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The relationship between financial development and the cost of capital: evidence from Sub-Saharan Africa

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DECLARATION

I, Tshidzani Thusanani Tshivhase, wish to hereby declare that this academic piece is my original work, except where otherwise mentioned. It has never been submitted in part or whole in any Degree, University and for any type of examination. It is originated to be submitted in partial fulfilment of the requirement for the degree of Master of Management: Finance and Investments at the University of the Witwatersrand, Johannesburg.

Signature:  **Date:** 20 April 2020

Abstract

This study aims to provide evidence of the relationship between financial development and the cost of capital in Sub-Saharan Africa (SSA) using a panel of 5 countries (Kenya, Mauritius, Namibia, Nigeria and South Africa) from 2011 to 2016. The variables used as proxies for Financial Development were stock market development and banking sector development. Using a Panel Least Squares Regression, the estimation results show that stock market development reduces the cost of capital and that this is achieved by greater diversification of risk, access to quality information and reducing monitoring and transaction costs. Conversely, the study finds that banking sector development weakly reduces the cost of capital in SSA due to the relatively low levels of banking sector competition experienced. It follows that low bank competition reduces the effectiveness of such institutions in fulfilling their functions as financial intermediaries. The significance of this study is mainly on the potential influence that such insights have on policy makers designing financial policies which will aid in attracting greater investment to the region at a desirable cost.

Acknowledgements

I would like to acknowledge my parents, Mrs Azwindini Dzedzemane and Mr Calvin Dzedzemane for supporting me throughout this journey and being there for Muvhuya when I was unable to be there for her. In addition, I would like to thank my twin sister, Thusani Tshivhase, for always being in my corner and encouraging me to keep on going. I would like to thank my friends and family that I have not mentioned by name but who otherwise contributed to my journey. In addition, I want to thank my supervisor, Professor Odongo Kodongo, for his guidance throughout this research process. Finally, I would like to thank God and my Ancestors for carrying me through it all.

Dedication

As a single mother it is only natural that one must assume all the duties and responsibilities of parenthood. The level of time invested in completing this qualification warranted me to sacrifice the time and attention I would have ordinarily given to my role as a Mother. I therefore find it prudent to dedicate this piece of work to my beautiful 4-year-old daughter, **Muvhuya Tshivhase** who has shown me the greatest support, understanding and most importantly, unconditional love. You have been my anchor through this academic journey – I could not have accomplished it without you. **This is for you.**

Chapter 1: Introduction

1.1 Background

There have been extensive studies on the impact that Financial Development has on the cost of equity and debt capital of a firm in developed markets. These studies have been largely done on the Asian and Latin American context with little focus on the emerging market landscape in Africa, and more specifically the Sub-Saharan Africa context.

Financial Development

Financial development enhances the ease of the creation of distinct financial contracts, enable financial intermediaries and markets to facilitate transactions, enforcing of contracts and can potentially low the costs of acquiring information. The financial system represents the environment in which all these activities take place and the more developed it is, the easier and more cost effective are these activities. According to Levine (2005), the purpose of financial systems is to mobilize and pool savings which can be directed into investments where economies of scale allow for diversification of risk and cost-effective trading. In addition, they exist to ease the exchange of goods and services. While this remains the purpose of financial systems, the degree to which they execute this mandate varies with the level of financial development in the different types of markets (Levine, 1997). Therefore, financial development can be seen as an indicator of the functioning of financial systems.

Various indicators of financial development exist today including: Financial Depth[1], Financial Access[2], Financial Efficiency[3] and Financial Stability[4]. It is important to note that the different measures of financial development give rise to different results. Capital market development and financial intermediary development are used as some of the indicators of financial development. For example, the liquidity of the stock market is a measure of the ease with which stocks can be traded without significant discount. It facilitates the uptake of projects that have a longer duration and yield higher returns which enhance growth in productivity (Levine & Zervos, 1998). It can aid in the computation of the cost of equity capital as it provides information on the returns investors demand for taking on additional risk.

According to Blackburn *et al* (2005) higher degrees of financial development are associated with the use of both debt and equity financing as pure debt financing carries increased costs and the issuing of both types of financing may be more feasible. The cost of equity also decreases as markets become more efficient. This is due to greater diversification of risk, access to higher quality information, lower costs of monitoring and lower transaction costs (Blackburn, Bose, & Capasso, 2005).

Love (2003) shows that financing constraints decrease with financial development. A key financing constraint being the cost of capital. In addition, these financing constraints interfere with efficient allocation of capital by changing the stochastic discount factor. It further goes to show that firms that have financial constraints will delay investment from today to the next period (Love, 2003). This results in slower economic growth.

[1] Financial Depth refers to the size of financial institutions (commonly proxied by Private Sector Credit to GDP, Financial Institutions' asset to GDP, M2 to GDP, Deposits to GDP, Gross value added to the financial sector to GDP) and financial markets (proxied by Stock market capitalisation and outstanding domestic private debt securities to GDP, Private Debt securities to GDP, Public Debt securities to GDP, International Debt securities to GDP, Stock Market Capitalisation to GDP, Stocks traded to GDP).

[2] Financial Access refers to the extent at which individuals can and use financial services. Indicators that are commonly used from a firm perspective are: % of firms with line of credit (all firms), % of firms with line of credit (small firms), Ratio of domestic to total debt securities, Ratio of private to total debt securities (domestic), Ratio of new corporate bond issues to GDP.

[3] Financial Efficiency refers to how efficient financial intermediaries and markets are at facilitating financial transactions and intermediating resources. Indicators that are commonly used are: Net interest margin, Lending-deposits spread, Profitability (ROA, ROE), Non-interest income to total income, Overhead costs (% of total assets), Turnover ratio for stock market, Turnover of bonds (private, public) on securities exchange, Liquidity/transaction costs.

[4] Financial Stability describes the stability of financial institutions and markets. Indicators that are commonly used are: Capital adequacy ratios, Asset quality ratios, Liquidity ratios, Z-score, Price/Earnings ratio, volatility of stock price index, sovereign bond index, skewness of the index (stock price, sovereign bond), Ratio of short-term to total bonds, Duration.

Cost of Equity and Debt Capital

The cost of equity is defined as the expected return that investors demand for bearing risk in an entity. The cost of debt is defined as the interest rate paid on borrowed money. The cost of capital is the weighted average of the costs of both equity and debt which jointly constitute the capital structure of a firm. If the cost of equity is considered the expected equity returns, it should follow that as financial development increases, the cost of equity decreases. This would be through greater diversification and management of risk. Similarly, if the cost of debt is the interest rate paid on debt then it should follow that as financial development increases, the cost of debt decreases.

According to Scott (1976), one of the determinants of debt financing is firm size. Larger firms with strong balance sheets have easier access to debt financing and have better long-term prospects. In addition, large firms have lower insolvency costs and can maintain interest payments on debt with relative ease. Small firms, however, have higher insolvency costs due to the weak balance sheets they possess. This may make debt capital an expensive choice of financing for small firms. Growth is also considered another determinant of debt financing. Firms with high growth prospects may not have enough cash internally to fund this growth and so they would seek out debt and equity financing.

Emerging and Frontier Markets

Emerging Markets are defined as markets that exhibit a high level of risk and volatility in their securities markets than seen in developed markets (Mody, 2004). Furthermore, they are considered emerging markets if they per capita GDP falls below a certain threshold which changes with time (Bakaert & Harvey, 2002).

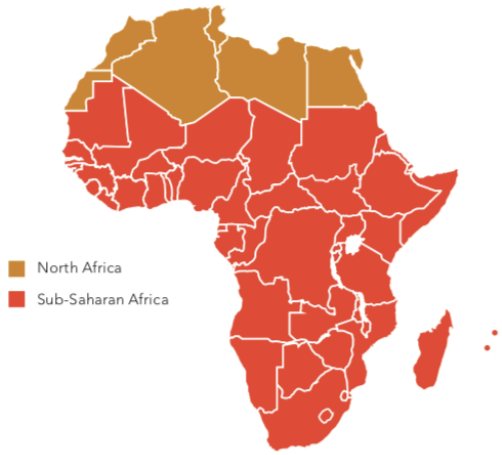
According to the FTSE Russell[5], Frontier Markets represent developing countries that exhibit high economic growth rates but have small and relatively illiquid stock markets. These markets have high growth potential but are still in the early stages of development to be considered emerging markets.

[5] Web link: https://www.ftserussell.com/research

The attractive aspect of emerging markets is their relative abundance of growth opportunities which give investors incentives to invest in such markets and subsequently yield higher returns for the additional risk taken. However, emerging markets have relatively low financial development which is seen through their small and relatively immature equity markets. This makes it challenging for firms to access capital financing which consequently increases the cost of capital.

Sub-Saharan Africa

Sub-Saharan Africa (SSA) is characterized by varying levels of GDP per capita but the overall trend is declining which is particularly evident post 2009 global financial crisis (see Figure 1).



Furthermore, the market is characterised by a small market size relative to developed nations and low levels of liquidity. In recent years there has seen a rise in the formation of stock exchanges in the region with 15 new stock exchanges being founded in the last 20 years (see Table 1). This is indicative of the progress that is being made in liberalising African markets to further enhance financial development and reduce barriers to gaining access to capital. This is especially critical for the Small and Medium Enterprises who's major hurdle in growth and sustainability is the access to feasible financing methods.

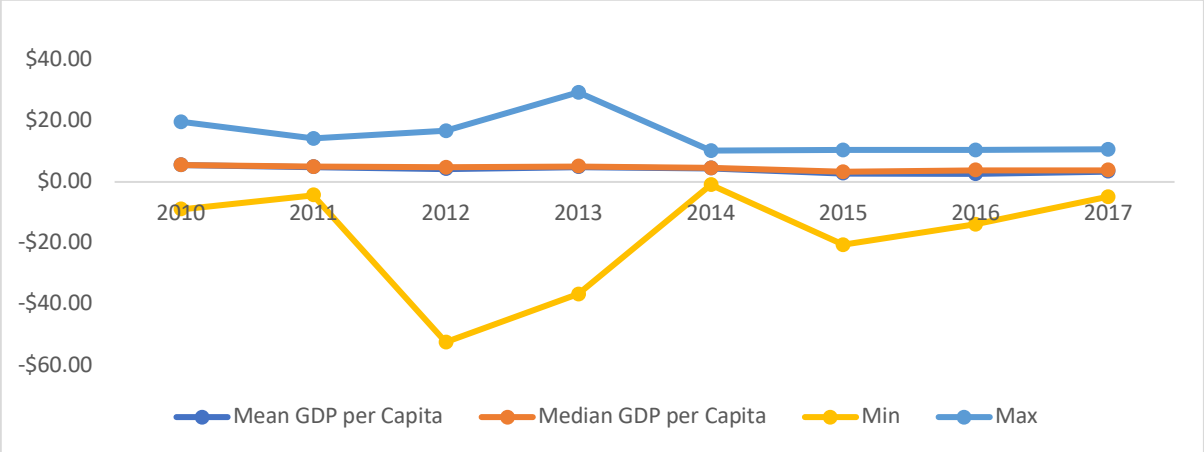


Figure 1: GDP per Capita for Sub-Saharan Africa

Table 1: List of Stock Exchanges in Sub-Saharan Africa

Country	**Exchange**	**Location**	**Founded**	**No. of Listed Companies**
Angola	Angolan Debt and Stock Exchange	Luanda	2016	
Botswana	Botswana Stock Exchange	Gaborone	1989	44
Cameroon	Douala Stock Exchange	Douala	2001	2
Cabo Verde	Bolsa de Valores de Cabo Verde	Mindelo	2005	
Ivory Coast	Bourse Régionale des Valeurs Mobilières	Abidjan	1998	39
Ghana	Ghana Stock Exchange	Accra	1990	37
Kenya	Nairobi Securities Exchange	Nairobi	1954	64
Lesotho	Maseru Securities Exchange	Maseru	2016	
Malawi	Malawi Stock Exchange	Blantyre	1995	14
Mauritius	Stock Exchange of Mauritius	Port Louis	1988	170
Mozambique	Bolsa de Valores de Mozambique	Maputo	1999	7
Namibia	Namibia Stock Exchange	Windhoek	1992	40
Nigeria	Abuja Securities and Commodities Exchange	Abuja	1998	
Nigeria	Nigerian Stock Exchange	Lagos	1960	169
Rwanda	Rwanda Stock Exchange	Kigali	2008	8
Seychelles	Seychelles Securities Exchange (Trop-X)	Victoria	2012	21
Somalia	Somali Stock Exchange	Mogadishu	2015	2
South Africa	JSE Limited	Johannesburg	1887	388
South Africa	A2X	Johannesburg	2017	20
Sudan	Khartoum Stock Exchange	Khartoum	1994	54
Swaziland	Swaziland Stock Exchange	Mbabane	1990	10
Tanzania	Dar es Salaam Stock Exchange	Dar es Salaam	1998	25
Uganda	Uganda Securities Exchange	Kampala	1997	17
East Africa	ALTX East Africa Exchange	Kampala	2013	3
Zambia	Agricultural Commodities Exchange of Zambia	Lusaka	2007	
Zambia	Lusaka Stock Exchange	Lusaka	1994	24
Zimbabwe	Zimbabwe Stock Exchange	Harare	1948	64

Stylized Facts

Financial markets provide an environment whereby trading of securities can take place. The banking sector can be seen to form part of the financial markets where they facilitate the trading

of goods and services. The banking sector of SSA can be described as being generally underdeveloped (Aluko & Ajayi, 2017; Akinlo & Egbetunde, 2010). Table 2 shows banking development indicators of SSA countries relative to some developed countries.

Table 2: Indicators of Banking Sector Development in selected countries in Sub-Saharan Africa as well as developed markets, 2010

Country	**Bank deposits to GDP (%)**	**Deposit money banks'' assets to GDP (%)**	**Private credit by deposit money banks and other financial institutions to GDP (%)**	**Private credit by deposit money banks to GDP (%)**
Ghana	21	24	14	14
Kenya	33	37	25	25
Mauritius	90	106	82	82
Namibia	59	51	46	46
Nigeria	18	22	17	17
South Africa	57	80	142	70
Zambia	14	14	9	9
Zimbabwe	18	12	11	11
Australia	93	124	130	121
Germany	73	112	91	91
Japan	200	176	162	100
United States	81	61	180	52

It can be seen that the average Bank deposits to GDP (%) ratio in SSA is 39% compared to 112% in developed markets. It can further be seen across all the listed banking sector development indicators that developed countries fair better and far higher than developing markets such as those in SSA. This suggests that, compared to developed countries, the banking sector in SSA is underdeveloped.

Table 3 shows indicators of stock market development in selected countries in SSA markets. It shows that these markets are small with few listed companies and low market capitalization (with the exception of Nigeria and South Africa). As of 2017, the Johannesburg Securities Exchange had 294 listed companies which is over half of the listed companies in SSA. According to Dermirguc-Kunt & Levine (1996), the assumption behind market capitalization is that market size is positively correlated to capital mobility and the ability to diversify risk. Stock markets in SSA have the inherent problem of low liquidity. Liquidity is measured by the Turnover ratio which was as low as 0.6% in Zambia in 2010 and as high as 30% in South Africa for the same period. In contrast, advanced markets such as Australia, Germany, the United States and Japan had turnover ratios of 76%, 113%, 116% and 222% respectively in 2010. Low

levels of stock market liquidity are indicative of low levels of financial development which would hinder the efficient trading of securities and drive the cost of equity capital upward.

Table 3: Indicators of Stock Market Development in selected countries in Sub-Saharan Africa, 2010 and 2017

	Market capitalization				**Market liquidity**		**Turnover ratio**		**Listed domestic companies**		**S&P/Global Equity Indices**	
					Value of shares traded		**Value of shares traded**		**number**			
	$ millions		**% of GDP**		**% of GDP**		**% of market capitalization**				**% change**	
Country	**2010**	**2017**	**2010**	**2017**	**2010**	**2017**	**2010**	**2017**	**2010**	**2017**	**2010**	**2017**
Ghana	2,948	..	9.2	..	0.3	..	3.5	..	31	..	94.1	49.1
Kenya	14,461	..	36.2	..	2.0	1.2	5.5	..	55	65	33.8	23.5
Mauritius	7,753	9,743	77.5	73.4	3.6	3.4	4.7	4.6	62	74	8.2	28.2
Namibia	1,176	2,915	10.4	22.0	0.2	..	1,721.5	..	7	10	24.2	17.7
Nigeria	50,546	37,218	13.9	9.9	1.4	0.6	10.1	5.9	215	166	20.3	37.4
South Africa	925,007	1,230,977	246.4	352.8	73.9	117.4	30.0	25.7	352	294	32.1	30.6
Zambia	3,184	..	13.6	..	0.1	..	0.6	..	20	..	17.4	36.6
Zimbabwe	..	..	..	..	..	..	..	..	..	..	..	..
Australia	1,454,491	1,508,463	127.1	114.0	98.9	61.1	77.8	53.6	1,913	2,013	12.5	16.5
Germany	1,429,719	2,262,223	41.8	61.3	43.7	42.2	104.5	63.6	690	450	7.4	12.5
Japan	3,827,774	6,222,825	67.2	127.7	74.9	118.6	111.6	92.8	2,281	3,598	9.6	19.1
United States	17,283,452	32,120,703	115.3	164.8	240.3	204.2	208.4	116.1	4,279	4,336	12.8	19.4

Source: World Bank, World Development Indicators

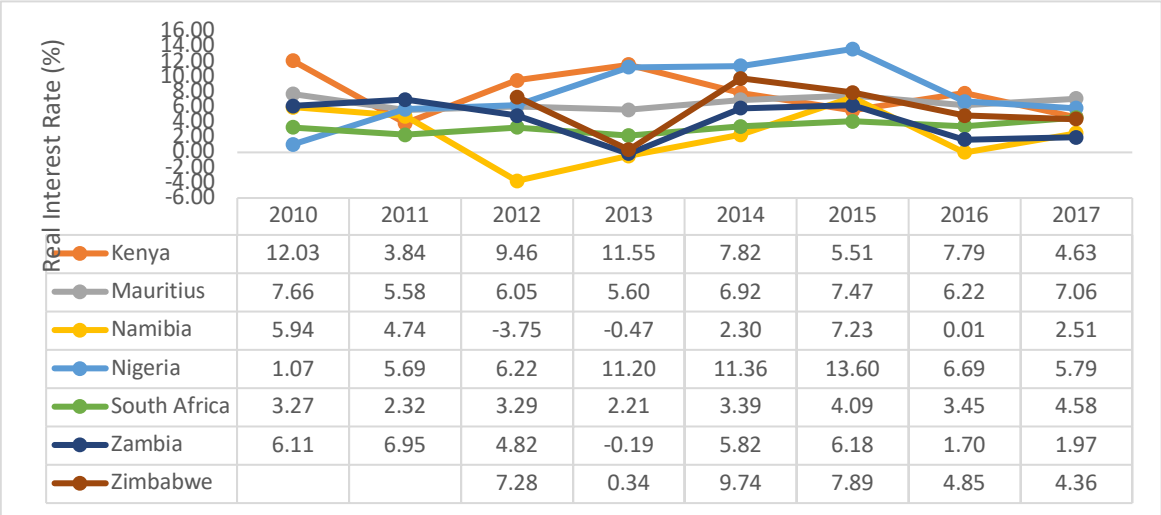
Despite the issues of low liquidity and small size, stock markets in SSA show varying performance in terms of rates of return. As of May 2017, Year-To-Date returns in US dollar terms were 9.86% (Kenya), 18.21% (Mauritius), 5.09% (Namibia), 4.81% (Nigeria), 13.78% (South Africa), 21.38% (Zambia), 10.91% (Zimbabwe) (Masango, 2017). In comparison, developed markets enjoy slightly higher rates of return due to higher levels of liquidity and larger market capitalizations. Examples of such countries are: Australia (20.2%), Germany (28.5%), Japan (24.4%) and the United States (21.83%)[6]. The implication of these levels of return on the cost of capital is that in SSA, lower returns are realized due to the increased cost of capital. The increased cost of capital can be explained by how progressive financial development is in a particular region. Developed markets have a higher financial development which leads to lower intermediation costs and results in higher returns. Conversely, developing

[6] https://novelinvestor.com/historical-returns/

and emerging markets with lower financial development leading to increased intermediation costs result in lower returns.

Levels of Interest Rates

Figure 2 shows the levels of real interest rates in selected SSA countries from 2010 to 2017. The interest rates are reflective of the various macroeconomic policies that countries employ. The cost of capital is sensitive to the prevailing interest rate at a given point in time. From a debt financing perspective there is a direct relationship between interest rates and the bond yield. This means that at high interest rates, the cost of debt of capital increases as well. A similar argument exists for equity financing but with a difference in that there is an opportunity cost that is forfeited instead of investing that money to earn an interest payment.



	2010	2011	2012	2013	2014	2015	2016	2017
Kenya	12.03	3.84	9.46	11.55	7.82	5.51	7.79	4.63
Mauritius	7.66	5.58	6.05	5.60	6.92	7.47	6.22	7.06
Namibia	5.94	4.74	-3.75	-0.47	2.30	7.23	0.01	2.51
Nigeria	1.07	5.69	6.22	11.20	11.36	13.60	6.69	5.79
South Africa	3.27	2.32	3.29	2.21	3.39	4.09	3.45	4.58
Zambia	6.11	6.95	4.82	-0.19	5.82	6.18	1.70	1.97
Zimbabwe			7.28	0.34	9.74	7.89	4.85	4.36

Figure 2: Levels of Interest Rates (%) in selected countries in Sub-Saharan Africa

Source: The World Bank, World Development Indicators

1.2 Problem Statement

There exists a significant volume of literature that seeks to describe and ascertain the relationship between financial development and the cost of capital. A large proportion of this literature focusses on developed economies and emerging markets such as Latin America and Asia. Furthermore, these studies have supported the notion that there exists a relationship between financial development and the cost of capital and that the cost of capital actually increases with decreasing financial development (Kim *et al,* 2015).

It is not clear the extent to which the results of these studies can be generalized to the Sub-Saharan African markets which the literature has largely ignored. Thus, market managers are not adequately informed of the role financial markets development plays in influencing the cost of financing enterprises and therefore the attractiveness of their countries to investors. This study therefore aims to provide further evidence of the relationship between financial development and the cost of (equity and debt) capital in these hitherto neglected markets.

1.3 Research Questions

- The study aims to answer the following pertinent questions: Does financial development affect the cost of equity capital in SSA?
    - What is the relationship between financial development and cost of equity in SSA?
- Does financial development affect the cost of debt capital in SSA?
    - What is the relationship between financial development and cost of debt in SSA?

1.4 Significance of the work contribution

The study will be contributing to existing literature on the relationship between financial development and financing types. More importantly it will be taking a look at the Sub-Saharan African context which is still considered a developing market. Existing literature shows that stock market development reduces the cost of equity (Kim *et al*, 2015; Blackburn *et al*, 2005). This will particularly be of importance to firms operating in emerging markets such as SSA as it would greatly influence their financing choices when looking into expanding operations. Furthermore, this work would be of significance to the finance and economic entities of country governments as they would be concerned with stimulating economic growth through foreign and local direct investments.

Chapter 2: Literature Review

2.1 Theoretical Framework

Financial Development involves the improvement of information symmetry regarding investments and allocation of capital, monitoring of investments by promoting corporate governance after the provision of finance, the facilitation of trading, diversification and management of risk, the mobilization and pooling of savings and the ease of exchanging of goods and services (Levine, 2005). While these remain the purpose of financial systems, the degree to which they execute the mandate varies with the level of financial development in the different types of markets (Levine, 1997).

Therefore, financial development can be seen as an indicator of the functioning of financial systems. For example, the liquidity of the stock market is a measure of the ease with which stocks can be traded without significant discount. It facilitates the uptake of projects that have a longer duration and yield higher returns which enhance growth in productivity (Levine & Zervos, 1998). It can aid in the computation of the cost of equity capital as it provides information on the returns investors demand for taking on additional risk.

2.1.1 Financial liberalization theory

A number of theories exist on the factors that influence financial development in the international context. There are theories on financial development such as the McKinnon-Shaw models of financial development which is based on the premise that financial repression results in the reduction in the real rate of growth and the real size of the financial sector relative to non-financial variables (Fry, 1989). This has been shown to have a negative impact on financial development.

In the 1970s, the neo-structuralist models were developed as a response to the McKinnon-Shaw models. The fundamental basis of the neo-structuralist models is the curb market which is where money – lenders and non – traditional banks intermediate between savers and investors. The predictions made by the neo-structuralist models were found to be the complete opposite to those of the McKinnon – Shaw models due to the initial assumptions made.

Furthermore, the McKinnon – Shaw and neo – structuralist models focus on the effects of financial liberalization at the macroeconomic level and highlight the impact that initial assumptions have on the outcomes of the two models. Should the assumption be that the traditional banking system is more efficient than the curb market at channeling and allocating pooled savings into investable projects then financial liberalization increases the real supply of credit and the volume and quality of investments (Fry, 1989). Conversely, if the traditional banking system is seen as inefficient at intermediating between savers and investors compared to the curb market due to the increased interest rates and reserve requirements then financial liberalization decreases the real supply of credit and the volume and quality of investments (Fry, 1989).

One of the major criticisms of the McKinnon – Shaw theory is that it does not adequately highlight the importance of macroeconomic stability and the existence of an adequate regulatory environment for banks (Fry, 1989). Through extensive research, the World Bank highlighted that there are four prerequisites for financial liberalization to be successful: (1) macroeconomic stability; (2) fiscal discipline; (3) an improved legal and regulatory environment and; (4) a tax system that does not excessively discriminate against finance (Fry, 1989).

2.1.2 Law and Finance theory

The law and finance theory's political channel and legal adaptability channel as well as the politics and finance theory has been mentioned in various literature. According to Beck *et al* (2001) in the politics and finance theory one of the driving forces behind financial development is political structure and not legal tradition. The law and finance theory's political channel argues that a centralized and powerful state that emphasizes private property ownership and rights, protects the rights of minority shareholders and creditors through the prevalence and use of civil law will be produced. In addition, this would lead to the development of competitive financial markets regardless of the prevailing political structure. Girma & Shortland (2008) further explain the politics and finance view in that the will of the elite will most likely and more effectively be implemented through a powerful and centralized government than in a decentralized, open and competitive political system.

Furthermore, according to Levine (2005), in many countries legislation does not sufficiently protect the rights of minority shareholders and in many instances, the legal system does not enforce the legislation that governs the protection of these shareholders. This can impact the channeling of savings to worthy investable projects which adversely impacts financial development. It is also key to note that financial underdevelopment is a characteristic of autocratic and generally unstable political regimes. This is particularly noteworthy in that political instability is prevalent in a number of emerging and transitional markets globally, more so in Africa.

2.1.3 Endowment Theory

The Endowment theory, formulated by Acemoglu *et al* (2010), argues that disease and geography are the key variables that influence the establishment of financial institutions which, in turn, influence financial development. Three assumptions underpin the endowment theory and they are: (1) Different types of colonization strategies give rise to different groups of institutions. In one type of colonization strategy, the approach was to set up "extractive states" (such as in the case of the colonization of Central Africa by Belgium) whose sole purpose was to expropriate resources from the colony to the colonizer. The institution in this regime did not care much about the protection of private property rights or the provision of a regulatory environment that mitigated government expropriation. They created institutions which would empower the elite and allow the expropriation of resources such as gold and silver (Beck *et al*, 2002). Conversely, the colonization strategy was for European migrants to relocate and settle in the colonized state due to a favorable disease environment and habitable terrain. In this case, settlers would try to replicate the institutions of their homelands which were characterized by strong property rights and a regulatory environment that kept government in check (Beck *et al*, 2002; Acemoglu *et al*, 2010). Examples of such colonies would be the United States, Australia, New Zealand and Canada. (2) The colonization strategy was driven by the potential longevity of the colonies. In cases where the environment was hostile from a disease and geography perspective which lead to high European mortality rates, the likelihood of the creation of an extractive state increased. (3) The colonial states and their institutions continued to exist even after the colony gained their independence.

Based on the assumptions of the Endowment theory, it can be argued that extractive states would not allow for the creation of free and competitive markets because they would be seen as a threat to the position of the elites who are benefiting from the dispensation.

2.1.4 Interest group theory of financial development

The Interest group theory of financial development, put forward by Rajan & Zingales (2003), was developed on the premise that a theory with a more variable factor was required in explaining the time series variability and cross – country differences in financial development. They argue that the strength of political forces in support of financial development is this factor.

The theory argues that incumbents in the financial industry and broader industries at large could be against arm's length financial markets as they may foster competition. Incumbents can be seen as monopolies in any given industry. In a financially underdeveloped market, incumbents could enjoy economic rent due to the monopolized position they occupy. If any new venture wants to enter that industry, they either have to sell to the incumbent or have them fund it so in addition to the economic rent, they would further gain through the appropriation of profits from these new ventures (Rajan & Zingales, 2003). Financial development would severely hamper the economic benefits of being an incumbent as increased competition would reduce their relative importance in terms of their reputation and collateral whilst allowing new ventures to disrupt the industry and gain profits.

The theory further argues that financial development will flourish and opposition to it reduced when a country's borders are open both to a free flow of trade and capital (Rajan & Zingales, 2003). This is due, in part, to the notion that foreign firm entry into domestic markets increase competition and reduce economic rent for domestic firms. Furthermore, cross-border capital flows would allow domestic firms to gain access into international capital markets for financing.

2.1.5 Demand following hypothesis

The Demand following hypothesis postulates that it is economic growth through the growth of the real sector which causes an increase in the demand for financial services which further

leads to financial development through the development of financial markets (Aluko & Ajayi, 2017).

2.1.6 Inflation and finance theory

The Inflation and finance theory, put forward by Huybens & Smith (1999), is a theoretical model whose predictions are consistent with the observations that in the long – run inflation and financial market activity are strongly negatively correlated. They argue that in environments of high inflation, banks would exercise credit rationing through decreased interest rates, and this would reduce returns on equity. This would subsequently lead to a decline in financial market activities which is an indicator of poor financial development (Aluko & Ajayi, 2017).

Financial Development and the Cost of Capital

The cost of equity is defined as the expected return that investors demand for bearing risk in an entity. Gordon & Gould (1978) define the cost of equity as being equal to the yield at which a firm's stock is selling. According to Gupta *et al* (2018), the following factors impact the cost of equity: (i) the degree to which minority shareholder rights are legally protected; (ii) Firm and Country level corporate governance and; (iii) the level of financial development and access to capital.

The cost of debt can be defined as the interest rate paid on borrowed money. Some of the associated costs of debt include financial distress, agency costs, debt overhang and personal taxes (van Binsbergen *et al*, 2010). The relationship between financial development and the cost of debt has been indirectly studied in the following context: the effect that financial development has on government bond returns in developed and emerging markets (Boubaker *et al*, 2019). They found that in emerging markets there is a positive relationship between financial development and government bond returns. This is further supported by Jiang *et al* (2002) who state that bond market development can lower the cost of debt as bank financing carries more intermediation costs. From a financial development perspective, the development of bond markets can provide a benchmark for the pricing of credit and equities which, in turn, provides that linkage with the cost of capital.

According to Scott (1976), one of the determinants of debt financing is firm size. Larger firms with strong balance sheets have easier access to debt financing and have better long-term prospects. In addition, large firms have lower insolvency costs and can maintain interest payments on debt with relative ease. Small firms, however, have higher insolvency costs due to the weak balance sheets they possess. This may make debt capital an expensive choice of financing for small firms. Growth is also considered another determinant of debt financing. Firms with high growth prospects may not have enough cash internally to fund this growth and so they would seek out alternative forms of financing such as issuing debt or equity.

Modigliani and Miller (1958) view debt financing as fixed legal claims on a firm's future cash flows and view equity financing as variable legal claims on a firm's cash flows. A legal claim is defined through a contractual agreement and should be enforced by the legal system. Through the law and finance theory and through the conjecture that legal institutions influence financial development, it can be said that the cost of issuing debt or equity increases when legal systems do not adequately protect investor or creditor rights. This would further lead to a weakly competitive financial market which would be an indicator of poor financial development. La Porta *et al* (1997) further support this argument through the premise that differences in legal protection of investors are explained by the differences in the design and effectiveness of financial systems.

The cost of capital is the weighted average of the costs of both equity and debt which jointly constitute the capital structure of a firm. If the cost of equity is considered the expected equity returns, it should follow that as financial development increases, the cost of equity decreases through greater diversification and management of risk. Similarly, if the cost of debt is the interest rate paid on debt then it should follow that as financial development increases, the cost of debt decreases.

2.2 Empirical Literature

The empirical definition of Financial Development as defined by the World Bank is segmented into four categories as shown in Table 4.

Empirically, it has been shown that the degree of democracy as well as the political stability of a country have a direct impact on financial development, more specifically the speed at which financial development occurs (Levine, 2005). A democratic dispensation reduces the influence

that elite groups have on financial policies due to the increased political participation. With that being said, a politically stable country would signal to the market that they are a safe haven to invest in, which would mean less risk taking on the investor and a decreased cost of capital to the firm seeking finance.

Love (2003) shows that financing constraints decrease with financial development. A key financing constraint is the cost of capital. In addition, these financing constraints interfere with efficient allocation of capital by changing the stochastic discount factor. It further goes to show that firms that have financial constraints will delay investment from today to the next period which would result in slower economic growth (Love, 2003).

According to Blackburn *et al* (2005) higher degrees of financial development are associated with the use of both debt and equity financing as pure debt financing carries increased costs and the issuing of both types of financing may be more feasible. This, however, should be contextualized within the size and type of the firms that are seeking financing. Private firms heavily rely on retained earnings and bank loans, small public firms rely on equity financing as debt financing may carry high costs relative to the potential benefit, and large public firms rely on retained earnings and the issuing of corporate bonds (Frank & Goyal, 2008). Therefore, higher degrees of financial development would be seen in countries that have a significant number of large publicly traded firms on their stock exchanges that use both debt and equity financing.

In addition, Blackburn *et al* (2005) found that the cost of equity also decreases as markets become more efficient due to greater diversification of risk, access to higher quality information, lower costs of monitoring and lower transaction costs. Kim *et al* (2015) found that stock market development decreases the cost of equity capital of publicly traded firms in China, but the effect is less significant in State Owned Enterprises (SOE's) and firms that are in a rapid growth phase.

In addition, they found that banking sector development only slightly reduces the cost of equity with the effect being more apparent in non-SOE's (Kim *et al*, 2015). Furthermore, it has been shown that large stock markets can lower the transaction costs related to mobilising savings and allocating them to investable projects (Levine & Zervos, 1996).

Table 4: Empirical Definition of Financial Development

Category	Financial Depth	Financial Access	Financial Efficiency	Financial Stability
Definition	The size of financial institutions and financial markets	The extent to which individuals can and do use financial services.	How efficient financial intermediaries and markets are at facilitating financial transactions and intermediating resources	Stability of financial institutions and markets
Indicators	• Financial Institutions: Private Sector Credit to GDP, Financial Institutions' asset to GDP, M2 to GDP, Deposits to GDP, Gross value added to the financial sector to GDP. • Financial Markets: Stock Market Capitalisation and outstanding domestic private debt securities to GDP, Private Debt securities to GDP, Public Debt securities to GDP, International Debt securities to GDP, Stock Market Capitalisation to GDP, Stocks traded to GDP	% of firms with line of credit (all firms), % of firms with line of credit (small firms), Ratio of domestic to total debt securities, Ratio of private to total debt securities (domestic), Ratio of new corporate bond issues to GDP	Net interest margin, Lending-deposits spread, Profitability (ROA, ROE), Non-interest income to total income, Overhead costs (% of total assets), Turnover ratio for stock market, Turnover of bonds (private, public) on securities exchange, Liquidity/transaction costs	Capital adequacy ratios, Asset quality ratios, Liquidity ratios, Z-score, Price/Earnings ratio, volatility of stock price index, sovereign bond index, skewness of the index (stock price, sovereign bond), Ratio of short-term to total bonds and Duration.

Arestis & Demetriades (1997) examine the relationship between financial development, growth and stock market development. They find that there is a positive relationship between stock market volatility and banking sector development. Given that banking sector development can be used as a proxy for financial development, it can further be inferred that there is a positive relationship between financial development and stock market volatility where stock market volatility is a measure of the cost of equity capital. Similarly, Demetriades & Devereux (1992) "find that the effect of higher domestic interest rates on the cost of capital outweighs the effect of an enhanced supply of investable funds on investment". Therefore, interest rate liberalization (which means that market forces determine interest rates) has a negative impact on investment.

Emerging and Frontier Markets

Emerging Markets are defined as markets that exhibit a high level of risk and volatility in their securities markets than seen in developed markets (Mody, 2004). Furthermore, they are considered emerging markets if their per capita GDP falls below a certain threshold which changes with time (Bakaert & Harvey, 2002). According to the FTSE Russell[7], Frontier Markets represent developing countries that exhibit high economic growth rates but have small and relatively illiquid stock markets. These markets have high growth potential but are still in the early stages of development to be considered emerging markets.

The attractive aspect of emerging markets is their relative abundance of growth opportunities which give investors incentives to invest in such markets and subsequently yield higher returns for the additional risk taken. However, emerging markets have relatively low financial development which is seen through their small and relatively immature equity markets. This makes it challenging for firms to access capital which increases the cost of capital.

Sub-Saharan Africa

Sub-Saharan Africa (SSA) is characterized by varying levels of GDP per capita but the overall trend is declining which is particularly evident post 2009 global financial crisis. Furthermore, the market is characterised by a small market size relative to developed nations and low levels

[7] Weblink: https://www.ftserussell.com/research

of liquidity. In recent years, there has seen a rise in the formation of stock exchanges in the region with 15 new stock exchanges being founded in the last 20 years. This is indicative of the progress that is being made in liberalising African markets to further enhance financial development and reduce barriers to gaining access to capital.

This is especially critical for the Small and Medium Enterprises who's major hurdle in growth and sustainability is the access to feasible financing methods. However, the banking sector still remains a key player as a financial intermediary in SSA and can be considered the main source of external capital for firms due to the relatively low levels of stock and bond market development (Ncanywa & Mabusela, 2019).

Stylized Facts

Financial markets provide an environment whereby trading of securities can take place. The banking sector can be seen to form part of the financial markets where they facilitate the trading of goods and services. The banking sector of SSA can be described as being generally underdeveloped (Aluko & Ajayi, 2017; Akinlo & Egbetunde, 2010). Table 5 shows banking development indicators of SSA countries and developed countries.

Table 5: Indicators of Banking Sector Development in selected countries in Sub-Saharan Africa as well as developed markets, 2010

Country	Bank deposits to GDP (%)	Deposit money banks'' assets to GDP (%)	Private credit by deposit money banks and other financial institutions to GDP (%)	Private credit by deposit money banks to GDP (%)
Ghana	21	24	14	14
Kenya	33	37	25	25
Mauritius	90	106	82	82
Namibia	59	51	46	46
Nigeria	18	22	17	17
South Africa	57	80	142	70
Zambia	14	14	9	9
Zimbabwe	18	12	11	11
Australia	93	124	130	121
Germany	73	112	91	91
Japan	200	176	162	100
United States	81	61	180	52

Source: World Bank, World Development Indicators

It can be seen that the average Bank deposits to GDP (%) ratio in SSA is 39% compared to 112% in developed markets. It can further be seen across all the listed banking sector development indicators that developed countries fair better and far higher than developing markets such as those in SSA. This suggests that, compared to developed countries, the banking sector in SSA is underdeveloped.

Table 6: Indicators of Stock Market Development in selected countries in Sub-Saharan Africa, 2010 and 2017

	Market capitalization				**Market liquidity**		**Turnover ratio**		**Listed domestic companies**		**S&P/Global Equity Indices**	
					Value of shares traded		**Value of shares traded**		**number**			
	$ millions		**% of GDP**		**% of GDP**		**% of market capitalization**				**% change**	
Country	**2010**	**2017**	**2010**	**2017**	**2010**	**2017**	**2010**	**2017**	**2010**	**2017**	**2010**	**2017**
Ghana	2,948	..	9.2	..	0.3	..	3.5	..	31	..	94.1	49.1
Kenya	14,461	..	36.2	..	2.0	1.2	5.5	..	55	65	33.8	23.5
Mauritius	7,753	9,743	77.5	73.4	3.6	3.4	4.7	4.6	62	74	8.2	28.2
Namibia	1,176	2,915	10.4	22.0	0.2	..	1,721.5	..	7	10	24.2	17.7
Nigeria	50,546	37,218	13.9	9.9	1.4	0.6	10.1	5.9	215	166	20.3	37.4
South Africa	925,007	1,230,977	246.4	352.8	73.9	117.4	30.0	25.7	352	294	32.1	30.6
Zambia	3,184	..	13.6	..	0.1	..	0.6	..	20	..	17.4	36.6
Zimbabwe	..	..	..	..	..	..	..	..	..	..	..	..
Australia	1,454,491	1,508,463	127.1	114.0	98.9	61.1	77.8	53.6	1,913	2,013	12.5	16.5
Germany	1,429,719	2,262,223	41.8	61.3	43.7	42.2	104.5	63.6	690	450	7.4	12.5
Japan	3,827,774	6,222,825	67.2	127.7	74.9	118.6	111.6	92.8	2,281	3,598	9.6	19.1
United States	17,283,452	32,120,703	115.3	164.8	240.3	204.2	208.4	116.1	4,279	4,336	12.8	19.4

Source: World Bank, World Development Indicators

Table 6 shows indicators of stock market development in selected countries in SSA markets. It shows that these markets are small with few listed companies and low market capitalization (with the exception of Nigeria and South Africa). As of 2017, the Johannesburg Securities Exchange had 294 listed companies which is over half of the listed companies in SSA. According to Dermirguc-Kunt & Levine (1996), the assumption behind market capitalization is that market size is positively correlated to capital mobility and the ability to diversify risk.

Stock markets in SSA have the inherent problem of low liquidity. Liquidity is measured by the Turnover ratio which is as low as 0.6% in Zambia in 2010 and as high as 30% in South Africa

for the same period. In contrast, developed markets such as Australia, Germany, the United States and Japan had turnover ratios of 76%, 113%, 116% and 222% respectively in 2010. Low levels of stock market liquidity are indicative of low levels of financial development which would hinder the efficient trading of securities and drive the cost of equity capital upward.

Despite the issues of low liquidity and small size, stock markets in SSA continue to show varying performance in terms of rates of return. As of 2017, Year-To-Date returns in US dollar terms were 9.86% (Kenya), 18.21% (Mauritius), 5.09% (Namibia), 4.81% (Nigeria), 13.78% (South Africa), 21.38% (Zambia), 10.91% (Zimbabwe) (Masango, 2017). Compared to developed markets, returns were 20.2% (Australia), 28.5% (Germany), 24.4% (Japan) and 21.83% (United States)[8]. Compared to developed markets, returns in SSA countries are low due to the low liquidity and small market capitalization values.

2.3 Summary and knowledge gap

Many of the theories on financial development focus on developing economies and their relevance in emerging and frontier markets need further testing. In addition, within emerging and frontier markets, most of the literature focusses on the Latin American and Asian contexts with few studies being done in the African and specifically the SSA context. In addition, a significant volume of literature is focused on the relationship between financial development and economic growth (Beck *et al*, 2000). It has been an observed that financial development through the development of the banking sector and financial markets, impacts asset returns through the main functions of the financial system (Boubaker *et al*, 2019). This also in the developed market context and not in the developing or emerging market context.

There exists a gap in current literature where little attention has been given to the relationship between financial development and the cost of capital in emerging and frontier markets in Africa which exhibit characteristics that are unique to the African context and may shape the relationship somewhat differently. The only other study that focuses on this relationship is in the Chinese context conducted by Kim *et al* (2015). This study aims to bridge the gap by providing evidence of the relationship between financial development and the cost of capital in the SSA context.

[8] https://novelinvestor.com/historical-returns/

Chapter 3: Research Methodology

The framework of this study will be to empirically measure financial development and the cost of equity and debt capital. The methodology used to model the relationship between financial development and the cost of equity is as outlined in (Kim *et al,* 2015). This study proposes to adopt their methodology.

3.1 Data and Sample

The study will be carried out for five SSA countries for the period 2011 – 2016. The five countries covered in the study are: Kenya, Mauritius, Namibia, Nigeria and South Africa. The aforementioned countries were chosen as they are classified as developing economies according to the United Nations[9]. The time period specified was chosen due to data availability and ensures that there are sufficient data points to make for a reasonably adequate study.

The stock market development, bond market development and banking sector development data are collected from the World Bank's "Global Financial Development Database". Measures for institutional factors are obtained from the World Bank's Worldwide Governance Indicators[10]. Statistical and empirical data processing is conducted using EViews.

3.2 Financial Development Measures

The main analysis uses several stock market development, bond market development and banking sector development variables as proxies for financial development. The addition of bond market development is a slight deviation from standard literature as I would like to take into account the effects of bond market development on the cost of both equity and debt capital. According to Adelegan & Radzewicz-Bak (2009) domestic bond markets of SSA countries are growing rapidly and have almost doubled between the years 2001 and 2008. With this being said, it would be important to take into account bond market development in the SSA context as it is becoming increasingly a key player in the sourcing of finance.

[9] https://www.un.org/en/development/desa/policy/wesp/wesp_current/2014wesp_country_classification.pdf
[10] https://datacatalog.worldbank.org/dataset/worldwide-governance-indicators

3.3 Cost of Capital

According to Luzi & Leuz (2006), the cost of equity is lower for firms that operate in countries that have more robust legal institutions and a stricter regulatory environment which is enforced. The cost of capital will be determined using the CAPM approach which will take into account the market returns of the major stock exchanges and relevant risk-free rates of the SSA countries in question. The CAPM will be adjusted to account for Country Risk as emerging markets have additional risks as compared to developed markets (Sabal, 2008).Although the assumptions around CAPM include the Efficient Market Hypothesis i.e. frictionless market and no information asymmetry (Mangram, 2013), empirically it has been found to perform well in determining average returns. In the African context, Coffie & Chukwulobelu (2013) have found evidence that supports the use of CAPM in the Kenyan market; more specifically the ability of Beta to describe systematic risk in the CAPM. In addition, Nel (2011), conducted a study of the application of CAPM in South Africa and found that both investment practitioners and academia agreed on the use of CAPM in calculating the Cost of Equity.

3.4 Model Specification

I will estimate the following model using a Panel Least Squares Regression:

$$KC_{it} = \alpha_0 + \alpha_1 FD_{it} + \alpha_2 SIZE_{it} + \alpha_3 IQ_{it} + \varepsilon_{it} \quad (1)$$

Where,

KC_{it} is the Cost of Capital (Equity or Debt)

FD_{it} is Financial Development measures which are: stock market development (SMD), bond market development (BMD) and banking sector development (BSD)

$SIZE_{it}$ is the natural logarithm of the Market Value of Equity (MVEQ) as well as Market Capitalization as a % of GDP (MKCPGDP)

IQ_{it} is the vector of all the other control variables that have an impact on the cost of capital including Regulatory Quality (REGQUAL) and Rule of Law (RULELAW)

α_0 is the constant variable

α_1 is the parameter that represents the extent to which Financial Development impacts the cost of capital

α_2 is the parameter that represents the extent to which the natural logarithm of the Market Value of equity impacts the cost of capital

α_3 is the parameter that represents the extent to which Institutional Quality impacts the cost of capital

ε_{it} is the error term

The subscripts *i* and *t* indicate the country and time period respectively.

3.5 Description of variables and data sources

Financial Development:

To empirically measure financial development, I use stock market development, bond market development and banking sector development variables. The variables are defined as follows:

$$Stock\ Market\ Development\ (SMD) = \frac{Market\ Capitalization}{GDP} \quad (2)$$

$$Banking\ Sector\ Development\ (BSD) = \frac{Domestic\ Credit\ provided\ by\ Financial\ Sector}{GDP} \quad (3)$$

$$Bond\ Market\ Development\ (BMD) = \frac{International\ Bonds}{GDP} \quad (4)$$

Ratio (2), (3) and (4) will be measured at the country level. The SMD, BSD and BMD indicators are all SIZE indicators which is one of the four pillars that make up the definition Financial Development according to the World Bank.

Institutional Quality

Institutional quality is a measure of the quality of the country governance. There are 6 governance indicators, namely: Control of Corruption; Government Effectiveness; Political Stability and Absence of Violence/Terrorism; Rule of Law; Regulatory Quality; and Voice and Accountability. I will use the Rule of Law and Regulatory Quality Indicators in my regression analysis as they have been found to have a marginal impact on the Cost of Capital as can be seen in the study conducted by Kim *et al* (2015). The use of these indicators makes reference to the Law and Finance theory which states that the quality of the prevailing political dispensation influences financial development through the strength and rigor of their legal systems. It is well documented that many African countries experience political instability

which directly impact the ability for them to create environments in which financial development can be stimulated.

Regulatory Quality is defined as “the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development” (Worldwide Governance Indicators, 2020). Rule of Law refers to “the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence” (Worldwide Governance Indicators, 2020). The indicators used will be the estimate indicators sourced from the Worldwide Governance Indicators (WGI) database in units of a standard normal distribution ranging from approximately -2.5 to 2.

Chapter 4: Results

In this chapter the results of the regression analysis depicting the relationship between financial development and the cost of capital will be presented and discussed. Existing literature suggests that there is an inverse relationship between financial development and the cost of capital. The following results and discussion will conclude if that relationship holds for Sub-Saharan Africa.

4.1 Descriptive Statistics

Table 7 details the descriptive statistics of the full sample behind the main test variables used in the study. The means (medians) of the Cost of Capital are 3.855% (3.374%) for the entire panel. The means (medians) for MKCPGDP, BSD, MVEQ, REGQUAL and RULELAW are 78.668% (31.231%), 61.704% (53.484%), 23.958 (23.710), 0.0528 (0.0134) and -0.0916 (0.1238), respectively. Market Capitalization as a % of GDP recorded the largest standard deviation at 1.0522 whilst BSD (Domestic Credit provided by the financial sector as a % of GDP) provided the smallest standard deviation at 0.3150.

Table 7: Descriptive Statistics

	KC	MKCPGDP	BSD	MVEQ	REGQUAL	RULELAW
Mean	0.0385539	0.786683	0.617045	23.95844	0.0527946	-0.091631
Median	0.0337405	0.312319	0.534844	23.71016	0.0134066	0.1237999
Maximum	0.0933911	3.115492	1.203486	27.58112	1.12727	0.9749667
Minimum	0.0097815	0.091112	0.208742	20.86514	-0.918893	-1.18154
Std. Dev.	0.0194182	1.052186	0.314981	2.137889	0.6129564	0.7099084
Skewness	0.6329997	1.476132	0.515167	0.487452	0.2562208	-0.106504
Kurtosis	3.0941467	3.381528	2.153722	2.217935	2.1077926	1.7804257
Jarque-Bera	2.0145229	11.07678	2.22222	1.952577	1.323288	1.9159178
Probability	0.3652178	0.003933	0.329193	0.376707	0.5160023	0.3836752
Sum	1.1566175	23.60049	18.51135	718.7531	1.5838389	-2.74893
Sum Sq. Dev.	0.010935	32.10577	2.877182	132.5465	10.89575	14.615127
Observations	30	30	30	30	30	30

The Cost of Capital was calculated using the Capital Asset Pricing Model adjusted for country risk and the 91-day Treasury Bill Rate was used as a proxy for the Risk-Free Rate. Cost of Capital was calculated at a monthly level and a 12-month weighted average was used to calculate annual cost of capital figures. The return data was available at a weekly level therefore I assumed that the last week of each month was a representation of each month in the year. The following average cost of capital for the period 2011 – 2016 were obtained: 5.547% (Kenya), 2.247% (Mauritius), 4.899% (Namibia), 4.659% (Nigeria) and 1.924% (South Africa).

It should be noted that due to the annual frequency of the variables and the relatively short period that the sample size is relatively small which reduces the degrees of freedom of the study. It was found that for countries situated in Sub-Saharan Africa data availability was an issue which channeled the study to be conducted at an annual frequency for the period 2011 – 2016. In addition, the World Development Indicators which are regressors in this study are measured at an annual frequency only.

4.2 Empirical Results

Beta is calculated by dividing the covariance of the returns of the banking index and returns of the market index by the variance of the returns of the market index at a weekly level. The banking sector index was used as it is a strong indicator of financial development. However, it was found that Namibia and Mauritius did not have banking indices therefore I used the index that most describes the dominant economic activities of each of these countries.

The data was structured into a panel with 5 cross sections and unit root tests were performed on each of the variables to test for stationarity. The method that was used to test for stationarity was Levin, Lin & Chu. The results of these unit root tests can be seen in Tables 8 – 12.

Table 8: Panel Unit Root Test on Kc

Panel unit root test: Summary
Series: D(KC)
Date: 04/07/20 Time: 23:26
Sample: 2011 2016
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0
Newey-West automatic bandwidth selection and Bartlett kernel
Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-3.47235	0.0003	5	20
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-0.74863	0.2270	5	20
ADF - Fisher Chi-square	10.6481	0.3856	5	20
PP - Fisher Chi-square	17.3230	0.0675	5	20

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Table 9: Panel Unit Root Test on BSD

Panel unit root test: Summary
Series: D(BSD)
Date: 03/29/20 Time: 16:42
Sample: 2011 2016
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0
Newey-West automatic bandwidth selection and Bartlett kernel
Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-3.30934	0.0005	5	20
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-0.29520	0.3839	5	20
ADF - Fisher Chi-square	9.62722	0.4738	5	20
PP - Fisher Chi-square	13.4893	0.1976	5	20

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Table 10: Panel Unit Root Test on MKCPGDP

Panel unit root test: Summary
Series: D(MKCPGDP)
Date: 03/29/20 Time: 16:43
Sample: 2011 2016
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0
Newey-West automatic bandwidth selection and Bartlett kernel
Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-2.39329	0.0083	5	20
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-0.46378	0.3214	5	20
ADF - Fisher Chi-square	9.16616	0.5164	5	20
PP - Fisher Chi-square	11.4486	0.3237	5	20

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Table 11: Panel Unit Root Test on RULELAW

Panel unit root test: Summary
Series: D(RULELAW)
Date: 03/29/20 Time: 16:49
Sample: 2011 2016
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0
Newey-West automatic bandwidth selection and Bartlett kernel
Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-2.80765	0.0025	5	20
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-0.95207	0.1705	5	20
ADF - Fisher Chi-square	11.7736	0.3005	5	20
PP - Fisher Chi-square	10.3450	0.4108	5	20

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Table 12: Panel Unit Root Test on REGQUAL

Panel unit root test: Summary
Series: REGQUAL
Date: 03/29/20 Time: 16:48
Sample: 2011 2016
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0
Newey-West automatic bandwidth selection and Bartlett kernel
Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-8.82397	0.0000	5	25
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-1.16991	0.1210	5	25
ADF - Fisher Chi-square	17.8622	0.0573	5	25
PP - Fisher Chi-square	28.0161	0.0018	5	25

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

The variables in the study were found to be stationary at first difference with the exception of REGQUAL which was stationary at level. A panel fixed effects regression was run using the transformed variables and the results are shown in the next section. A Fixed effects model was chosen as I performed the Hausmann Test which resulted in the rejection of the Null Hypothesis that the Random Effects is appropriate.

4.2.1 Relationship between stock market development and the cost of capital

Table 13 shows the output of the regression analysis determining if there is a relationship between the Cost of Capital and Stock Market Development (Market Capitalisation as a % of GDP) in Sub-Saharan Africa (SSA). The probability statistic of the stock market development indicator (DMKCPGDP) is statistically significant at the 10% confidence interval suggesting that there exists a relationship between the cost of capital and stock market development. Furthermore, the coefficient (t-statistic) of DMKCPGDP is -0.018572 (-1.812304). The negative coefficient indicates that an increase in market capitalisation as a % of GDP reduces the cost of capital in SSA. This result can be supported by the conclusions made by Kim *et al* (2015) in that stock market development lowers the cost of capital. The result further suggests that investors will require a lower risk premium from firms that are located in countries that have more developed stock markets.

Table 13: Relationship between Stock Market Development (Market Capitalisation as a % of GDP) and the Cost of Capital

Dependent Variable: DKC
Method: Panel EGLS (Cross-section weights)
Date: 04/13/20 Time: 07:00
Sample (adjusted): 2012 2016
Periods included: 5
Cross-sections included: 5
Total panel (balanced) observations: 25
Linear estimation after one-step weighting matrix
White cross-section standard errors & covariance (no d.f. correction)
WARNING: estimated coefficient covariance matrix is of reduced rank

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.004216	0.001622	2.599377	0.0194
DMKCPGDP	-0.018572	0.010248	-1.812304	0.0887
DMVEQ	0.018026	0.006896	2.614163	0.0188
DRULELAW	-0.026793	0.017746	-1.509800	0.1506
REGQUAL	-0.005426	0.014607	-0.371480	0.7152

Effects Specification

Cross-section fixed (dummy variables)

Weighted Statistics

R-squared	0.389162	Mean dependent var	0.001860
Adjusted R-squared	0.083743	S.D. dependent var	0.011718
S.E. of regression	0.011363	Sum squared resid	0.002066
F-statistic	1.274191	Durbin-Watson stat	2.448286
Prob(F-statistic)	0.322483		

Unweighted Statistics

R-squared	0.286792	Mean dependent var	0.003415
Sum squared resid	0.002756	Durbin-Watson stat	2.215363

4.2.2 Relationship between banking sector development and the cost of capital

Table 14 shows the estimation results for the relation between banking sector development and the cost of capital in SSA. The probability statistic of the banking sector development coefficient (DBSD) is statistically insignificant at value of 0.3169. This indicates that domestic credit provided by the financial sector as a % of GDP cannot explain the increase or decrease in the cost of capital in SSA. The weak relationship between banking sector development and the cost of capital can be explained in that there is relatively low banking competition in SSA (Mlachila *et al*, 2013) which inhibit a bank's core function of financial intermediation, risk spreading, market monitoring and information production (Kim *et al*, 2015). Therefore, banking sector development in SSA is weakly associated with the control of the cost of capital.

Table 14: Relationship between Banking Sector Development (Domestic Credit provided by the Financial Sector as a % of GDP) and the Cost of Capital

Dependent Variable: DKC
Method: Panel Least Squares
Date: 04/08/20 Time: 00:32
Sample (adjusted): 2012 2016
Periods included: 5
Cross-sections included: 5
Total panel (balanced) observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.006498	0.003745	1.734792	0.1020
DBSD	-0.098775	0.095606	-1.033139	0.3169
DMVEQ	0.024523	0.013225	1.854326	0.0822
DRULELAW	-0.013780	0.032992	-0.417676	0.6817
REGQUAL	-0.062468	0.045313	-1.378578	0.1870

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.363307	Mean dependent var	0.003415
Adjusted R-squared	0.044960	S.D. dependent var	0.012690
S.E. of regression	0.012401	Akaike info criterion	-5.668346
Sum squared resid	0.002461	Schwarz criterion	-5.229551
Log likelihood	79.85433	Hannan-Quinn criter.	-5.546643
F-statistic	1.141229	Durbin-Watson stat	2.640813
Prob(F-statistic)	0.389210		

4.2.3 Further Analysis: The Effects of Institutional Factors

In Tables 13 and 14 we see the results of the impact that institutional factors such as Rule of Law and Regulatory Quality have on the relation between stock market development and the cost of capital as well as between banking sector development and the cost of capital.

In the case of stock market development and the cost of capital the coefficients (p-statistic) for DRULELAW and REGQUAL are -0.026793 (0.1506) and -0.005426 (0.7152), respectively. It can be seen that the coefficients are statistically insignificant in relating stock market development to the cost of capital. In addition, the negative nature of the coefficients suggests that there is an inverse relation with the cost of capital which are consistent with the results obtained in Kim *et al* (2015) in that strong legal enforcement and regulatory quality will reduce the cost of equity. However, the relation is weak for both coefficients which suggests that in SSA legal enforcement and regulatory quality have a marginal impact on the cost of capital.

In the case of banking sector development and the cost of capital the coefficients (p-statistic) for DRULELAW and REGQUAL are -0.013780 (0.6817) and -0.062468 (0.1870), respectively. A similar conclusion as seen in the previous paragraph can be made.

4.2.4 Robustness Check

To check the validity of the outputs of the regression analysis, a Robust Least Squares Panel Regression was performed. A Robust Least Squares regression can be used in a situation where a least squares regression has been used. The purpose of this type of regression is to determine the influential variables in the regression model or to dynamically weigh observations to see how well they behave. Tables 15 and 16 show the estimation output for both stock market development and banking sector development.

Table 15: Robust Least Squares Estimation Output - Stock Market Development and the Cost of Capital

Dependent Variable: DKC
Method: Robust Least Squares
Date: 04/13/20 Time: 17:53
Sample (adjusted): 2012 2016
Included observations: 25 after adjustments
Method: M-estimation
M settings: weight=Bisquare, tuning=4.685, scale=MAD (median centered)
Huber Type I Standard Errors & Covariance

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.004055	0.002064	1.964445	0.0495
DMKCPGDP	-0.025538	0.018011	-1.417934	0.1562
DMVEQ	0.026108	0.009458	2.760291	0.0058
DRULELAW	-0.057559	0.023845	-2.413924	0.0158
REGQUAL	-0.006467	0.003343	-1.934377	0.0531

Robust Statistics

R-squared	0.240831	Adjusted R-squared	0.088997
Rw-squared	0.471999	Adjust Rw-squared	0.471999
Akaike info criterion	37.86278	Schwarz criterion	46.56953
Deviance	0.001832	Scale	0.007752
Rn-squared statistic	12.19271	Prob(Rn-squared stat.)	0.015974

Non-robust Statistics

Mean dependent var	0.003415	S.D. dependent var	0.012690
S.E. of regression	0.013229	Sum squared resid	0.003500

What is interesting to note is that in the relation between stock market development and the cost of capital, DMVEQ, DRULELAW and REGQUAL are all statistically significant at 1%, 5% and 10% confidence interval whilst DMKCPGDP is statistically insignificant but still holds a weak negative relationship with the cost of capital.

Table 16: Robust Least Squares Estimation Output - Banking Sector Development and the Cost of Capital

Dependent Variable: DKC
Method: Robust Least Squares
Date: 04/13/20 Time: 17:53
Sample (adjusted): 2012 2016
Included observations: 25 after adjustments
Method: M-estimation
M settings: weight=Bisquare, tuning=4.685, scale=MAD (median centered)
Huber Type I Standard Errors & Covariance

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.002868	0.002545	1.126750	0.2598
DBSD	-0.015867	0.071770	-0.221080	0.8250
DMVEQ	0.018312	0.010597	1.727959	0.0840
DRULELAW	-0.034872	0.029018	-1.201744	0.2295
REGQUAL	-0.005800	0.004041	-1.435261	0.1512

Robust Statistics

R-squared	0.150331	Adjusted R-squared	-0.019603
Rw-squared	0.218965	Adjust Rw-squared	0.218965
Akaike info criterion	25.44585	Schwarz criterion	35.83119
Deviance	0.002630	Scale	0.011544
Rn-squared statistic	4.467380	Prob(Rn-squared stat.)	0.346433

Non-robust Statistics

Mean dependent var	0.003415	S.D. dependent var	0.012690
S.E. of regression	0.013083	Sum squared resid	0.003424

In contrast, the relation between banking sector development and the cost of capital shows statistical insignificance for the following variables: DBSD, DRULELAW, c and REGQUAL which is consistent with the results obtained in the Least Squares Regression analysis.

Chapter 5: Conclusion

The study investigates the relationship between Financial Development and the Cost of Capital in Sub-Saharan Africa. The study finds that stock market development reduces the cost of capital in SSA which further supports the argument that they aid in the diversification of risk, the accessibility of quality information and the reduction of monitoring and transaction costs. In contrast, the study finds that banking sector development weakly reduces the cost of capital in SSA. This is plausible as there is low banking sector competition in SSA which reduces the efficacy of such institutions in general in financial intermediation.

The results of this study are consistent with the results obtained in the reference study by Kim *et al* (2015) which were obtained in the Chinese context. The main obstacle experienced in this study was the general lack of data for the financial development variables for longer periods of time. In some instances, there were large gaps in data which greatly reduced the degrees of freedom for this study. I would recommend that more primary and secondary data be collected and made available so that further studies on this topic are conducted as the insights gathered here have the potential to influence policies around the stock markets and banking sectors of countries within SSA to attract greater investments at a reduced cost.

It should also be noted that bond market development was one of the initial indicators that were meant to be studied in this paper however, the lack of data available on this particular variable resulted in it not being included in the econometric analyses.

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