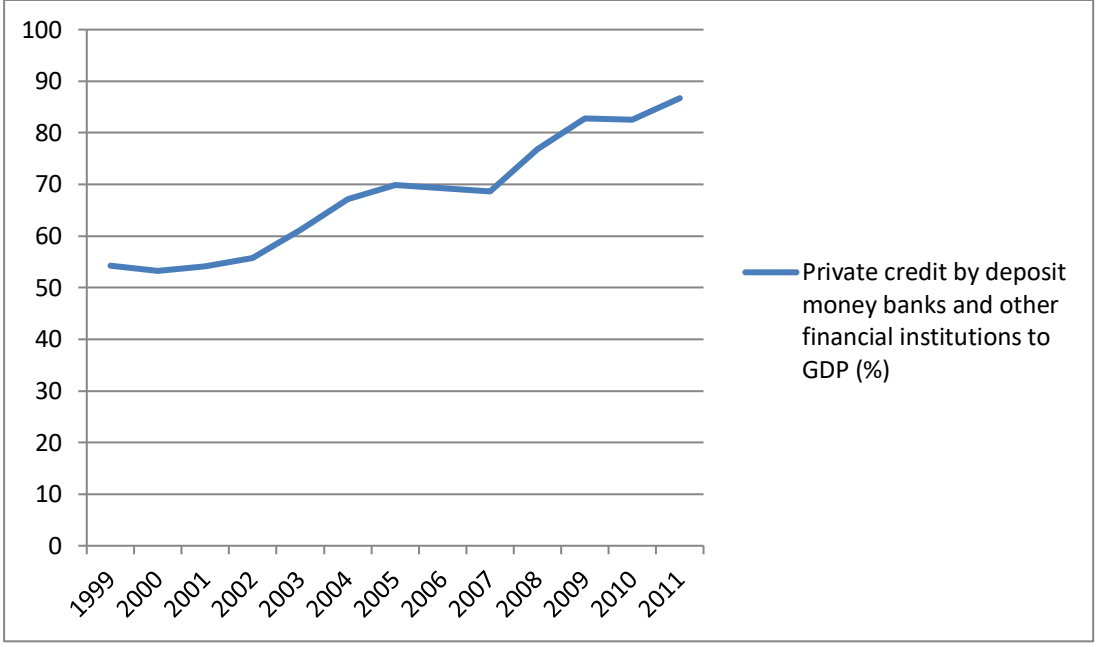
Component loadings for South Africa appear to have some interesting properties. Whilst private credit from both banks and other financial institutions is found to be significantly correlated to the first component, the correlations are negative. This negative correlation is not observed in other sample countries with relatively developed financial institutions (such as Mauritius) or economies with high income levels or total GDP (such as Botswana or Nigeria). It is worth noting that this finding matches the results of the Baliamoune-Lutz (2013) study. A possible explanation might lie in the time period that the data was selected from, which covered the global financial crisis. Whilst South Africa's banks were relatively protected from the credit restrictions that were prevalent in other parts of the world, it is possible that South African bank's lending activities were still impacted during this time. The figure below shows the value of credit from South African institutions over the period as a percentage of GDP.

Figure 5.1 – Credit from South African Institutions as a Percentage of GDP from 1999 to 2011



It is clear that the provision of credit over the period was not smooth – there is an evident dip in 2003 as well as a decline towards the end of the series. This is contrasted with the Mauritian case (Mauritius is a useful comparison due to its similar income levels and level of institutional development) in figure 5.2. Whilst the graph is somewhat stepped, there is a clear and consistent upward trend in the provision of credit to the private sector.

Figure 5.2 – Credit from Mauritian Institutions as a Percentage of GDP from 1999 to 2011



It is likely that the uneven lending activity from South African banks and other institutions over the period has resulted in the negative correlation with the first component for financial development. A possible narrative around this might be that whilst the provision of credit lessened, other areas of the financial system expanded (such as stock market capitalisation or insurance industry assets) – the statistical analysis has therefore found a negative relationship, despite the theory suggesting that provision of credit should be positively linked to financial development. Of course the comparison between South Africa and Mauritius is anecdotal, and the results for the South African case are perhaps an area that requires further investigation.

In general it is worth noting the variance in indicator correlations across countries. No two countries are the same, and even the most common indicator (private credit from banks) only features 11 times out of the sample of 17. This echoes the assertion from the literature that structural and other environmental differences between economies leads to different channels and mechanisms for financial development and subsequently, the impact of indicators differs across countries.

In all, given the mix of correlated indicators, the first principal component appears to be a measure of financial institutional size. Beck et al. (1999) describe the provision of private credit as a share of GDP as a measure of "financial activity" but it is fair to say that the ability of institutions to provide credit is also a measure of their size or depth. Stock market capitalisation (which features third most prominently in correlations) is also a clear measure of the size for the capital market. Whist the banking concentration ratio is commonly thought of as an indicator of efficiency (a less concentrated sector is more competitive etc.) it could be argued that given the definition of this indicator is the "assets of three largest commercial banks as a share of total commercial banking assets", this is also in some way a proxy for institutional size – this is most likely the reason that this measure is significantly correlated to the first component.

Given that the second principal components can account for an additional 20% of the variance in the dataset, these have also been examined. The orthogonal nature of the components also means that the second component should also be correlated to different characteristics of the financial system (other than institutional or market size in the case of the first component).

Table 5.4 presents selected eigenvectors for each country sample for the second principal component. As with the first component, only indicators with an absolute value of 0.3 for the eigenvector are included. Table 5.5 shows the number of times a specific indicator has been included in the selection for the second component.

For the second component, bank overhead costs to bank assets is the most commonly significant indicator. This is closely followed by both Stock market Turnover Ratio and Non-life Insurance Premium Volume to GDP. The bank overhead ratio is a measure of efficiency for the banking sector that is quite prevalent in the literature. It should be noted that as with the first component, the banking sector features prominently in the second component. The stock market turnover ratio is also a measure of efficiency, very prevalent in the literature. The presence of non-life insurance premium volume is somewhat unexpected, given Africa's underdeveloped insurance industry, as well as the relatively high count of life insurance premium volumes in the first principal component.

Beyond the three indicators above, Life Insurance Premium Volume to GDP, Stock market Total Value Traded and the Bank Z Score all feature relatively often in the second component. The presence of the life insurance premium indicator is perhaps evidence that the non-banking sector (specifically insurance, although given the absence of any direct indicators for other non-bank institutions this cannot be confirmed) is more significant as a measure of financial development in Africa than previously argued in some of the literature.

The second component can be said to account primarily for the efficiency of both the banking and capital market sectors of the financial system in Africa. Further there is also a component of variance in the size of the non-banking (insurance) sector that is captured in this component.

5.1.2 Results vs. Hypotheses – Measures of Financial Development

The hypothesis that (1) Private credit by deposit money banks and other financial institutions to GDP, and (2) Deposit money bank assets to deposit money bank assets and central bank assets will be most correlated to the first Principal Component has clearly been disproved. Whilst Private credit by deposit money banks and other financial institutions is very prominent, it is shown to be only the second most commonly correlated indicator to the first Principal Component, with Private credit from banks (only)

being marginally higher in the count. The assets of banks and other institutions to GDP is only the 10th most commonly correlated indicator to the first Principal Component.

It should be noted though that the wider hypothesis that the size of the banking sector will be accounted for by the first Component appears to have been correct. The correlation of the bank concentration ratio to the first principal component is also somewhat in line with the original hypothesis of this study (and arguments from the literature such as Baliamoune-Lutz, 2013).

The secondary hypothesis indicators of financial efficiency will feature prominently appears to hold true, and the assertion that Bank Overhead costs would be the most prominent indicator for efficiency of the financial system has been shown (with the indicator being highly correlated to the second Component for 8 observations – more than any other). However, the participation of foreign banks is found to have negligible impact, with Foreign bank among Total Banks being one of the bottom two most correlated indicators to the second component.

5.2 Financial Development and Economic Growth in Africa

Table 5.6 shows a summary of the regression analysis for fifteen sample countries. The analysis finds that for all but four of the countries, financial development is related to economic development at the 1% significance level. Even for those four where the relationship does not appear as clear, only one is found to be completely unable to reject the null hypothesis. One sample shows significance at the 5% level and the remaining two are significant at the 10% level.

Cote d'Ivoire, Ghana, Tunisia and Uganda are found to have a less clear relationship between economic development and financial development. This could be due to their legal origins (in the case of Cote d'Ivoire and Tunisia).

Trade is found not to be a significant factor for economic development. This appears contrary to the literature (Gallup, Sachs and Mellinger, 1999 etc.). However, given that the indicator in the model measures the net of imports and exports, the lack of significance may be due to the fact that many of the countries in the sample are net importers – at least of capital goods (most would likely be exporters of un-beneficiated natural resources). In this way, a high *Trade* value might lead to lower growth. Given that the effects are possibly cancelled out, this could be a reason for the insignificant relationship. It should be noted then that the use of a net imports and exports indicator for trade is not advisable and will likely lead to poor statistical results in future studies. A better proxy for trade openness might be a dummy policy indicator, or perhaps using only imports or exports exclusively.

The low significance of the Institutional development amongst many of the countries appears contrary to the literature. This could be due to choice of using concurrent time periods of the data in the regression, both GDP per capita and the proxy for institutional development were from the same time period of 1999 to 2011. It may be that institutional development only has a lagged impact on economic growth and performance (this would make intuitive sense as the benefits of strong institutions may take years or even decades to come to fruition). The use of an alternative proxy for institutional development or perhaps the use of a lagged variable might yield stronger results.

The intention with the selection of countries was that the differences in certain attributes (income etc.) across the sample act as a crude control for factors that might influence the relationship between finance and economic growth. Despite differences in legal systems, income levels, trade policy and economic output, the analysis shows that financial development impacts economic growth for African countries. The initial hypothesis that a relationship between finance and economic growth exists in the sample is therefore shown to be correct.

6 Conclusion

6.1 Conclusion

This study has provided a review of the core literature on financial development, from its relationship to economic growth and its determinants to the various approaches to measuring development of financial systems.

With widespread recognition of the value that financial development plays in long run growth, the focus has been to unpack the proposed mechanisms behind this relationship with the consensus broadly being that the complexity and dynamic nature of an economy means any causality flows in both directions. Empirical research has however failed to comprehensively support any single view. This is likely a result of a huge variety in data sources and statistical techniques applied to the question of the finance – growth relationship. The recent work of Čihák, Feyen, Levine and Demirgüç-kunt (2013) amongst others has provided a strong and comprehensive framework for the measurement of financial systems which will hopefully influence a level of consistency in future research.

The determinants of financial development have received comparatively less attention in the literature, although there is already a clear framework for the primary theoretical drivers. Many of these however seem to reflect on somewhat arbitrary historical conditions that have led to different levels of development rather than the practical levers to improve the size and efficiency of the financial system (although to be fair, a good deal of the literature deals with policy related to trade and financial openness which has direct practical application).

The choice of indicators and measures for financial development has been shown to impact the findings of numerous studies. It has been argued that research which accounts for how an indicator relates to the underlying functions of the financial institutions and markets, or the system's broader characteristics will assist in the selection of appropriate variables. The use of Principal Component Analysis has also been shown to assist in reducing the high number of potential variables (especially with growing preferences to account for indicators related to financial inclusion and stability as well as 'traditional' measures), which can be most useful for certain types of analysis.

In terms of this study's empirical findings, it has been shown that, in line with the arguments from some of the literature, credit from banks to the private sector accounts for the most variance in the dataset for financial development across 15 African countries. The provision of private credit is therefore a strong proxy for the overall size of the financial sector in many African markets and it is hoped that this finding will prove useful for future research. The efficiency of the banking sector

(specifically as measured by overhead cost ratios) is also shown to be an appropriate indicator for financial development in Africa.

Analysis into the relationship between financial development and economic growth in Africa has yielded strong results, finding that a significant exists between the two. Although this might not be surprising given the bulk of evidence to support this in the literature, the cross country approach with a focus on African economies has received relatively little attention previously (with most studies considering only one African country). This study has found then that the relationship between finance and growth exists for almost all African economies (with some exceptions).

In all it is hoped that this study has highlighted the importance of financial development for the long term economic prospects of any country, and specifically African economies. Given this importance, the selection of measures for financial development has been shown to materially affect findings related to the dynamics of the relationship. This makes the approach to measurement of financial systems even more important. The discussion in this study has aimed provided a good practical and theoretical overview for the measures of financial development.

6.2 Recommendations for future research

In the context of African economies, the availability and quality of data is still a constraint to extensive statistical analysis. As data become more reliable and widely available, opportunities for further research will become abundant. Even so, this study has highlighted some potentially interesting areas for future research that can be conducted with the existing data. Proposals for areas of future research are presented below;

- Conducting a deeper analysis into the direction of causality between financial development and economic growth in a sample of African countries may be of interest. Testing of Patrick's (1966) Stage of Growth theory for African countries – as economies mature there may be empirical evidence of a 'switch' between the supply leading and demand leading mechanisms. In general, studies that make use of more detailed statistical analysis to control for correlation of variables and other issues will add value to the literature.

- The importance of small business growth as a means to wider economic development would justify research into the value that financial institutions add at the firm level. Data are seemingly available for businesses using bank credit for investment, working capital and other forms of support for business activities. Examining the relationship between financial access or inclusion and indicators such as small business failure rates – especially in rural areas – would be useful.

- Building of the work of Allen et al. (2013) in analysing the financial development "gap" in Africa, research into the determinants of financial development in Africa would be of use to policy makers and advance the general literature.

- Future research could also adopt a broader view of economic development, more focussed on the ultimate welfare outcomes of improved economic performance such as income distribution and employment levels. The relationship between financial development and indicators such as the Gini-Coefficient or unemployment rates could be explored.

- Following the 2008 financial crash, the need for risk management has become even more pronounced. A studying with a strong focus on the stability of sample financial systems would be of interest, perhaps developing an approach to better incorporate risk into the measures of financial development (such as the risk adjusted measures mentioned earlier in this study). The World Bank Development Indicators dataset contains data for country level "banking crises", which may be useful as indicators of unstable financial systems.

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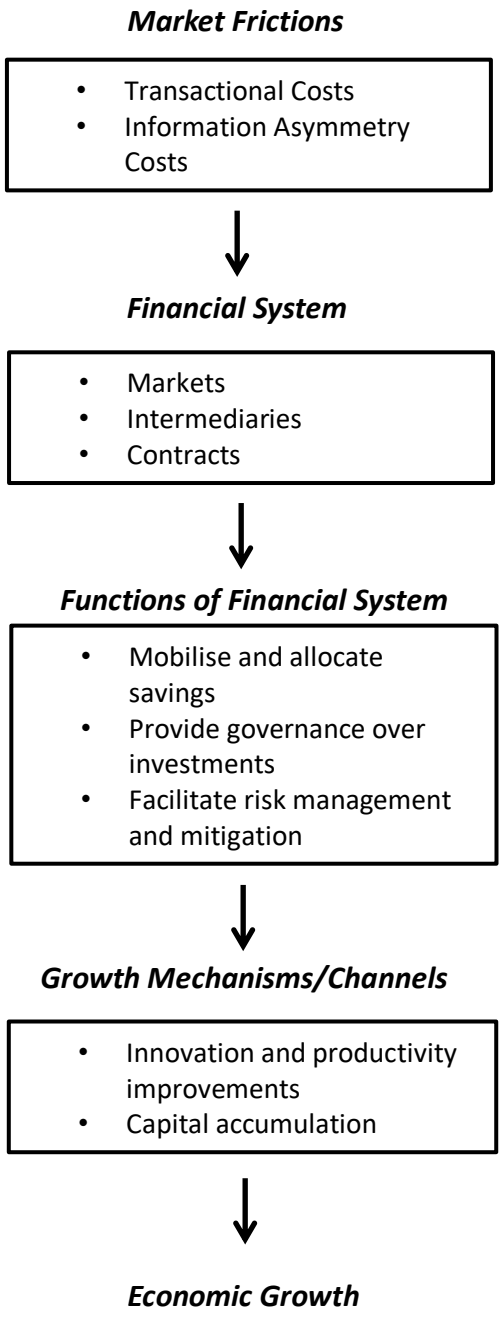
8 Appendices

8.1 Figure 3.1 – Relationship between Financial System and Economic Growth

Adapted from Levine (1997)



8. 2 Tables of Results

Table 5.1 – PCA Eigenvalue Outputs for All Sample Countries

Country	Component Number	Eigenvalue	Proportion (Variance Explained)	Cumulative
Botswana	1	7.8947	0.4934	0.4934
	2	3.4609	0.2163	0.7097
	3	2.529	0.1581	0.8678
Cote d'Ivoire	1	7.9725	0.469	0.469
	2	4.4766	0.2633	0.7323
	3	2.1247	0.125	0.8573
Egypt	1	7.508	0.4693	0.4693
	2	4.1237	0.2577	0.727
	3	1.8955	0.1185	0.8455
Ghana	1	6.0866	0.3804	0.3804
	2	4.7425	0.2964	0.6768
	3	1.968	0.123	0.7998
Kenya	1	9.0899	0.5681	0.5681
	2	2.7732	0.1733	0.7414
	3	1.9002	0.1188	0.8602
Malawi	1	7.6619	0.5108	0.5108
	2	2.5013	0.1668	0.6775
	3	1.8739	0.1249	0.8025
Mauritius	1	8.6263	0.5391	0.5391
	2	2.0087	0.1255	0.6647
	3	1.7738	0.1109	0.7756
Namibia	1	7.1242	0.4191	0.4191
	2	2.99	0.1759	0.595
	3	2.1456	0.1262	0.7212
Nigeria	1	8.0985	0.5062	0.5062
	2	4.098	0.2561	0.7623
	3	1.2635	0.079	0.8413
South Africa	1	7.6505	0.4782	0.4782
	2	2.6054	0.1628	0.641
	3	2.099	0.1312	0.7722
Tanzania	1	8.1359	0.5085	0.5085
	2	3.2661	0.2041	0.7126
	3	1.9459	0.1216	0.8342
Tunisia	1	8.3622	0.5226	0.5226
	2	3.4366	0.2148	0.7374
	3	2.2598	0.1412	0.8787
Uganda	1	10.487	0.6554	0.6554
	2	1.9972	0.1248	0.7803
	3	1.27	0.0794	0.8596
Zambia	1	5.5319	0.3457	0.3457
	2	2.72	0.17	0.5157
	3	2.2287	0.1393	0.655

Table 5.2 – Selected Eigenvectors for each Country Sample for the First Principal Component

Country	Indicator	Eigenvectors: Principal Component 1
Botswana	Private Credit by Deposit Money Banks and Other Financial Institutions to GDP	0.343
	Private Credit by Deposit Money Banks to GDP	0.343
	Liquid Liabilities to GDP	0.322
	Stock market Capitalization to GDP	0.302
	Bank Concentration Ratio	-0.329
Cote d'Ivoire	Life Insurance Premium Volume to GDP	0.337
	Stock market Capitalization to GDP	0.325
	Insurance Company Assets to GDP	0.324
	Liquid Liabilities to GDP	0.323
	Private Credit by Deposit Money Banks and Other Financial Institutions to GDP	0.301
	Private Credit by Deposit Money Banks to GDP	0.301
	Bank Net Interest Margin	-0.317
Egypt	Private Credit by Deposit Money Banks and Other Financial Institutions to GDP	0.349
	Private Credit by Deposit Money Banks to GDP	0.348
	Bank Z Score	-0.302
	Deposit Money Bank Assets to Deposit Money Bank Assets and Central Bank Assets	-0.314
	Bank Net Interest Margin	-0.339
Ghana	Bank Branches per 100,000 Adults	0.369
	Insurance Company Assets to GDP	0.354
	Private Credit by Deposit Money Banks and Other Financial Institutions to GDP	0.305
	Private Credit by Deposit Money Banks to GDP	0.305
	Bank Concentration Ratio	-0.387
Kenya	Deposit Money Bank Assets to Deposit Money Bank Assets and Central Bank Assets	0.326
	Life Insurance Premium Volume to GDP	0.313
	Bank Z Score	0.312
	Foreign Banks among Total Banks	0.302
	Bank Concentration Ratio	-0.321
Malawi	Stock market Capitalization to GDP	0.35
	Life Insurance Premium Volume to GDP	0.323
	Private Credit by Deposit Money Banks and Other Financial Institutions to GDP	0.319
	Private Credit by Deposit Money Banks to GDP	0.318
	Bank Branches per 100,000 Adults	0.31
	Stock market Turnover Ratio	-0.305

Mauritius	Private Credit by Deposit Money Banks and Other Financial Institutions to GDP	0.332
	Private Credit by Deposit Money Banks to GDP	0.332
	Insurance Company Assets to GDP	0.329
	Life Insurance Premium Volume to GDP	0.317
	Stock market Total Value Traded	0.302
	Bank Concentration Ratio	-0.319
Namibia	Insurance Company Assets to GDP	0.332
	Stock market Capitalization to GDP	0.302
	Bank Net Interest Margin	-0.328
	Bank Z Score	-0.366
Nigeria	Private Credit by Deposit Money Banks and Other Financial Institutions to GDP	0.338
	Private Credit by Deposit Money Banks to GDP	0.338
	Insurance Company Assets to GDP	0.332
	Liquid Liabilities to GDP	0.313
South Africa	Private Credit by Deposit Money Banks to GDP	-0.311
	Foreign Banks among Total Banks	-0.325
	Stock market Total Value Traded	-0.339
	Private Credit by Deposit Money Banks and Other Financial Institutions to GDP	-0.345
Tanzania	Private Credit by Deposit Money Banks and Other Financial Institutions to GDP	0.346
	Private Credit by Deposit Money Banks to GDP	0.346
	Liquid Liabilities to GDP	0.34
	Foreign Banks among Total Banks	0.315
	Non-life Insurance Premium Volume to GDP	0.311
	Deposit Money Bank Assets to Deposit Money Bank Assets and Central Bank Assets	0.308
	Bank Concentration Ratio	-0.318
Tunisia	Life Insurance Premium Volume to GDP	0.341
	Bank Branches per 100,000 Adults	0.325
	Stock market Capitalization to GDP	0.313
Uganda	Private Credit by Deposit Money Banks and Other Financial Institutions to GDP	0.297
	Private Credit by Deposit Money Banks to GDP	0.297
	Stock market Capitalization to GDP	0.294
	Liquid Liabilities to GDP	0.278
	Bank Concentration Ratio	-0.275
Zambia	Foreign Banks among Total Banks	0.407
	Stock market Capitalization to GDP	0.399
	Deposit Money Bank Assets to Deposit Money Bank Assets and Central Bank Assets	0.393
	Private Credit by Deposit Money Banks to GDP	0.339

	Bank Branches per 100,000 Adults	0.301
	Bank Concentration Ratio	-0.307
	Bank Overhead Costs to Total Assets	-0.357

Table 5.3 – Count for Material Inclusion of Financial Development Indicators in First Principal Component

Indicator	Count for |Eigenvector| > 0.3
Private Credit by Deposit Money Banks to GDP	11
Private Credit by Deposit Money Banks and Other Financial Institutions to GDP	10
Stock market Capitalization to GDP	7
Bank Concentration Ratio	7
Liquid Liabilities to GDP	5
Insurance Company Assets to GDP	5
Life Insurance Premium Volume to GDP	5
Foreign Banks among Total Banks	4
Bank Branches per 100,000 Adults	4
Deposit Money Bank Assets to Deposit Money Bank Assets and Central Bank Assets	4
Bank Net Interest Margin	3
Bank Z Score	3
Stock market Total Value Traded	2
Non-life Insurance Premium Volume to GDP	1
Bank Overhead Costs to Total Assets	1
Stock market Turnover Ratio	1

Table 5.4 – Selected Eigenvectors for each Country Sample for the Second Principal Component

Country	Indicator	Eigenvectors: Principal Component 2
Botswana	Non-life Insurance Premium Volume to GDP	0.323
	Stock market Turnover Ratio	-0.307
	Stock market Total Value Traded	-0.314
	Bank Branches per 100,000 Adults	-0.35
	Deposit Money Bank Assets to Deposit Money Bank Assets and Central Bank Assets	-0.455
Cote d'Ivoire	Bank Overhead Costs to Total Assets	0.41
	Foreign Banks among Total Banks	0.344
	Deposit Money Bank Assets to Deposit Money Bank Assets and Central Bank Assets	0.327
	Bank Z Score	0.324

	Non-life Insurance Premium Volume to GDP	-0.354
	Bank Concentration Ratio	-0.376
Egypt	Stock market Total Value Traded	-0.314
	Life Insurance Premium Volume to GDP	-0.318
	Liquid Liabilities to GDP	-0.43
	Stock market Capitalization to GDP	-0.448
Ghana	Bank Z Score	0.371
	Life Insurance Premium Volume to GDP	0.333
	Bank Overhead Costs to Total Assets	0.31
	Stock market Capitalization to GDP	0.308
Kenya	Stock market Turnover Ratio	0.393
	Stock market Total Value Traded	0.311
	Bank Overhead Costs to Total Assets	0.305
	Private Credit by Deposit Money Banks to GDP	-0.308
	Bank Branches per 100,000 Adults	-0.359
	Private Credit by Deposit Money Banks and Other Financial Institutions to GDP	-0.437
Malawi	Bank Overhead Costs to Total Assets	0.429
	Bank Concentration Ratio	0.351
	Non-life Insurance Premium Volume to GDP	-0.433
	Deposit Money Bank Assets to Deposit Money Bank Assets and Central Bank Assets	-0.495
Mauritius	Stock market Turnover Ratio	0.635
	Bank Z Score	-0.397
	Bank Overhead Costs to Total Assets	-0.405
	Non-life Insurance Premium Volume to GDP	-0.435
Namibia	Bank Concentration Ratio	0.381
	Stock market Capitalization to GDP	-0.322
	Liquid Liabilities to GDP	-0.373
Nigeria	Stock market Turnover Ratio	0.346
	Bank Z Score	0.336
	Life Insurance Premium Volume to GDP	-0.313
	Bank Overhead Costs to Total Assets	-0.355
	Non-life Insurance Premium Volume to GDP	-0.404
South Africa	Liquid Liabilities to GDP	0.44
	Life Insurance Premium Volume to GDP	0.354
	Bank Net Interest Margin	-0.302
	Non-life Insurance Premium Volume to GDP	-0.303
	Bank Overhead Costs to Total Assets	-0.46
Tanzania	Life Insurance Premium Volume to GDP	0.505
	Bank Z Score	0.448

	Insurance Company Assets to GDP	0.417
	Stock market Capitalization to GDP	-0.34
Tunisia	Stock market Turnover Ratio	0.462
	Bank Net Interest Margin	0.447
	Private Credit by Deposit Money Banks and Other Financial Institutions to GDP	-0.356
	Private Credit by Deposit Money Banks to GDP	-0.38
Uganda	Bank Overhead Costs to Total Assets	0.545
	Bank Net Interest Margin	0.389
	Stock market Total Value Traded	0.374
	Deposit Money Bank Assets to Deposit Money Bank Assets and Central Bank Assets	0.333
	Stock market Turnover Ratio	0.326
	Bank Branches per 100,000 Adults	-0.303
Zambia	Stock market Turnover Ratio	0.487
	Stock market Total Value Traded	0.442
	Non-life Insurance Premium Volume to GDP	0.435
	Bank Net Interest Margin	0.421

Table 5.5 Count for Material Inclusion of Financial Development Indicators in Second Principal Component

Indicator	Count for |Eigenvector| > 0.3
Bank Overhead Costs to Total Assets	8
Non-life Insurance Premium Volume to GDP	7
Stock market Turnover Ratio	7
Life Insurance Premium Volume to GDP	5
Stock market Total Value Traded	5
Bank Z Score	5
Stock market Capitalization to GDP	4
Deposit Money Bank Assets to Deposit Money Bank Assets and Central Bank Assets	4
Bank Net Interest Margin	4
Liquid Liabilities to GDP	3
Bank Branches per 100,000 Adults	3
Bank Concentration Ratio	3
Private Credit by Deposit Money Banks and Other Financial Institutions to GDP	2
Private Credit by Deposit Money Banks to GDP	2
Insurance Company Assets to GDP	1
Foreign Banks among Total Banks	1

Table 5.6 – Regression Outputs for Analysis of Relationship between Financial Development and Economic Growth

	FD		InstDev		Trade		Model R-sq Adjusted
Country	**Coefficient**	**p-value**	**Coefficient**	**p-value**	**Coefficient**	**p-value**	
Botswana	0.0378***	0.0001	-0.0163	0.7196	0.0031	0.2867	0.7502
Cote d'Ivoire	-0.0051	0.1826	0.0242**	0.0363	-0.0009	0.6090	0.7555
Egypt, Arab Rep.	-0.0324***	0.0000	-0.0541***	0.0065	0.0011	0.2588	0.9218
Ghana	0.0222*	0.0593	0.1270**	0.0154	0.0007	0.5598	0.8309
Kenya	0.0192***	0.0011	-0.0225	0.1963	0.0005	0.7760	0.9017
Malawi	0.0223***	0.0022	0.0482	0.1335	-0.0005	0.8010	0.8040
Mauritius	0.0414***	0.0000	-0.0287	0.4332	-0.0021**	0.0424	0.9727
Morocco	0.0318***	0.0008	-0.0410	0.1494	0.0015	0.5246	0.9029
Namibia	0.0382***	0.0000	0.0731	0.1180	0.0001	0.9324	0.9187
Nigeria	0.0606***	0.0025	-0.0480	0.5927	-0.0077*	0.0721	0.6839
South Africa	-0.0303***	0.0002	-0.0098	0.7632	0.0000	0.9886	0.8686
Tanzania	0.0480***	0.0004	-0.0099	0.6949	0.0013	0.3704	0.9774
Tunisia	0.0208*	0.0852	-0.0270	0.7142	0.0053**	0.0470	0.8372
Uganda	0.0246**	0.0450	0.1185***	0.0047	0.0026	0.4995	0.9566
Zambia	0.0464***	0.0038	-0.0152	0.7294	0.0007	0.7443	0.9066

Notes: *, **, *** indicates significance at the 10%, 5% and 1% levels respectively

8.3 Indicator and Variable Definitions

8.3.1 Descriptions for Financial Development Indicators

Source: Worldbank Database Descriptions (2014)

Indicator Name	Bank concentration (%)
Short definition	Assets of three largest commercial banks as a share of total commercial banking assets. Total assets include total earning assets, cash and due from banks, foreclosed real estate, fixed assets, goodwill, other intangibles, current tax assets, deferred tax assets, discontinued operations and other assets.
Source	Bankscope, Bureau van Dijk (BvD)

Indicator Name	Bank net interest margin (%)
Short definition	Accounting value of bank's net interest revenue as a share of its average interest-bearing (total earning) assets.
Source	Bankscope, Bureau van Dijk (BvD)

Indicator Name	Bank overhead costs to total assets (%)
Short definition	Operating expenses of a bank as a share of the value of all assets held. Total assets include total earning assets, cash and due from banks, foreclosed real estate, fixed assets, goodwill, other intangibles, current tax assets, deferred tax assets, discontinued operations and other assets.
Source	Bankscope, Bureau van Dijk (BvD)

Indicator Name	Deposit money bank assets to deposit money bank assets and central bank assets (%)
Short definition	Total assets held by deposit money banks as a share of sum of deposit money bank and Central Bank claims on domestic nonfinancial real sector. Assets include claims on domestic real nonfinancial sector which includes central, state and local governments, nonfinancial public enterprises and private sector. Deposit money banks comprise commercial banks and other financial institutions that accept transferable deposits, such as demand deposits.
Source	International Financial Statistics (IFS), International Monetary Fund (IMF)

Indicator Name	Foreign banks among total banks (%)
Short definition	Percentage of the number of foreign owned banks to the number of the total banks in an Economy. A foreign bank is a bank where 50 percent or more of its shares are owned by foreigners. (Stijn Claessens and Neeltje van Horen, 2012. "Foreign Banks: Trends, Impact and Financial Stability" IMF Working Paper. WP/12/10)

Source	Stijn Claessens and Neeltje van Horen, 2012. "Foreign Banks: Trends, Impact and Financial Stability" IMF Working Paper, WP/12/10

Indicator Name	Life insurance premium volume to GDP (%)
Short definition	Ratio of life insurance premium volume to GDP. Premium volume is the insurer's direct premiums earned (if Property/Casualty) or received (if Life/Health) during the previous calendar year.
Source	Sigma Reports, Swiss Re

Indicator Name	Liquid liabilities to GDP (%)
Short definition	Ratio of liquid liabilities to GDP. Liquid liabilities are also known as broad money, or M3. They are the sum of currency and deposits in the central bank (M0), plus transferable deposits and electronic currency (M1), plus time and savings deposits, foreign currency transferable deposits, certificates of deposit, and securities repurchase agreements (M2), plus travelers checks, foreign currency time deposits, commercial paper, and shares of mutual funds or market funds held by residents.
Source	International Financial Statistics (IFS), International Monetary Fund (IMF)

Indicator Name	Nonlife insurance premium volume to GDP (%)
Short definition	Ratio of nonlife insurance premium volume to GDP. Premium volume is the insurer's direct premiums earned (if Property/Casualty) or received (if Life/Health) during the previous calendar year.
Source	Sigma Reports, Swiss Re

Indicator Name	Private credit by deposit money banks and other financial institutions to GDP (%)
Short definition	Private credit by deposit money banks and other financial institutions to GDP.
Source	International Financial Statistics (IFS), International Monetary Fund (IMF)

Indicator Name	Private credit by deposit money banks to GDP (%)
Short definition	The financial resources provided to the private sector by domestic money banks as a share of GDP. Domestic money banks comprise commercial banks and other financial institutions that accept transferable deposits, such as demand deposits.
Source	International Financial Statistics (IFS), International Monetary Fund (IMF)

Indicator Name	Stock market capitalization to GDP (%)
Short definition	Total value of all listed shares in a stock market as a percentage of GDP.

Source	Global Stock Markets Factbook and supplemental S&P data, Standard & Poor's

Indicator Name	Stock market total value traded to GDP (%)
Short definition	Total value of all traded shares in a stock market exchange as a percentage of GDP.
Source	Global Stock Markets Factbook and supplemental S&P data, Standard & Poor's

Indicator Name	Stock market turnover ratio (%)
Short definition	Total value of shares traded during the period divided by the average market capitalization for the period.
Source	Global Stock Markets Factbook and supplemental S&P data, Standard & Poor's

Indicator Name	Insurance company assets to GDP (%)
Short definition	Total assets held by Insurance as a share of GDP.
Source	The World Bank; http://databank.worldbank.org/

Indicator Name	Bank Branches per 100, 000
Short definition	Number of physical bank branches per 100, 000 of reported population.
Source	The World Bank; http://databank.worldbank.org/

Indicator Name	Account at a formal financial institution (% age 15+)
Short definition	Percentage of reported population above the age of 15 with at least one account (deposit, savings, transaction or other) at a formal banking or other financial institution.
Source	The World Bank; http://databank.worldbank.org/

Indicator Name	Bank Z-Score
Short definition	Ratios of deposit money banks equity capital and returns to assets to the standard deviation of return on deposit money banks assets.
Source	The World Bank; http://databank.worldbank.org/