THE RELATIONSHIP BETWEEN FINANCIAL DEVELOPMENT AND COST OF EQUITY CAPITAL IN AFRICAN EMERGING AND FRONTIER MARKETS

by

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ABSTRACT

Although many studies have been done to determine the relationship between financial development and cost of equity capital in various markets, few have focused on the African emerging and frontier markets. This research therefore investigates the relationship between financial development and cost of equity capital in the African Emerging and Frontier Markets. Stock market development and banking sector development are both used as proxies for financial development in this study whilst cost of equity is determined using CAPM. The study is based on five emerging and frontier markets (Egypt, Kenya, Morocco, Nigeria and South Africa). The research finds that both measures of stock market development (stock market capitalisation to GDP ratio and stock market liquidity/turnover to GDP ratio) tend to reduce cost of equity in the African emerging and frontier markets. In a similar fashion, the banking sector development was also found to be negatively related to cost of equity.

Keywords: *Financial development; Cost of equity; African emerging and frontier markets*

1 INTRODUCTION

1.1 BACKGROUND

Cost of capital is fundamental to a variety of organisational dynamics and decisions. The cost of capital is not only used as hurdle rate for capital budgeting purposes but plays a critical role in influencing the composition of an organisation's capital structure (Easley and O'hara 2004). The cost of equity is particularly important as it can also be used as a compass to discern the direction of stock prices (Hackel, 2011). Coupled with significant capital inflows to emerging markets which are considered as an alternative for diversification (Changa, Lima, & Tabak, 2004), this research seeks to investigate whether there is a relationship between cost of equity capital and financial development in the African emerging markets and frontier markets.

Financial development generally measures the ease with which the finance system provides funding for entrepreneurial activities, and the extent to which financial services are made available (Gwama, 2012). Huang (2006) defines financial development as 'increasing the efficiency of allocating financial resources and monitoring capital projects, through encouraging competition and increasing the importance of the financial system'.

Prior research has established that an inverse relationship exists between cost of equity capital and financial development. Addisu (2011) found that "both firm-level measures of credit access and country-level indicators of financial development reduce firm's cost of capital". In other words, well developed financial markets will make more finance available at a lower cost compared to less developed financial markets due to increased financial access which tends to reduce the cost of capital.

Hail (2006) and Leuz (2006) found that firms operating in countries with strong legal institutions tend to have lower levels of cost of capital compared to their counterparts operating in countries with weak legal systems. In sync with this finding is the fact that less developed countries tends to have weak legal systems in contrast with more developed countries. Easley (2004) and O'hara (2004) concluded that firms with more private information and less public information tend to attract higher cost of capital compared to their counterparts with more public information. Their argument is that companies with private information tend to increase the risk of uniformed investors hence investors in such companies demand a higher return compared to the entities with publicly available information. In addition to that, when information is publicly available, investors incorporate new information into their investment portfolios with ease enabling them an opportunity to re-adjust their investment portfolio in line with new information.

1.2 PURPOSE OF THE STUDY

The purpose of the study is to establish whether there is a relationship between cost of equity capital and financial development in emerging markets and frontier markets.

Hypotheses

H_0: There is no relationship between financial development and cost of equity capital in the African emerging and frontier markets

H_1: There is a relationship between financial development and cost of equity capital in the African emerging and frontier markets.

1.3 PROBLEM STATEMENT

A significant volume of the literature suggests that a relationship exists between financial development and cost of capital. Empirical evidence, dominantly from non-African markets, revealed that cost of capital is lower in financially developed markets compared to their less developed counterparts due to increased liquidity.

Inasmuch as this relationship has been found to hold in other markets, it however remains to be seen whether the same relationship exists in the African Emerging and Frontier Markets. African emerging and frontier markets have been attracting significant investment amounts from the world markets in the past decades thus addressing such a knowledge gap is not only a necessity but logical.

In response to this information gap, my study proposes to investigate whether a relationship exists between banking sector development and the cost of equity capital and stock market development and cost of equity capital in the African emerging and frontier markets. Considering the critical role of cost capital to entities, providing such a body of information on the African emerging and frontier markets would be of paramount importance to existing and would be stakeholders.

1.4 SIGNIFICANCE OF STUDY

Previous researchers have focused on the relationship of financial development and cost of equity capital in non-African emerging and frontier markets and developed markets. In addition to that, similar studies focused dominantly on single countries without seeking to draw comparatives among emerging markets. This study therefore seeks to bridge this gap by investigating this relationship in the African context. This study will therefore offer insights and inform various stakeholders as to whether there is a relationship between financial market development and the cost of equity.

1.5 OUTLINE OF THE STUDY

The paper will be presented as follows:

- The paper will start with a detailed introduction highlighting the background of research. In addition to that, an executive summary of the paper will provided.
- This will be followed by a detailed literature review. This section will concentrate on the findings and views of previous researchers. The information will be gathered through review of publications relevant to the subject of study.
- Research and methodology to be used in the study will then follow. This section will capture how data will be analysed including hypothesis testing.
- The next section will contain the findings of the study.
- Conclusions will be drawn from the obtained empirical results.

CHAPTER 2: LITERATURE REVIEW

2 INTRODUCTION

This chapter provides the review of existing literature on financial development and cost of equity capital in the African emerging markets. It also focuses on the relevance and applicability of Capital Asset Pricing Model (CAPM) in emerging markets, how it can be adopted and whether that adoption makes a significant difference.

2.1 OVERVIEW OF EMERGING AND FRONTIER MARKETS

The stakes are high when it comes to estimating cost of equity in emerging markets. In developed markets, Capital Asset Pricing Model (CAPM) (Sharpe, 1964) and Lintner (1965) remains the preferred method for estimating the cost of capital for capital budgeting purposes (Graham and Harvey, 2001). The use of traditional methods such as CAPM to estimate cost of capital in emerging markets has been greatly questioned since little guidance is given as to how they should be applied (Luis E Pereiro, 2003)

Javier Estrada (2000) found that both academics and practitioners have struggled to come up with an appropriate definition of risk and the disagreements are more so glaring and pronounced when it comes to the definition of risk in emerging markets. Estrada also concluded that practitioners prefer using CAPM to estimate discount rates.

Estrada (2002) propagated that the downside risk measures (D-CAPM) were more appropriate and relevant to emerging markets compared to standard measures of risk which are more accurate when the distribution of returns is symmetrical and follows a normal distribution a notion greatly questioned by empirical evidence.

Emerging markets are increasingly playing a significant role and occupying key economic spaces of the global economy (Agility Emerging Markets Logistics Index, 2016). Although emerging markets in general experienced a net capital inflow slowdown between the periods

of 2010-2015 (International Monetary Fund, 2016), it remains a fact that African emerging and frontier markets have been attracting significant interest from global investors in the past decade. Institutional reforms and better policies also played a role in attracting capital to African Emerging Markets.

Despite the engraved craving of FDI in African emerging and frontier markets, Kodongo and Ojah (2016) found that Remittances from the Diaspora (RFD) have positive effects on the manufacturing sector for selected African countries whilst FDI have a negative effect on the same sector. Remittances from the diaspora have since overtaken FDI as the largest source of external funds for Africa. In 2013, remittances from the diaspora amounted to $62.9 billion whilst the FDI figure totalled $56.6 billion in the same period[1].

The Agility Emerging Markets Logistics Index (2016) classifies South Africa, Nigeria, Kenya, Ghana, Angola, Tanzania, Mozambique, Ethiopia and DRC Congo as the top countries in the sub-Saharan region which are more preferable for investment in the logistics industry.

Unlike the case with frontier markets, a significant volume of literature is readily available for emerging markets. The coining of the word frontier markets is largely ascribed to International Finance Corporation's Farida Khambata. Frontier markets are sometimes referred to as pre-emerging markets pointing to the expectation that at some point they should graduate to be emerging markets.

Frontier markets are the 81 markets that do not form part of the MSCI developed and emerging market indexes (Dickson, 2013). Frontier markets are characterised by illiquid

[1] Data of UNCTAD stat

markets, marginally developed markets and lower per capita incomes in comparison to more developed emerging markets[2] (Nasdaq, 2012).

Table 1 suggests that the MSCI index has a narrow or more strict definition of both emerging and frontier markets. Under the emerging markets category only South Africa and Egypt feature from Africa whilst under the frontier markets Kenya, Mauritius, Morocco, Nigeria and Tunisia are included. In addition to that, the MSCI Index also classifies Botswana, Zimbabwe and Ghana under the Standalone Market Index.

Table 1: MSCI EMERGING AND FRONTIER MARKETS

MSCI EMERGING AND FRONTIER MARKETS							
MSCI EMERGING INDEX			MSCI FRONTIER MARKETS				
EMERGING MARKETS			FRONTIER MARKETS				
America	**Europe, Middle East & Africa**	**Asia**	**America**	**Europe & CIS**	**Africa**	**Middle East**	**Asia**
Brazil	Czech Republic	China	Argentina	Croatia	Kenya	Bahrain	Bangladesh
Chile	Egypt	India		Estonia	Mauritius	Jordan	Pakistan
Colombia	Greece	Indonesia		Lithunia	Morocco	Kuwait	Sri Lanka
Mexico	Hungary	Korea		Kazakhstan	Nigeria	Lebanon	Vietnam
Peru	Poland	Malaysia		Romania	Tunisia	Oman	
	Qatar	Philippines		Serbia			
	Russia	Taiwan		Slovenia			
	South Africa	Thailand					
	Turkey						
	United Arab Emirates						
MSCI STANDALONE MARKET INDEXES							
	Saudi Arabia		Jamaica	Bosnia	Botswana		
			Trinidad & Tobago	Herzegovina	Ghana		
				Bulgaria	WAEMU		
				Ukraine	Zimbabwe		

Adopted from https://www.msci.com/market-classification (22.09.2016)

African emerging and frontier markets are greatly bedevilled by lack of adequate data and information for purposes of research. This lack of information and data has resulted in some

[2] http://www.nasdaq.com/article/what-is-the-difference-between-a-developed-emerging-and-frontier-market-cm140649

instances the adjusted U.S Treasury bond (a proxy for the risk free return) and equity premium of mature markets (for example the U.S) being used to compute cost of equity capital using CAPM (Okere, 2007).

Exploration of the relationship of cost of equity capital and financial development in emerging markets will not be adequate without understanding the structure of the African emerging and frontier markets. It is this understanding which forms platform upon which to investigate whether a relationship exists between cost of equity and financial development.

Ojah (2012) described emerging markets as the national financial markets where the private sector has begun to emerge from the dominance of the government in the provisioning of finance for production. Nellor (2008) asserted that compilers of emerging market indices decide whether a country is an emerging market by assessing the nature and sophistication of the stock market in relation to the degree of development of the economy.

Since the 1980s emerging markets have significantly integrated with the developed financial markets on the back of capital inflows from developed markets (Buckberg, 1995). This brings to question whether the emerging markets still insulate investors from global economic shocks and if they still do to what extent.

Andrianaivo (2010) and Yartey (2010) show that financial depth in Africa is lowest in the world and African banks have no significant role to play in the economy. Barring the evils besetting the banking sector in emerging markets and African markets, positive changes are starting to show in most markets. This evolution includes consolidation, privatisation and penetration by foreign owned banks.

In comparison to other emerging markets, stock markets are highly illiquid and small in size. The existing stock markets are dominated by large multinational firms who account for the significant portion of the whole market capitalisation (Andrianaivo and Yartey, 2010). Ring-fencing of portions of public funds in domestic stock markets is considered one of the solutions to addressing the problem of size and illiquidity of the African stock markets (Ojah and Kodongo, 2015)

Taking a glimpse on market performance and returns, emerging markets are generally characterised by high price volatility (Elaine Buckberg, 1995) and African emerging markets are not an exception. The price volatility is largely ascribed to information asymmetry despite the fact that information technology is on a trajectory in Africa. Bekaert and Harvey (1997) also adequately documented higher risks inherent in emerging markets.

Maybe in fashion to compensate for high volatility, emerging markets tend to offer higher rates of return relative to mature/developed markets (Nellor, 2008). When markets are highly volatile, investors tend to demand a premium to compensate for the added risk posed by such a market. African emerging, frontier and stand-alone markets are not an exception as they are largely illiquid and highly volatile.

2.2 FINANCIAL DEVELOPMENT AND OTHER DETERMINANTS OF COST OF EQUITY CAPITAL

Stock market development is widely used and accepted as a proxy for financial development. Liquidity is one developmental facets of a stock market development, which is a big influence in determining whether firms have access to capital market. Butler, Grullon and Weston (2005) find that “firms may have an incentive to promote liquidity in their stock market liquidity, as it can lower the cost of raising capital”. The organization of stock exchange has been found to have an impact on the liquidity of the stock market. A change in organization of a stock exchange can result in change of prices as it has the potential to

influence liquidity and liquidity risk. Muscarella and Piwowar (2001) find that switching trade from call to continuous trading tend to improve various measures of liquidity. The findings of Muscarella and Piwowar could explain the lower cost of equity characterising developed markets which largely use electronic trading contrary to many emerging markets (African emerging markets in particular) which are still using manual trading systems. In concurrence, previous research suggested that financial development reduce cost of equity through improved liquidity (Levine 2005).

Kim, Ma and Wang (2015) find that cost of equity decreases with stock market development in China. They also find that "banking development is weakly and negatively associated with the cost of equity" whilst both the stock market and banking development were found to have no impact on the cost of equity of State-Owned Enterprises (SOEs) and a significant one on non-SOEs. Their findings on the impact of stock market development on cost of equity are in tandem with the notion that stock markets play pivotal roles in reducing information asymmetry as well as provisioning of liquidity in the market.

Mohammed Omran (2004) and John Pointon (2004) found that growth and size of firms were significant factors in determining cost of equity in Egypt. Consistent with the Fama and French (1998), larger firms were found to have lower cost of equity compared to smaller firms. In their sector level cost of equity in African markets review, Hearn (2009) and Piesse (2009) finds cost of equity to be highest in financial sector and lowest in the blue chip stocks in Tunisia, Morocco, Namibia and South Africa. This dovetails well with the findings of Omran and Pointon (2004) annotated above. The low cost of capital associated with large firms can be explained by a variety of reasons. One such reason could be reduced information asymmetry which consequently results in improved liquidity of the incumbent's securities (Diamond and Verrecchia, 1991). Information asymmetry tend to be lower for large firms because of their willingness to invest in information, bear media related costs and

adoption of policies that reduce information asymmetry. Secondly, large firms generally tend to be considered as low risk compared to smaller firms who have limited capacity to self-finance hence investor demand low premium to pick up their securities leading to the lower cost of equity. And it is a fact that financially developed markets tend to have better information disclosure platforms contrary to less developed markets.

Contrary to the contemporary accounting notion that firms with strong disclosure platforms and ethics should have lower cost of capital, Leuz and Verrecchia (2001) admitted that it was difficult to empirically document that relationship. However, Fu, Kraft and Zhang (2012) find that "higher financial reporting frequency reduces information asymmetry and the cost of equity"

Nan Geng and Papa N'Diaye (2012) attributed low cost of equity in China compared to the rest of the world to be a result of little dividends paid out by Chinese firms, which are mostly State Owned Enterprises. This finding point to the fact that a low cost of equity may not always insinuate financial development of the country under study albeit depending on the computational methodology adopted in estimating the cost of capital. Wang and Feng (2013) found that firms with better corporate social responsibility tend to have lower cost of capital in North America, Europe and Africa. However, the results could not hold for Asia.

Like stock market development, the banking sector development is at least theoretical expected to reduce the cost of equity. The banking sector plays a critical role in enhancing domestic investment through their intermediation role. Ndikumana (2003) finds that financial development results in improved domestic investment and as the markets become sophisticated; access to capital is improved and becomes cheaper at the same time.

Kim, Ma and Wang (2015) find that the level of financial development of a country can be influenced by prevailing legislation including accounting rules thereby compromising its

relationship to cost of equity hence more caution is needed in concluding that low cost of equity capital points to financial development of a market.

The discussions above insinuate that both stock market development and banking sector development tend to have a decreasing effect on cost of equity. But does the same argument hold for African Emerging markets? This research seeks to establish that.

2.3 AN EXPOSITORY ON FINANCIAL DEVELOPMENT MEASURES

Although literature abundantly affirms that financial development is a key component for economic growth, the question that remains not fully answered is how one measures financial development. In a bid to shed light on financial development, The World Bank's Global Financial Development Database designed a conceptual framework based on four proxies characterising a well-functioning financial system as illustrated below.

Table 2: World Bank Financial Development Measures

	Financial Institutions	Financial Markets
Depth	• Private Sector Credit to GDP • Financial Institutions' asset to GDP • M2 to GDP • Deposits to GDP • Gross value added of the financial sector to GDP	• Stock market capitalization 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 Capitalization to GDP • Stocks traded to GDP
Access	• Accounts per thousand adults(commercial banks) • Branches per 100,000 adults (commercial banks) • % of people with a bank account (from user survey) • % of firms with line of credit (all firms) • % of firms with line of credit (small firms)	• Percent of market capitalization outside of top 10 largest companies • Percent of value traded outside of top 10 traded companies • Government bond yields (3 month and 10 years) • Ratio of domestic to total debt securities • Ratio of private to total debt securities (domestic) • Ratio of new corporate bond issues to GDP
Efficiency	• Net interest margin • Lending-deposits spread • Non-interest income to total income • Overhead costs (% of total assets) • Profitability (return on assets, return on equity) • Boone indicator (or Herfindahl or H-statistics)	• Turnover ratio for stock market • Price synchronicity (co-movement) • Private information trading • Price impact • Liquidity/transaction costs • Quoted bid-ask spread for government bonds • Turnover of bonds (private, public) on securities exchange • Settlement efficiency
Stability	• Z-score • Capital adequacy ratios • Asset quality ratios • Liquidity ratios • Others (net foreign exchange position to capital etc)	• Volatility (standard deviation / average) of stock price index, sovereign bond index • Skewness of the index (stock price, sovereign bond) • Vulnerability to earnings manipulation • Price/earnings ratio • Duration • Ratio of short-term to total bonds (domestic, int'l) • Correlation with major bond returns (German, US)

Adopted from: http://www.worldbank.org/en/publication/gfdr/background/financial-development

Pill and Pradhan (1995) find that only private sector credit was correlated to financial development after using Fisherian model that included broad money; base money; bank credit to private sector and real interest rates as indicators of financial development. The private sector to GDP indicator has received wide acceptance and popularity when it comes to explaining financial depth of a financial market. Čihák, Demirgüč-Kunt, Feyen, Levine (2013) asserts that private credit does not include credit issued to government; its agencies and public enterprises. Total banking assets to GDP is considered a better alternative compared to private credit to GDP as it is more encompassing (Čihák et al 2013).

Given the complexity and diversity of financial systems in different countries, Sahay, Cihak, Ndiaye, Barajas, Bi, Ayala, Gao, Kyobe, Nguyen, Saborowski, Svirydzenka and Yousefi (2015) state that “financial development is multi-faceted and should be measured by looking at many indicators”. They also assert that financial development can be spurred by a sound business, regulatory and supervisory environment. Adding weight to the findings of Sahay et al are Andrianaivo and Yartey (2010) who find banking sector development to be diverse across different African countries. However, for the purposes of this study, complex Financial Development (FD) indices will not be used to avoid the entrapment of lean information associated with most African emerging and frontier markets.

2.4 COST OF EQUITY CAPITAL AND CAPM IN EMERGING MARKETS

Since its introduction by Sharpe (1964) and Lintner (1965), CAPM has formed one of the key cornerstones for investment valuation and has been widely used to determine cost of equity in particular, which is a vital cog to the WACC formula. Fama and French (2004) questioned the empirical validity of CAPM. Their conclusion was that CAPM was invalid for the purposes for which it was used in light of the empirical failings of its key restrictions.

The capital asset pricing model is based on the assumption of Mean Variance Behaviour framework (Estrada, 2002). One of the many criticisms of CAPM highlights the inadequacy of this assumption as it is only applicable when the returns follow symmetrical and normal distribution; a notion not supported by empirical evidence. Markowitz (1952) deemed semi-variance to be a more plausible measure of risk and utility function compared to variance.

Okore (2007) deemed the CAPM not to provide a satisfactory explanation of equity returns in the emerging markets for the reason of not fully capturing the volatility associated with the

these markets. The applicability of CAPM in emerging markets have also been questioned on the premise that no guidance is available on its how it should be applied in these markets (Pereira, 2003). Ihnatov and Sprincean (2015) found CAPM to more accurately forecast the expected returns on the developed market but not so for the emerging markets. However, they found that CAPM was statistically validated for the US, Polish and Romanian markets.

On the wake of many highlighted short-comings of CAPM, many efforts were exerted to adapt the CAPM including I-CAPM and D-CAPM. Although downside risk models and asymmetric data functions do not address all the problems relating to this subject, Hwang and Pedersen (2002) admitted that they were an option for risk measurement in emerging markets. Reliant on the MSCI database of emerging markets, Estrada (2002) found a strong correlation between returns and downside beta compared to returns and beta.

The CAPM debate is not short of those who still propagate for its use in the determination of cost of equity capital. Peter Kristofik (2010) stated that although many debates and empirical validation issues have been raised over a longer time, its undisputed theoretical soundness have seen it widely used for the purposes of determining discount rates. Da, Guo and Jagannathan (2009) in support of CAPM also concluded that “the empirical evidence is not sufficient to abandon the CAPM in favour of other models”.

Harvey and Graham (2001) state that CAPM is still widely used to an extent of 73.49% for the purpose of assessing risk and return and this is corroborated by Bruner, Smosna and Garcia (1998) who found that 85% of deemed best-practice firms were using CAPM. Although the Academic battle around CAPM is still raging, it seems as if CAPM is still enthroned as the basis and preferred model to illustrate risk and return.

CHAPTER 3: RESEARCH METHODOLOGY

3 INTRODUCTION

The overall objective of this study is to establish whether there is a relationship between cost of equity and financial development in African emerging and frontier markets. This study will use both the stock market development and banking sector development as proxies for financial development. Significant volume of literature, for example Levine and Zervos, 1998; Pill and Pradhan, 1995; Kim, Ma and Wang, 2015 and many others, supports the two as measures of financial development.

3.1 DATA AND SAMPLE

The data for this study covers five countries (South Africa; Kenya; Nigeria; Egypt and Morocco), which are all categorized by the MSCI index as either an emerging market or frontier market. In this case South Africa and Egypt are categorized as emerging markets whilst Kenya; Nigeria and Morocco are categorized as frontier markets. Given that the study entails five countries, a panel of data approach had to be adopted. The period of study stretched from 2008 to 2014 and to ensure enough data points I performed extrapolation of annual data to quarterly frequency using quadratic-match average from low to high. Although it was absolutely desirable to have a longer period of study, the selected period was forced by lack of information for some of the countries under study. Cost of equity estimation was done based on all share indices and sectorial indices of the countries sampled. During the study, it was noted that only the banking sector index was common for all the sampled countries. In addition to that, with the exception of South Africa and Egypt, all other banking indices were dating back only as far as 2008 thereby forcing a period limit starting from 2008. In the case of Kenya the banking index used is a weighted average of the indices of the sampled bank as the Nairobi Stock Exchange does not have a standalone banking Index. .

Stock market information required for the purposes of this study will be obtained from the major stock markets of respective countries in the sample. GDP data and Banking development data will be extracted from the central statistics offices and central banks of the sampled countries respectively.

3.2 COST OF EQUITY

The cost of equity is estimated using Sharpe's model of Capital Asset Pricing Model. The model finds the cost of capital by establishing a relationship between risk and return. Despite its many criticisms, Da, Guo and Jagannathan (2009) found strong empirical support for CAPM when they evaluated it using aged betas following Hoberg and Welch (2007). They found that the CAPM "performs well in pricing the average returns on the CAPM-beta-sorted portfolios during the period of 1932-2007."

For each sampled country, an average annual cost of equity will be computed based on All Share index and the banking index. The banking index has been selected for the estimation of cost of equity since it was found to be the only common index for the sampled countries. In addition to that, the fact the banking sector development is a proxy for financial development in this study makes the case strong to use banking index for estimating cost of equity.

3.3 FINANCIAL DEVELOPMENT MEASURES

Following Kim et al (2015), both value and liquidity based measures will be used in determining stock market development. The value-based measure entails ratio of market capitalisation at year end to GDP of the same year whilst the liquidity-based measure focuses on the ratio of total value of shares traded in a year to GDP in the same year. The

value based measure and the liquidity based measure will be denoted as SMCAP and SMLIQ respectively.

This study will measure banking sector development on the basis of the ratio domestic credit issued to private banks by banks in a year to total GDP of the same year. This will be denoted as DCRED.

3.4 MODEL SPECIFICATION

Considering that the study entails five countries mentioned above, a panel of ordinary least squares will be used to establish whether a relationship exists between financial development and cost of equity in the African emerging and frontier markets. The relationship between cost of equity capital and financial development variables is expected to be linear thus OLS is deemed an appropriate method. The possible challenge posed by OLS is that it may perform poorly when the relationship between the dependent and variables are not linear of at least close to linear.

$$Coe_{it} = \alpha + \beta_1 FinDev_{it} + \beta_2 \sum X_{it} + \boldsymbol{\varepsilon}_{it} \quad (1)$$

Where,
Coe_{it} is cost of equity
β_1 captures the impact of financial development on cost of equity
β_2 captures the marginal impact of other variable factors
$\boldsymbol{\varepsilon}_{it}$ represents the error term

Variables definition:

Financial Development

The proxies for financial development are Stock market development and banking sector development.

Stock market development is measured by:

- Ratio of market capitalisation at year end to GDP (DSMCAP) for the same year
- Ratio of value traded at year end to GDP (DSMLIQ) for the same year

Banking sector development (DDCRED) is measured by ratio of credit/loans issued out by banks in year to GDP for the same year.

Other variables

The study adopted the following three variables that can have marginal impact on cost of equity:

- **Regulatory quality**

Theoretically sound regulatory quality tends to boost investor confidence thereby lowering the required risk premium which in turn reduces cost of equity. Ladekarl and Zervos (2004) noted that a country can attract international investors through sound policy initiatives. From an economic point of view this too will tend to reduce cost of equity owing to the laws of demand and supply.(The regulatory quality variable will be denoted as DRQUAL in the regression equation.

"Regulatory Quality captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development. Estimate gives the country's score on the aggregate indicator, in units of a standard normal distribution, i.e. ranging from approximately -2.5 to 2.5."[3]

Regulatory quality indicative data will be drawn from World Governance Indicators.

- **Rule of law**

Luiz Hail (2006) and Christian Leuz (2006) found that firms operating in countries with strong legal institutions tend to have lower levels of cost of capital compared to their counterparts

[3] http://info.worldbank.org/governance/wgi/index.aspx#home

operating in countries with weak legal systems. The rule of law control variable will be denoted as DDRLAW in the regression equation.

"Rule of Law captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence. Estimate gives the country's score on the aggregate indicator, in units of a standard normal distribution, i.e. ranging from approximately -2.5 to 2.5."[4]

Rule of law indicative data will be drawn from World Governance Indicators.

- **Country Risk**

Significant volume of literature indicates that investors tend to demand lower risk premium when investing in countries with low country and sovereign risk thereby reducing cost of equity. The expectation therefore is that low country risk reduces cost of equity. Estrada (2002) in discussing the cost of capital in emerging market noted "sovereign risk premium as a factor in emerging market risk." .The general consensus is that investors tend to demand higher return when investing in more riskier environments (Naumoski, 2011) further substantiating the role that could be played by country risk in influencing cost of equity. Bekaert, Harvey, Lundblad, and Siegel (2015) also highlight that "sovereign spread variation reflects global risk conditions" thereby producing more argument on the influence that political risk can pose on cost of equity.

In the equation country risk is denoted DDCRISK.

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[4] http://info.worldbank.org/governance/wgi/index.aspx#home

CHAPTER 4: RESULTS

4 INTRODUCTION

This chapter examines whether a relationship exist between cost of equity capital and financial development in the African Emerging and Frontier markets. Significant volume of literature already promulgates an inverse relationship between cost of equity capital and financial development albeit with limited empirical results which are Afrocentric.

4.1 DESCRIPTIVE STATISTICS

Table 3 presents the descriptive statistics for all the variables used in the model estimation. The means (medians) of DSMCAP, DSMLIQ, DDCRED, DDCRISK, DDRLAW, and DRQUAL are -0.654956 (-0.680508), -0.617129 (-0.231988), -0.031365 (0.257508), -0.042308 (0.000000), 0.001888 (0.002946), -0.008016 (-0.004633), respectively. Market capitalisation to GDP recorded the highest standard deviation at 4.507949 whilst rule of law recorded the lowest standard deviation at 0.020320. Table 11-13 reveal significant negative relationship for all the three measures of financial development and cost equity providing strong empirical evidence that a relationship exist between cost of equity and financial development. The coefficients of financial development measures range from -0.081324 to -0.021463 and this is comparable to coefficients of financial of financial development by Kim et al (2015) which ranged between -0.217 to -0.020.

Cost of equity capital for the sampled countries was calculated based on the CAPM model and the following average (2008-2014) cost of equity were obtained: 6.47% (South Africa); 11.36% (Egypt); 8.57% (Kenya); 3.02% (Morocco) and 8.71% (Nigeria). The lower average cost of equity capital recorded by South Africa and Morocco compared to their sample counterparts may suggest higher levels of financial development particularly for South Africa which has been a subject of debate on whether it should be classified as a developing

country or it already a developed country. The Treasury Bill Rates were used as proxies for the risk free rates with Egypt coming tops with an average (2008-2014) of 11.42% whilst Morocco had the lowest at 3.11%. South Africa, Nigeria and Kenya had average Treasury bill rates of 6.6%; 8.74% and 8.6% respectively.

Table 3: Descriptive Statistics

	DCOE	DSMCAP	DSMLIQ	DDCRED	DDCRISK	DDRLAW	DRQUAL
Mean	0.006141	-0.654956	-0.617129	-0.031365	-0.042308	0.001888	-0.008016
Median	-0.044095	-0.680508	-0.231988	0.257508	0.000000	0.002946	-0.004633
Maximum	2.931047	24.08785	2.577554	4.960213	4.562500	0.089720	0.058944
Minimum	-2.825970	-25.97605	-8.128134	-13.18191	-4.437500	-0.089211	-0.077524
Std. Dev.	0.842076	4.507949	1.484361	1.794764	1.243691	0.020320	0.024948
Observations	130	130	130	130	130	130	130

4.2 EMPIRICAL RESULTS

Log returns of each series (market index and banking index) were calculated for all the sampled countries (Egypt, Morocco, South Africa, Kenya and Nigeria). For Kenya the banking index used is a weighted average of the indices of the sampled bank as the Nairobi Stock Exchange does not have a banking Index.

Beta for each banking sector index was computed by regressing on the stock market index for the respective countries over a twelve month period, using weekly data for each year. Cost of capital was then calculated for each country using the capm formula (R_bank= riskfree +Beta*(Rm-Rf) for each years. To ensure enough data points, extrapolation of annual data was performed to quarterly frequency using quadratic-match average.

Putting all data in a panel form for regression, the log difference of the data series was extracted to make them stationary as shown below on Tables 4-10 using Levin, Lin and Chu. After satisfied that all series were stationary, a panel fixed effects regression was run using each of the proxies for financial development and obtained results as shown on Tables 11-13.

Table 4: Unit root test – regulatory quality

Panel unit root test: Summary
Series: D(DRQUAL)

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-5.62016	0.0000	5	120
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-4.91744	0.0000	5	120
ADF - Fisher Chi-square	42.2827	0.0000	5	120
PP - Fisher Chi-square	101.378	0.0000	5	125

Table 5: Unit root test - Cost of equity series

Panel unit root test: Summary
Series: D(DCOE)

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-6.03206	0.0000	5	120
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-5.14349	0.0000	5	120
ADF - Fisher Chi-square	44.3862	0.0000	5	120
PP - Fisher Chi-square	103.514	0.0000	5	125

Table 6: Unit root test – Stock Market Cap series

Panel unit root test: Summary
Series: DSMCAP

Method	Statistic	Prob.**	Cross-Sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-1.88800	0.0295	5	125
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-2.24989	0.0122	5	125
ADF - Fisher Chi-square	20.0810	0.0285	5	125
PP - Fisher Chi-square	24.3758	0.0067	5	130

Table 7: Unit root test – Country Risk series

Panel unit root test: Summary
Series: DDCRISK

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-5.51722	0.0000	5	120
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-4.95771	0.0000	5	120
ADF - Fisher Chi-square	42.8168	0.0000	5	120
PP - Fisher Chi-square	100.962	0.0000	5	125

Table 8: Unit root test – Stock Market Liquidity series

Panel unit root test: Summary
Series: DSMLIQ

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-3.16009	0.0008	5	125
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-1.36537	0.0861	5	125
ADF - Fisher Chi-square	17.8829	0.0570	5	125
PP - Fisher Chi-square	33.0722	0.0003	5	130

Table 9: Unit root test – Domestic Credit series

Panel unit root test: Summary
Series: DDCRED

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-0.93007	0.1762	5	125
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-1.70605	0.0440	5	125
ADF - Fisher Chi-square	16.5297	0.0854	5	125
PP - Fisher Chi-square	22.2417	0.0139	5	130

Table 10: Unit root test – Rule Law series

Panel unit root test: Summary
Series: DDRLAW

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-5.33470	0.0000	5	120
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-5.13029	0.0000	5	120
ADF - Fisher Chi-square	44.3229	0.0000	5	120
PP - Fisher Chi-square	103.655	0.0000	5	125

4.2.1 Relationship between stock market development and cost of equity

Table 11 & 12 below show the results of OLS regression investigating whether a relationship exists between stock market development and cost of equity capital in the African Emerging and Frontier Markets. The p-values of both stock market development indicators are statistically significant indicating that a relationship exists between stock market development and cost of equity. The market capitalisation based measure (DSMCAP) and market liquidity based measure (DSMLIQ) are negatively associated with the Cost of Equity. DSMCAP has a coefficient (t-statistic) of -0.021463 (–1.779558) whilst DSMLIQ has a coefficient (t-statistic) of -0.081324 (-2.040072). This implies that an increase in stock market capitalization and stock market liquidity measure results in reduction of cost of equity in the African emerging markets. This result tend to agree Kim et al (2015) who also found that both market capitalisation measure and market liquidity measure were negatively associated with the cost of equity measure. Furthermore the result relating to market liquidity measure is largely supported by Diamond and Verrecchia (1991) who found that more liquid companies tend to have lower cost capital. This theoretic supports that assertion that investors tend to demand a higher premium where they have an information disadvantage (Choi and Yan, 2013) thus improved information availability which comes with stock market development has a tendency to lower cost of equity.

Table 11: Relationship between stock market development (Market Capitalisation) and cost of equity

Dependent Variable: DCOE
Method: Panel Least Squares
Date: 03/17/17 Time: 19:36
Sample (adjusted): 2008Q3 2014Q4
Periods included: 26
Cross-sections included: 5
Total panel (balanced) observations: 130

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.072403	0.055586	-1.302529	0.1952
DSMCAP	-0.021463	0.012061	-1.779558	0.0777
DDCRISK	0.062955	0.044037	1.429588	0.1554
DDRLAW	-1.832752	2.714989	-0.675049	0.5009
DRQUAL	-10.34602	2.277756	-4.542196	0.0000
DCOE(-1)	0.598044	0.060195	9.935041	0.0000

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.557182	Mean dependent var	0.006141
Adjusted R-squared	0.523970	S.D. dependent var	0.842076
S.E. of regression	0.580989	Akaike info criterion	1.825635
Sum squared resid	40.50582	Schwarz criterion	2.046214
Log likelihood	-108.6662	Hannan-Quinn criter.	1.915263
F-statistic	16.77684	Durbin-Watson stat	1.945377
Prob(F-statistic)	0.000000		

Table 12: Relationship between stock market development (Market Liquidity) and cost of equity

Dependent Variable: DCOE
Method: Panel Least Squares
Date: 03/17/17 Time: 19:39
Sample (adjusted): 2008Q3 2014Q4
Periods included: 26
Cross-sections included: 5
Total panel (balanced) observations: 130

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.118925	0.063036	-1.886614	0.0616
DSMLIQ	-0.081324	0.039863	-2.040072	0.0435
DDCRISK	0.058501	0.043781	1.336229	0.1840
DDRLAW	-1.311563	2.728348	-0.480717	0.6316
DRQUAL	-11.47234	2.389818	-4.800510	0.0000
DCOE(-1)	0.588766	0.060035	9.807107	0.0000

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.560731	Mean dependent var	0.006141
Adjusted R-squared	0.527786	S.D. dependent var	0.842076
S.E. of regression	0.578656	Akaike info criterion	1.817588
Sum squared resid	40.18120	Schwarz criterion	2.038168
Log likelihood	-108.1432	Hannan-Quinn criter.	1.907217
F-statistic	17.02011	Durbin-Watson stat	1.914149
Prob(F-statistic)	0.000000		

4.2.2 Relationship between banking sector development and cost of equity capital

Table 13 below shows the results of OLS regression investigating whether a relationship exists between banking sector development and cost of equity capital in the African Emerging and Frontier Markets. The p-value of the banking sector development indicator is statistically significant indicating that a relationship exists between stock market development and cost of equity. The banking development measure (DDCRED) is negatively associated with the Cost of Equity as shown by coefficient (t-statistic) of -0.063471 (-2.088520). This implies that an increase in banking sector development measure results in the reduction of cost of equity in the African emerging markets. Kim et al (2015) also found that banking development measure was negatively associated with cost of equity measure in China. Pill and Pradhan (1995) found that private sector credit was correlated to

financial development. Their findings affirm the suitability of credit to private sector which was used in this study as a proxy of banking sector development.

Table 13: Relationship between banking sector development and cost of equity capital

Dependent Variable: DCOE
Method: Panel Least Squares
Date: 03/17/17 Time: 19:40
Sample (adjusted): 2008Q3 2014Q4
Periods included: 26
Cross-sections included: 5
Total panel (balanced) observations: 130

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.061481	0.054464	-1.128845	0.2612
DDCRED	-0.063471	0.030391	-2.088520	0.0389
DDCRISK	0.061548	0.043774	1.406045	0.1623
DDRLAW	-2.444313	2.701423	-0.904824	0.3674
DRQUAL	-10.57159	2.276208	-4.644386	0.0000
DCOE(-1)	0.577057	0.060550	9.530180	0.0000

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.561437	Mean dependent var	0.006141
Adjusted R-squared	0.528545	S.D. dependent var	0.842076
S.E. of regression	0.578191	Akaike info criterion	1.815978
Sum squared resid	40.11657	Schwarz criterion	2.036558
Log likelihood	-108.0386	Hannan-Quinn criter.	1.905607
F-statistic	17.06900	Durbin-Watson stat	1.954418
Prob(F-statistic)	0.000000		

4.2.3 Robustness Check

Robustness check was performed using Stepwise Regression. Stepwise regression is an automated tool used in the exploratory stages of model building to identify a useful subset of predictors. The process systematically adds the most significant variable or removes the least significant variable during each step. As indicated on the results shown on Table 14-16, all the variables were found to be significant as none was removed by the model.

Table 14: Robustness Test – Stock Market Capitalisation

Dependent Variable: DCOE
Method: Stepwise Regression
Date: 03/29/17 Time: 15:00
Sample (adjusted): 2008Q3 2014Q4
Included observations: 130 after adjustments
Number of always included regressors: 1
Number of search regressors: 5
Selection method: Stepwise forwards
Stopping criterion: p-value forwards/backwards = 0.5/0.5

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
C	-0.065230	0.054193	-1.203653	0.2310
DCOE(-1)	0.603189	0.059172	10.19386	0.0000
DRQUAL	-9.216641	2.093020	-4.403514	0.0000
DDCRISK	0.074665	0.041074	1.817798	0.0715
DSMCAP	-0.019967	0.011340	-1.760813	0.0807

R-squared	0.545186	Mean dependent var	0.006141
Adjusted R-squared	0.530632	S.D. dependent var	0.842076
S.E. of regression	0.576910	Akaike info criterion	1.775440
Sum squared resid	41.60308	Schwarz criterion	1.885730
Log likelihood	-110.4036	Hannan-Quinn criter.	1.820254
F-statistic	37.45946	Durbin-Watson stat	1.957237
Prob(F-statistic)	0.000000		

Table 15: Robustness Test – Stock Market Liquidity

Dependent Variable: DCOE
Method: Stepwise Regression
Date: 03/29/17 Time: 15:06
Sample (adjusted): 2008Q3 2014Q4
Included observations: 130 after adjustments
Number of always included regressors: 1
Number of search regressors: 5
Selection method: Stepwise forwards
Stopping criterion: p-value forwards/backwards = 0.5/0.5

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
C	-0.083718	0.059179	-1.414653	0.1597
DCOE(-1)	0.599808	0.059452	10.08892	0.0000
DRQUAL	-9.405985	2.130227	-4.415486	0.0000
DDCRISK	0.069747	0.041268	1.690092	0.0935
DSMLIQ	-0.048241	0.035009	-1.377936	0.1707

R-squared	0.540879	Mean dependent var	0.006141
Adjusted R-squared	0.526187	S.D. dependent var	0.842076
S.E. of regression	0.579635	Akaike info criterion	1.784866
Sum squared resid	41.99707	Schwarz criterion	1.895155
Log likelihood	-111.0163	Hannan-Quinn criter.	1.829680
F-statistic	36.81488	Durbin-Watson stat	1.950166
Prob(F-statistic)	0.000000		

Table 16: Robustness Check - Banking sector development

Dependent Variable: DCOE
Method: Stepwise Regression
Date: 03/29/17 Time: 15:09
Sample (adjusted): 2008Q3 2014Q4
Included observations: 130 after adjustments
Number of always included regressors: 1
Number of search regressors: 5
Selection method: Stepwise forwards
Stopping criterion: p-value forwards/backwards = 0.5/0.5

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
C	-0.048695	0.053946	-0.902662	0.3685
DCOE(-1)	0.590972	0.059741	9.892216	0.0000
DRQUAL	-8.997999	2.107495	-4.269524	0.0000
DDCRISK	0.065487	0.043637	1.500716	0.1360
DDCRED	-0.052355	0.028729	-1.822347	0.0708
DDRLAW	-2.111415	2.687851	-0.785540	0.4336

R-squared	0.547764	Mean dependent var	0.006141
Adjusted R-squared	0.529529	S.D. dependent var	0.842076
S.E. of regression	0.577587	Akaike info criterion	1.785140
Sum squared resid	41.36726	Schwarz criterion	1.917488
Log likelihood	-110.0341	Hannan-Quinn criter.	1.838917
F-statistic	30.03868	Durbin-Watson stat	1.982620
Prob(F-statistic)	0.000000		

5 CONCLUDING REMARKS

The research investigates the relationship between financial development and cost of equity in African emerging and frontier markets. The research finds that both stock market development measures (stock market capitalization and stock market liquidity) tend to reduce the cost of equity. The notion of inverse relationship between stock market development and cost of equity tends to support findings by Kim et al (2015) who concluded that stock development reduce cost of equity in China. Like the stock market development measures, this study revealed that the banking sector development measure (domestic credit to private as ration of GDP) tends also to have a negative relationship with cost of equity. However, not so in tandem with this result, Kim et al (2015) noted that banking development weakly reduced cost of equity in China.

It is the researcher's view that this study contributes to the pool of information with regards to the relationship between cost of equity capital and financial development in African emerging and frontier markets as most previous similar studies were not Afrocentric. Given the quest for Foreign Direct Investment (FDI), by African countries in general and emerging markets in particular, this research is poised to provide insight to policy makers and market leaders in African emerging markets about some of the drivers of cost of equity in their respective countries.

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