Determinants of Capital Structure of African Firms: A Categorical Analysis

Demis Hailegebreal[1]   Man Wang[2]
1.Accounting School, Dongbei University of Finance and Economics, China
2.Accounting School, Dongbei University of Finance and Economics, China International Research Centre

Abstract
This study contributes to capital structure literature by investigating the determinant factor of financing decision of firms operating in 13 African countries with different financial, institutional, legal and economic environments. We employed categorical analysis so as to investigate the factors that influence the financing decision of firms operating in countries with underdeveloped and developed stock and banking sector. We also test in this study the pecking order and trade off theory is more statistically powerful in explaining firms' financing decision of those African countries and the result confirms both pecking order and trade off theory. Our study found that asset tangibility, financial distress cost, profitability and Non debt tax shield are strong firm specific determinants of capital structure. This study also found that corporate tax rate, banking sector development, GDP growth rate, and lending interest rate are the most important country specific determinants of capital structure. Rule of law is found to be strong determinants of capital structure of African firms.
Keywords: Africa, Capitals structure, Country's legal system, Country specific determinants, Pecking order theory, Trade off theory

1. Introduction

Since the seminal work of Modigliani and Miller (1958, 1963), numerous literatures have been documented regarding theoretical and empirical studies of investigating the determinant factors of capital structure. The Modigliani–Miller theory (MM theory) states that, in the absence of taxes, bankruptcy costs, and asymmetric information, and in an efficient or perfect capital market, firm's value is independent of how it is financed, regardless of whether firm's capital comprises of equities or debt, or both, or what the dividend policy is. However, when one or more of the MM assumptions such as perfect capital markets and tax are relaxed, many economists have shown how firm value may vary with changes in the debt-equity mix that leads to introduction alternative theories. Accordingly, DeAngelo and Masulis (1980) introduced static theory which assumes that the optimal debt level is a result of a trade-off between the tax advantages of debt and financial distress costs. According to this theory, the optimum capital structure does exist and a firm is considered as adjusting a target debt level and gradually moving towards it. The firm's optimum capital structure will encompass the trade-off between the effects of corporate and personal taxes, bankruptcy costs and agency costs, etc. On the other hand, the pecking order theory, first introduced by Myers and Majluf (1984), states that there is no well-defined target debt ratio rather choose retained earnings as their main source of funds for investment followed by less risky debt and risky external equity financing. Such preference of using internal funds for investment financing is due to the existence of the asymmetric information problem in credit market. Several empirical studies have confirmed the basic Myers–Majluf idea, such as Brennan and Kraus (1987), Constantinides and Grundy (1989), Krasker (1986), Heinkel and Zechner (1990), Narayanan (1988), and Noe (1988).

Moreover, previous researchers investigated the determining factors of the capital structure and identified firm size, profitability; growth opportunities and tangibility of assets are the most important firm specific determinants of firm's capital structure (Rajan and Zingales, 1995; Anders Kjellman And Staffan Hansin, 1995; De Miguel and Pindado, 2001; Joshua Abor, 2008; Frank and Goyal, 2009; Chimwemwe Chipeta and Chera Deressa, 2016). Similarly, the empirical studies on capital structure have also involved examining the macroeconomic or country-specific variables (Guihai Huang and Frank M. Song, 2006; De Jong et al., 2008; Cook and Tang, 2010; Chipeta and Mbululu, 2013, Ebenezer Bugri Anarfo, 2015) and institutional factors (Bancel and Mittoo, 2004; Brounen et al., 2006; Gwatidzo and Ojah, 2014, Jian Chen Chunxia Jiang Yujia Lin, 2014) that influences the choice of firm leverage. Besides, La Porta et al. (1997, 1998) argued that a country's legal system plays an important role in the development of financial markets, as it influences the establishment of shareholder and creditor rights. Thus, such additional country-specific factors should be considered in studies concerning capital structure as they play a significant role in explaining disparities in leverage (De Jong et al., 2008).

However, even if firm-level and country-specific factors have significant impact on firms' capital structure it has not been that much investigated, particularly in the context of firms in the emerging stock markets of Africa. Previous studies ignored this area, primarily due to the following reasons. First, the emerging stock markets of Sub-Saharan Africa were perceived as irrelevant relative to other more developed African stock markets such as the Egyptian, Kenyan, Nigerian and South African stock exchanges (Chimwemwe Chipeta and Chera Deressa, 2016). Hence, previous studies on capital structure in Africa has inclined to emphasis on more developed stock

markets of Africa (Gwatidzo and Ojah, 2009; Auret et al., 2013; Chipeta and Mbululu, 2013; Jooma and Gwatidzo, 2013). Second, the lack of availability of data for firms listing on to these stock markets posed challenges to researchers to conduct research on the area. However, currently the extent of the stock market in Sub-Saharan Africa has been growing in the number of domestic firms listing and in the total market capitalisation of shares listed (Chimwemwe Chipeta Chera Deressa, 2016). Due to the availability of credible data on stock markets for these countries, now, it is possible to conduct studies on how firm and country-specific variables influences on the choice of leverage for firms in Africa. Moreover, the previous empirical studies were conducted either in the countries where the stock market is relatively developed (Gwatidzo and Ojah, 2009; Auret et al., 2013; Chipeta and Mbululu, 2013; Jooma and Gwatidzo, 2013) or in Sub-Sahara African countries (Chimwemwe Chipeta and Chera Deressa, 2016). None of the above studies consider both Sub-Saharan Africa and Non Sub-Saharan Africa in this regard. This study therefore, investigated the factors that determine the firms' financing decision in both Sub-Saharan Africa and Non Sub-Saharan Africa. In this study, we used firm specific and country specific variable and we also include the country's legal system and institutional proxies so as to investigate what determine the firms' financing decision in Africa. The inclusion of such proxies is inspired by the institutional difference hypothesis which suggests that institutional differences create unique business environments that have influence on the way firms behave (Julian and Ofori-Dankwa, 2013). Chimwemwe Chipeta and Chera Deressa, (2016) argued that the rule of law, control of corruption are suitable proxies that can impact firm access to capital. Similarly, differences in the developments of financial markets and other macroeconomic conditions can impact the capacity for firms to contract debt and equity capital. In this study, we perform the categorical analysis based on the banking sector and stock market development. We categorized countries as lower, middle and upper as per the mean value of the development of banking sector and stock market proxies followed by descriptive statistics and regression analysis. The purpose of this categorical analysis is to investigate the relationship of banking sector and stock market development with firms' leverage. We found from this categorical analysis that banking sector development has a negative association with leverage of firms in countries where the sector is underdeveloped and stock market development has negative relationship with firms' leverage in countries categorized as lower and upper based on stock market development. Our study confirms both pecking order and static trade of capital structure theories. The association of profitability and debt ratio of firms' in countries categorized as lower and middle in both banking sector and stock market development is negative and significant which confirms pecking order theory whereas the association of profitability and leverage is positive and significant for firms in relatively developed stock market and banking sector in Africa. This result implies that there exist asymmetric information and symmetric information in firms in Africa.

2. Theoretical analysis and research hypotheses

Starting from the seminal work of Modigliani and Miller (1958), several researchers have introduced theories that tried to describe the way firm managers decide on the capital structure of the firms. But, accordingly Barclay and Smith (2005) the challenge over the years has been to devise conclusive tests that offer a base for choosing the correct theory. For instance, partial adjustment regressions confirmed the static trade-off theory even on data simulated according to the pecking order theory (Shyam-Sunder and Myers, 1999). Such contradiction rises because of the methodological weaknesses of partial adjustment models used in several capital structure researches (Hovakimian and Li, 2011), and because the theories in some cases presents contradictory expectations on how managers choose their capital structure. For instance, the pecking order theory assumes that profitable firms will prefer to use their retained earnings, and hence would borrow less. The trade-off theory, to the contrary, suggests that profitable firms will try to shield their earning from tax by borrowing more to take advantage of the interest tax shields of borrowed money. Moreover, it is common to find numerous theories of capital structure confirmed for the same set of data. Likewise, Chipeta et al. (2012) confirm the static trade-off and pecking order theories of capital structure for the same set of JSE listed firms. They found a positive and statistically significant association on the target leverage and a statistically significant negative relationship between profitability and leverage. Similarly, Barclay and Smith (2005) argue that these theories are mutually exclusive. This study is basically designed to test whether trade-off or pecking order theory of capital structure is confirmed in this study. The next part of this study presents the detail of different theories of capital structure of firms.

2.1 The pecking order and trade-off theories

The pecking order theory was first introduced by Myers and Majluf (1984) and suggests that firms usually choose internal finance or retaining earing to finance their investment projects and choose debt to equity when their retained earnings is not sufficient (Barclay and Smith,2005). Such preference is due to the existence of information asymmetry in the credit market and is used to avoid negative influence of asymmetric information that investors tend to believe that firms issue equity when stock prices are overpriced and therefore stock prices would fall after stock issue is announced.

The hypothesis of pecking order theory was confirmed by previous empirical studies in the case of negative

relationship between leverage and profitability (Rajan and Zingales, 1995; Shyam-Sunder and Myers, 1999; Booth et al., 2001; Delcoure, 2007; Strebulaev, 2007; Chipeta et al., 2013). These researchers found that profitable firms actually reported a lower debt ratio. On the other hand several previous studies found contradicting result with the view point of pecking order theory (Helwege and Liang, 1996; Frank and Goyal, 2003).

Bessler et al. (2011) documented that information asymmetry is the major factor of dynamic pecking order financing behaviour. Yang et al. (2014) examined the signal factor hypothesis which syndicates the estimation of the trade-off and pecking order theories. They found that firms with symmetric (asymmetric) information show evidence of trade-off (pecking order) financing behaviour. That is, firms with symmetric information choose to borrow whereas firms with asymmetric information choose to use their retained earnings to finance their projects. Shyam-Sunder and Myers (1999) used a novel approach to investigate the pecking order against the trade-off theory. They investigated financing decisions of 157 US firms in accordance with the pecking order where financing is a consequence of the collective need for external funding. They then documented that the pecking order theory has more statistical power than the trade-off theory. Similarly, Seifert and Gonenc (2010) explored a broader set of 23 emerging market economies' firms, and they proved that pecking order financing behaviour is more powerful in those markets characterised by a high degree of information asymmetry and agency costs. The trade of theory dated back to the study of Kraus and Litzenberger (1973) who coined the interest tax shields related with debt and the costs of financial distress into a state preference model. This theory states that firm managers try to balance the benefits of interest tax shields against the present value of costs of financial distress. There are numerous assumptions of the trade-off theory; first, the theory assumes that firms will pursue an optimum capital structure, and they will eventually adjust towards the optimum target. Graham and Harvey (2001) documented that many of the surveyed chief financial officers in their survey stated that they have a target debt ratio. Second, the trade-off theory argued that profitable firms with fewer non-debt tax shields will issue more debt in order to shield their profits from tax (De Angelo and Masulis, 1980). However, majority of previous studies on profitability and leverage does not confirm the trade-off theory. Hence, we expect the firms' profitability will negatively affect the firms' financial leverage in Africa which leads to the following hypothesis.
H1: Profitability has significant and negative relationship with firms' leverage

2.2 Contracting cost theory

Contracting costs of debt comes from the underinvestment problem as it is stated by Myers (1977). A high growth firm that is facing challenges in servicing its debt may be forced to sacrifice its capital and investment opportunities. Equity investors may be reluctant to invest their funds as they worry that the funds may be used to support the creditors' position (Barclay and Smith, 2005). Hence, such investors will need a higher return for compensating the risk of investment. Thus, to alleviate the adverse impact of the underinvestment problem, higher growth firms with intangible assets are probably avoiding issuing debt.

Several empirical studies have been conducted to test the contracting cost theory using numerous measures for growth. Adam and Goyal (2008) documented the market to book value of assets has the highest information content in relation to investment opportunities. Many empirical studies also used assets and sales as a measure of growth opportunities of firms and we also used sales growth to asset growth ratio as a measure of growth opportunities of African publicly listed firms in this study. The result of empirical studies with respect to relation between growth opportunity and leverage is mixed. For example, Ozkan, 2001; Ngugi (2008); Frank and Goyal, (2009); Jooma and Gwatidzo, (2013), found that there is a negative relationship between growth opportunity and firms' capital structure whereas Abor and Biekpe, (2005); Chipeta et al., (2013) found positive relation between the two variables. On the other hand, Delcoure (2007) investigated capital structures of firms in Western European transition economies and found statistically insignificant relationship between growth opportunities and leverage. This contradiction in the set of results is reasonable. Myers (1977) point out that growth firms require external financing to support their operations. Drobetz and Wanzenried (2006) stated the negative impact of altering the arrangement of new issues can be alleviated by the positive impact of future growth opportunities, even under asymmetric information.

Despite, creditors will be capable to facilitate credit to firms that experience real growth in sales and assets. Some studies that used asset as measure of growth opportunities found a positive correlation between growth opportunities and leverage (Titman and Wessels, 1988; Abor and Biekpe, 2005). Hence, the following hypothesis was developed in this study.
H2: Asset tangibility has positive and significant association with firms' leverage in Africa.

2.3 Institutional determinants of capital structure

Several empirical studies documented institutional factors influence the choice of capital structure (Demirguc-Kunt and Maksimovic, 1998; Boothet al., 2001; Bancel and Mittoo, 2004, Fan et al. 2012; Chimwemwe Chipeta and Chera Deressa, 2016). In Underdeveloped, weak, uncompetitive financial system firms face huge challenges to access capital that leads firms to have limited access to debt. Fan et al. (2012) found that firms have lower debt

ratios in countries that are corrupt, and weaker legal systems. Similarly, Chimwemwe Chipeta and Chera Deressa, (2016) documented determinants of capital structure of Sub Saharan African countries and found that development of banking sector, stock market, and strong legal system have strong influence on the choice of capital structure. For instance, they found that firms in countries with relatively developed stock market reported the lowest debt ratio as firms operating in such environment have alternative sources of capital in the form of equity, however, firms operating in underdeveloped stock markets more depend on debt because of the limited financing alternatives available in these countries. Also, De Jong et al. (2008) documented the influence of collateral value of assets is low in countries with relatively developed bond markets. Their result also shows that firms in countries with strong legal systems rely more on long-term debt. Moreover, Tchuigoua (2014) investigated the external financing need of the micro finance institutions that considers creditor rights, the legal system and the development of the banking sector and found that the development of the banking sector is positively associated with external borrowings for micro finance institutions. These lead to the following hypothesis in this study.

H3: Banking sector and stock market development has positive relationship with firms' leverage in Africa.

2.4 Country-specific determinants of capital structure
2.4.1 GDP
Besides the firm specific factors documented in previous studies of capital structure, the country level factors such as GDP growth rate, inflation rate and interest rate have a significant influence on the choice of leverage of firms. For example, various studies conducted to evaluate the impact of GDP growth rate on capital structure found a mixed result. Booth et al (2001) documented the capital structure of developing countries and found that real economic growth tend to increase the overall debt ratio and long-term debt ratio of firms. Similarly, korajaczyk and Levy (2003) investigated the capital structure optimal, macroeconomic situations and financial constraints it has been found that macroeconomic conditions account for 12% to 51% of the time series variation of firms leverage financing decisions and reflect the state of the economy in turn indicating that economic growth positively affecting the leverage of firms. On the other hand, Gajurel (2005) used macroeconomic variables to investigate the impact of GDP growth rate on the capital structure of Nepalese firms and it has been found that GDP growth rate was negatively associated with leverage of Nepalese firms. Cook and Tiang (2008) documented that firms adjust to target leverage faster in good states than in bad states. Based on this, we developed the following hypothesis.

H4: GDP growth rate has significant effect on firms leverage in Africa.

2.4.2 Interest rate
Interest rate especially lending rate as it is considered as cost of borrowing is the most important determinants of the choice of capital structure of firms. Myers and Steward (1984), prevailing interest rates are of much worry to many firms, because of indexing of interest rates to inflation and previous studies revealed that it affects the capital structure decision of firms. Jalilvand and Harris (1984) study US corporations' capital structure and found that the financial decision of US firms is independent of interest rate. The higher interest rate leads investment to falls, a low rate of interest lead to increase in investment (Singh, 1993). Increasing in investment is an indication of using more debts. However, in the short run, interest is inelastic and fails to affect investment. In this study, we use the lending interest rate and expected to have strong association with debt ratio of firms in Africa and we expect the following relationship of lending interest rate and firms' leverage in Africa.

H5: Higher interest rate negatively associated with firms' leverage.

2.4.3 Inflation
Another important macro -economic variable that may have significant influence is inflation. Low or medium levels of inflation in a particular country may have positive influence on the business activities, in that it can be considered as an encouragement to production. High levels of inflation however can adversely influence firm's profitability by directly influencing the cost of raw materials and by reducing final demand for the products. Dammon (1988) stated that inflation influences capital structure decision and firm value and further stated that higher inflation leads investors to sell bonds in exchange to stocks and firms capital structure measured as debt-equity mix tend to drop. Similarly, Frank & Goyal (2009) and Jõeveer (2013) found that inflation rate has a positive association with firms leverage as in higher inflation firms can repay debt easily due to the greater pricing power and higher return. To the contrary, Booth et al. (2001), Gajurel (2005), Beck et al. (2008) and Muthama et al. (2013) found negative association between inflation and firm's capital structure. Based on Beck et al. (2008), Camara (2012), Muthama et al. (2013) and Chipeta & Mbululu (2013), we use the annual percentage of Inflation, GDP deflator to measure inflation in this study and we expect the following relationship between inflation and firms' leverage.

H6: Inflation has positive and significant relationship with leverage of firms in Africa.

2.5. Countries legal system
It has been argued that differences in a country's legal system plays a vital role in helping access to debt and equity

capital by protecting the rights of lenders and borrowers. Chimwemwe Chipeta and Chera Deressa, (2016) stated that the rule of law, and control of corruption are suitable proxies that can impact firm access to capital. The market paricipants in every country may rely on the strong legal system of the country and we expect that strong legal system will have a positive effect on firms' capital structure. This will lead to the following two hypothesis.

H7: Control of corruption is positively and significantly associated firms' leverage in Africa

H8: Rule of law is positively and significantly associated firms' leverage in Africa

3. Data sources and Methodology

3.1 Data sources

This study has been conducted on capital structure determinants of publicly listed non-financial firms of 13 African countries namely South Africa, Mauritius, Egypt, Nigeria, Kenya, Morocco, Tunisia, Tanzania, Namibia, Swaziland, Ivory Coast, Ghana and Botswana. The inclusion of these countries in this study is guided by the availability of the required data for firms in these countries. Based on the availability of data, again, this study is delimited from the year 2000 to 20015. Hence, a 16 years panel data of 254 publicly listed non-financial firms are used for this study. This offers an adequate sample to compare the leverage between countries of emerging and developed stock markets and banking sector. The firm level data is extracted from BVD Osiris, data for country specific variables are obtained from World development indicators and data for institutional development indicators are obtained from World Governance indictor and Doing business. Financial firms such as banks and insurance companies are excluded from this study on the ground that they are subject to specific and strong regulation that has impact on their capital structure.

3.2 Estimation techniques and variables description

In this study, we employed descriptive statistics followed by regression analysis and we also employed categorical analysis based on the stock market and banking sector development. The purpose of this study is to examine the determining factors such as firm specific, institutional development and Macro-economic variables. Hence, to achieve this objective, the following econometric model is developed for this study.

$$LEV_{i,j,t} = \alpha + \beta_1 x_{i,j,t} + \beta_2 \gamma_{i,j,t} + \beta_3 z_{i,j,t} + \mu_{i,j,t}$$

Where i, denotes an individual firm, j represents the country and t denotes time whereas $LEV_{i,j,t}$ is the dependent variable measuring the total debt ratios, $x_{i,j,t}$ is the vector of firm-specific variables, and $z_{i,j,t}$ the vector of country specific variables, α denotes constant, β_1 , β_2 and β_3 denotes coefficients and $\mu_{i,j,t}$ is the error term. The variables with its measurement and sources are presented in table 1.

Table 1: Variables description and measurement

Variable	Code	Measurement	Sources of data
Dependent Variable			
Total debt ratio	TD	Total debt to Total Assets	BVD Osiris
Independent Variables			
1. Firm specific variables			
Size of the firm	SZ	Logarithm of Total assets	
Growth opportunity	Growth	Sales growth/Asset Growth	
Tangibility	TAN	Fixed Assets to Total Assets	
Financial distress cost	FDC	σEBIT/ total assets	
Profitability	PROFIT	Net income to total asset ratio	
2. Country specific variables			
Gross Domestic Product	GDP	GDP growth (annual %)	World development index
Real Interest rate	Interest	Nominal interest rate adjusted for inflation	
Inflation rate	Inflation	Inflation, GDP deflator (annual %)	
Banking sector development	Bank	Bank deposit to GDP (%)	Global financial development database
Stock market development	Market	Stock market capitalisation to GDP (%)	
Credit extended to the private sector	Private	Domestic credit to private sector (% of GDP)	
3. Country's legal system index			
Rule of Law	Rule	Measures the perceptions of the extent to which agents have confidence in, and abide by societal rules.	World governance indicator
Control of Corruption	Control	Measures the extent to which public power is misused for private gain	

4. Data analysis

4.1 Descriptive statistics

The mean value of firm level, country specific variables and country's legal system indexes are presented in table 2 below (figures in bracket are standard deviation). Particularly, the mean value of firm specific variables is presented on panel A of table 2. The mean value the overall debt ranges from 0.36 for firms in Botswana to 1.24 for firms in Nigeria. The mean value of Asset tangibility ranges from 0.41 for firms in Ivory Coast to 1.49 for firms in Nigeria. The minimum mean value of financial distress cost have been scored by the firms in Nigeria which is -0.14281 and the highest mean value of financial distress cost has been obtained for firms in South Africa which is 0.57. The mean value of growth opportunity ranges from -25.9 for firms in Egypt to 4.48 for firms in

Mauritius. Firms in Namibia have been found more profitable with the mean value of 0.12 whereas firms in Ghana have been found less profitable with the mean value of 0.035 of profitability. The mean value of non -debt tax shield ranges from -0.062 for firms in Namibia to -0.016 for firms in Mauritius. The mean value of country specific and legal system variables have been presented on panel B of table 2. Accordingly, Mauritius has the lowest mean score of corporate tax rate which is 19.84 whereas South Africa has been found to have the highest mean value of corporate tax rate which 34.82. With respect to control of corruption, Nigeria is found to have the lowest mean value (-1.13) whereas South Africa has been found to have the highest mean value (0.23). Mauritius has the highest mean of rule of law whereas Ivory Coast is associated with the lowest mean value of rule of law. The mean value of banking sector development has been found lowest in Ivory Coast, Ghana, Swaziland, Nigeria, and Tanzania and is highest in Mauritius, morocco and Egypt. In the case of stock market development, South Africa has been found the top with the mean value of 196.16 and Tanzania has been found the least with the mean value of 3.86. Nigeria has achieved the highest growth rate with the mean value of 7.54 whereas Tunisia obtained the least economic growth rate of 3.08 on average. Ghana scored the highest inflation rate of 23.32 on average and the lowest inflation rate has been scored in Morocco, Ivory Coast, and Tunisia. Finally, the mean value of interest rate ranges from 6.02 in Morocco to 18.68 in Ghana.

Table 2: Descriptive statistics of firm level, country level and legal system variables

Panel A: firm specific Variables							
Country	TD	TAN	FZ	FDC	Growth	PROFIT	NDTs
South Africa	0.522358 (0.323301)	0.530102 (0.2432)	5.79434 (0.784757)	0.573022 (6.939598)	0.911528 (32.84306)	0.049344 (0.540453)	-0.04092 (0.082746)
Mauritius	0.4645099 (0.2316383)	.675581 (.2366017)	5.75555 (.6168475)	.1385536 (.2464544)	4.481299 (26.44054)	.0586893 (.0761605)	-.015805 (.032092)
Egypt	0.474169 (0.268492)	0.512386 (0.218039)	5.661396 (0.673427)	0.068079 (0.098939)	-25.912 (383.6057)	0.067884 (0.080558)	-0.0219 (0.030869)
Nigeria	1.23954 (16.6272)	1.498108 (23.85397)	5.930317 (0.804829)	-0.14281 (16.64843)	8.229258 (171.4232)	0.110425 (3.671178)	-0.02196 (0.022573)
Kenya	0.521986 (0.192945)	0.673781 (0.242309)	6.210758 (0.699378)	0.114641 (0.154097)	1.232044 (14.28069)	0.059093 (0.133354)	-0.02856 (0.018576)
Morocco	0.5741717 (.8683725)	.4696878 (.206807)	5.476719 (.3950513)	.0890526 (.1336795)	1.328237 (8.015054)	.1120202 (.1709195)	-.0557652 (.0626938)
Tunisia	0.391818 (0.2474528)	0.4440086 (.1902961)	4.760089 (.4612767)	.1033518 (.1440343)	-1.055417 (24.01737)	.0575104 (.1061632)	-.0489717 (.0810561)
Tanzania	0.545213 (0.234141)	0.674768 (0.099777)	7.489842 (0.663951)	0.17129 (0.103655)	0.960678 (4.633571)	0.099293 (0.178043)	-0.04813 (0.01855)
Namibia	0.461886 (0.067757)	0.541918 (0.049733)	5.068707 (0.190201)	0.081068 (0.036769)	1.51423 (1.871775)	0.116406 (0.053603)	-0.06246 (0.022343)
Swaziland	0.46059 (0.097644)	0.76267 (0.047294)	5.321834 (0.179766)	0.076928 (0.042884)	0.800263 (2.398221)	0.06585 (0.052732)	-0.06133 (0.009913)
Ivory Coast	0.745011 0.190819	0.413209 (0.234733)	7.444566 0.202535	0.135984 0.072328	0.696994 6.559802	0.098861 0.226994	-0.02795 0.018026
Ghana	0.607558 (0.203847)	0.481501 (0.238638)	3.883412 (0.846548)	0.280427 (0.455736)	-0.05635 (7.356784)	0.035015 (0.118061)	-0.0372 (0.021423)
Botswana	0.3660427 (.1207668)	.8476216 (.1333938)	5.185498 (.472)	.221894 (.1689154)	2.372667 (6.856046)	.0800469 (.0925901)	-.0490312 (.0641148)

Panel B: Country specific and Legal system Variables								
Country	Tax	Control	Rule	Banking	Private	Market	GDP	Inflation	Interest
South Africa	34.82562 (3.545785)	0.230334 (0.264048)	0.100694 (0.050242)	56.16225 (4.79184)	139.4239 (13.35613)	196.1633 (41.86264)	3.108787 (1.739086)	7.018031 (1.889063)	11.66797 (2.452534)
Mauritius	19.84375 (4.886181)	.4969058 (.1039598)	.9503092 (.0598837)	83.50922 (8.542494)	78.44556 (15.82951)	51.43214 (20.58587)	4.365583 (2.043694)	4.197918 (2.97379)	15.10151 (6.058648)
Egypt	27.96875 (9.645084)	-0.5298 (0.13028)	-0.18991 (0.235725)	68.48514 (7.827512)	43.16664 (10.84472)	42.12565 (22.44579)	4.155255 (1.758137)	9.337001 (3.982017)	12.46401 (0.845388)
Nigeria	30 (0)	-1.13 (0.138445)	-1.20356 (0.152359)	17.83986 (5.504844)	17.06784 (7.851318)	15.91477 (8.460366)	7.540982 (7.034315)	17.02738 (25.37124)	18.47007 (2.633816)
Kenya	30 (0)	-0.96354 (0.080906)	-0.86098 (0.165747)	34.92749 (4.026977)	27.00178 (3.041917)	24.30427 (9.573314)	4.467236 (2.335055)	8.1268 (5.425089)	16.08118 (2.740137)
Morocco	30.0625 (.2424828)	-.2566894 (.128548)	-.1141198 (.1350253)	70.63682 (12.7837)	55.71814 (10.7679)	50.40885 (20.1659)	4.458983 (1.578488)	1.152051 (1.314065)	6.017404 (2.638732)
Tunisia	31.5625 (3.414312)	-.0184796 (.20003)	-.002961 (.1455177)	47.23128 (4.695478)	64.53226 (7.23305)	14.19182 (5.075326)	3.088929 (2.155896)	3.701386 (1.006697)	7.424273 (2.016934)
Tanzania	30 (0)	-0.66126 (0.218437)	-0.41336 (0.081892)	19.63231 (4.691716)	9.73247 (3.174661)	3.864412 (0.997078)	6.60306 (1.182335)	10.02061 (5.407733)	16.05288 (1.950429)
Namibia	33.8125 (0.394443)	0.267421 (0.144652)	0.173993 (0.105379)	43.41556 (9.21303)	47.06886 (3.303656)	4.028975 (3.824237)	4.920882 (2.705253)	7.022136 (4.044051)	11.41762 (2.381839)
Swaziland	27.5 (0)	-0.31834 (0.122108)	-0.59447 (0.180786)	20.9717 (3.068716)	18.72133 (4.5857)	8.556294 (1.835983)	3.263378 (1.21652)	7.881021 (4.269158)	11.45313 (2.371562)
Ivory Coast	25 (0)	-0.89371 (0.304017)	-1.21198 (0.298142)	17.01319 (3.922977)	15.49732 (2.072017)	20.78325 (10.71806)	2.620626 (4.464124)	3.222565 (2.837355)	7.72 (0.972495)
Ghana	25 (0)	-0.10339 (0.129402)	-0.01498 (0.079347)	18.71109 (2.96114)	14.49138 (2.199808)	7.528998 (2.40082)	6.25601 (2.699242)	23.32008 (16.04584)	18.68495 (9.273757)
Botswana	24.0625 (1.412787)	.9046375 (.161072)	.6170955 (.048702)	33.82151 (9.561892)	23.28482 (5.82426)	28.53252 (7.692189)	4.206753 (4.25435)	7.250459 (5.110524)	13.68082 (2.988068)

4.2 Correlation

In order to evaluate the possible level of multi-collinearly, the correlation between explanatory variables which are firm specific, country specific and country's legal system is presented on table 3. Accordingly, the correlation of most independent variables is fairly small indicating that there is no serious multi-collinearly problem among the independent variables included in this study.

Table 3: Correlation among variables

	TAN	SZ	FDC	Growth	PROFIT	NDTs	Tax	Control	Rule of law	Bank	private	market	GDP	Inflation	Interest
TAN	1														
SZ	0.0787	1													
FDC	0.0093	-0.1564	1												
Growth	-0.7672	0.037	0.0048	1											
PROFIT	-0.7577	0.0533	-0.1564	0.003	1										
NDTs	-0.0013	0.03	0.0212	-0.0051	0.0465	1									
Tax	-0.0274	-0.0594	0.0415	-0.0394	-0.0052	-0.0606	1								
Control of corruption	0.0084	-0.1723	0.0189	0.0012	0.0231	-0.0741	0.2085	1							
Rule of law	0.0215	-0.1277	-0.0044	-0.0156	0.033	-0.0328	-0.0798	0.8683	1						
Bank	0.007	0.0033	-0.0281	-0.0313	0.0396	-0.003	-0.2266	0.5433	0.7669	1					
private	-0.0116	0.0715	0.0233	0.0018	0.0148	-0.0668	0.3828	0.6859	0.5717	0.4734	1				
Market	-0.0042	0.174	0.0253	0.01	0.0117	-0.0476	0.3414	0.4921	0.385	0.3431	0.9375	1			
GDP	-0.0178	-0.0009	0.0221	0.0071	-0.006	0.0556	-0.0551	-0.2908	-0.3215	-0.287	-0.3393	-0.293	1		
Inflation rate	0.0125	0.0025	0.0118	0.0129	-0.009	0.0546	-0.0197	-0.2481	-0.3053	-0.2537	-0.1707	-0.1208	0.0667	1	
Interest rate	0.02	0.0211	0.0258	0.0136	-0.0212	0.1172	0.0305	-0.339	-0.3487	-0.2781	0.2859	0.3404	1		

TD, Total Debt ratio calculated as total liability to total assets; TAN, Asset tangibility calculated as fixed assets to total assets, SZ is firm size measured as logarizm of total assets; FDC is financial distress cost determined as standard deviation of EBIT to total assets; Growth is defined as Growth opportunity of firms calculated as the ratio of sales growth to assets growth; profit is defined as profitability of firms measured as net income over total assets; NDTs denotes Non debt tax shield calculated as depreciation expense to total assets, Tax is corporate tax rate, control stands for control of corruption; Rule is defined as rule of law' Bank is defined as the development banking sector development; Private is private sector credit to GDP; Market stands for Stock market development, GDP is GDP growth rate, Inflation is inflation rate as consumer prices index; Interest is defined as lending interest rate

5. Result

This part of the study presented the empirical investigation of determinates of firms' capital structure in Africa. In this part we run two different regressions. First, we run OLS regression of all firms so as to reach to the general relationship of firm specific variables, country specific variables and countries legal system indexes with firms' leverage in Africa. Second, we run categorical analysis based on the stock market and banking sector development of countries in order to reach to the clear insight of the relationship of variables based on institutional differences, basically, based on the developmental differences of stock market and banking sector.

Firm specific determinants: The OLS estimation of firm specific determinants is presented on table 4. The result of this study confirms the trade-off theory that assumes firms with relatively high tangible fixed assets tend to use it as a collateral value for external debt. Furthermore, it has been assumed that firms relatively with safe tangible fixed assets will suffer less from potential costs of financial distress, and such firms are supposed to borrow more. Hence, the relationship between asset tangibility and leverage is found to be statistically significant and positive and is as expected which is consistent with several empirical studies (Huang and Song, 2006; De Jong et al., 2008; Ezeoha and Botha, 2012). The relationship between firm size and firm leverage is found as expected. Firm size has statistically significant and positive relationship with firms' leverage, which is also in line with trade of theory. Large firms are considered as mature with relatively stable cash flows and can deal for loans on more favourable conditions that minimize the possibility of financial distress and is confirmed by this study. This result is consistent with previous studies (Booth et al., 2001; Deesomsak et al., 2004; Kayo and Kimura, 2011; Ukaegbu and Oino, 2014). According to trade of theory, the costs of financial distress can lead firms to bankruptcy and are supposed to borrow less. This assumption of trade off theory is confirmed by this study. There exist negative and statistically significant association between financial distress cost and firm leverage. The association between growth opportunity and financial structure is also as expected. There exist a positive but insignificant correlation between growth opportunity and leverage and this study is in line with the previous study of Titman and Wessels, (1988); Abor and Biekpe, (2005). Packing order theory stated that profitable firms usually prefer to use their internal source of finance to support their investment and are supposed to borrow less and is confirmed by this study. The relationship between profitability of firms and debt ratio is negative and statistically significant. This relationship is consistent with the study of Rajan and Zingales, (1995); Shyam-Sunder and Myers, (1999); Booth et al., (2001); Delcoure, (2007); Strebulaev, (2007); Chipeta et al., (2013). The trade-off theory argued that profitable firms with fewer non-debt tax shields will issue more debt in order to shield their profits from tax. This study also hypothesized that there is a positive and significant association between non debt tax shield and firm leverage and the result is as expected.

Country specific factors and country's legal system: Table 4 also presented the relationship between macro

level variables and firms' capital structure. Furthermore, the table comprises the relationship between country's legal system indexes and capital structure. The OLS estimation shows that corporate tax rate has statistically significant and positive relationship with firms leverage and is as expected. The relationship between rule of law and firms leverage is not as expected in this study. There exists inverse and significant relationship between rule of law and leverage in this study indicating that in countries with strong rule of law, firms are tend to borrow less and this result is inconsistent with previous studies (De Jong et al. (2008). Banking sector development enhances the provision of debt for investment financing and it has been expected in this study that there is a positive and significant relationship between banking sector development and leverage; the result is as expected and consistent with previous studies of Tchuigoua (2014) and Chimwemwe Chipeta and Chera Deressa, (2016). It has been argued that the real economic growth tend to increase the overall debt ratio of firms. Similarly, it has been hypothesized in this study that GDP growth rate has a positive relationship with leverage and the result is as expected and is consistent with the previous study of Booth et al (2001). Our study found that the lending interest rate found to be the most important and strong determinants of leverage of firms in Africa and the result is as expected. Finally this study doesn't found significant relationship between inflation rate, stock market development and Domestic credit to private sector.

Table 4: OLS regression

TD	Coef.	Std. Err.	T	P>t	[95% Conf.	Interval]
TAN	6.770478	0.068354	99.05	0.000*	6.636467	6.904489
SZ	-0.42638	0.043726	-9.75	0.000*	-0.5121	-0.34065
FDC	-0.00342	0.00754	-0.45	0.65***	-0.0182	0.011364
Growth	0.000329	0.000222	1.48	0.138**	-0.00011	0.000765
PROFIT	-1.89665	0.080558	-23.54	0.000*	-2.05459	-1.73872
NDTs	1.282345	0.519878	2.47	0.014*	0.263096	2.301595
Tax	0.01897	0.007379	2.57	0.01*	0.004503	0.033437
Control	-0.11698	0.163245	-0.72	0.474**	-0.43703	0.203065
Rule	-0.85425	0.182893	-4.67	0.000*	-1.21282	-0.49567
Bank	0.006654	0.003122	2.13	0.033*	0.000533	0.012775
Private	0.004638	0.003031	1.53	0.126**	-0.00131	0.010581
Market	-0.00116	0.001425	-0.81	0.417**	-0.00395	0.001637
GDP	0.021041	0.01012	2.08	0.038*	0.001201	0.040881
Inflation	-0.00227	0.003227	-0.7	0.482**	-0.0086	0.004059
Interest	-0.02856	0.008912	-3.2	0.001*	-0.04603	-0.01108
_cons	-1.51657	0.393642	-3.85	0.000**	-2.28832	-0.74481

Number of obs = 4029
Prob > F = 0.0000
Adj R-squared = 0.8970

*TD, Total Debt ratio calculated as total liability to total assets; TAN, Asset tangibility calculated as fixed assets to total assets, SZ is firm size measured as logarizm of total assets; FDC is financial distress cost determined as standard deviation of EBIT to total assets; Growth is defined as Growth opportunity of firms calculated as the ratio of sales growth to assets growth; profit is defined as profitability of firms measured as net income over total assets; NDTs denotes Non debt tax shield calculated as depreciation expense to total assets, Tax is corporate tax rate, control stands for control of corruption; Rule is defined as rule of law' Bank is defined as the development banking sector development; Private is private sector credit to GDP; Market stands for Stock market development, GDP is GDP growth rate, Inflation is inflation rate as consumer prices index; Interest is defined as lending interest rate; and *,** and ***significant level at 1%, 5% and 10% respectively.*

5.2 Categorical Analysis

In this part we categorized countries based on the development of Banking sector and Stock market. Table 6 presents the categorical regression analysis and we use the mean value of banking sector and stock market development indexes for the purpose of grouping. Countries grouped under lower in both banking sector and stock market development are those whose mean value of the specified indexes is relatively lower (below 0.2) and countries which are categorized under upper are countries with relatively higher mean value (above 0.7), whereas, countries categorized under middle are countries with the mean value in between upper and lower categorized courtiers (from 0.2 to 0.7). Table 5 presents the list of countries under each categories. We started by analysing the mean of total debt ratio for each category under both banking sector and stock market development. This result also shows that firms in countries with relatively developed stock market reported the lowest average debt ratio as firms operating in such environment have alternative sources of capital in the form of equity and this result is consistent with the previous study of Chimwemwe Chipeta and Chera Deressa, (2016). However, firms in countries with lower banking and stock market development reported highest average debt ratio because in underdeveloped, weak, and uncompetitive financial system, firms face huge challenges to access capital and use huge debt as a source of financing their investment projects.

As it is presented in table 6, asset tangibility, growth opportunity, financial distress cost, and profitability

significantly affect the capital structure of firms in countries categorized as under lower, middle and upper in the case of banking sector and stock market development. The association of profitability and debt ratio of firms' in countries categorized as lower and middle in both banking sector and stock market development is negative and significant. This result confirms the pecking order theory that states as there exist asymmetric information in credit market, firms prefer retained earnings to debt and also shows that firms in lower development of banking sector suffers from asymmetric information. Contrarily, there exist a positive and significant association between profitability and leverage of firms in countries where there is relatively developed stock and banking sector development which confirms a trade-off capital structure theory. This also shows that information asymmetry is not a problem of firms in countries with relative development of banking sector and stock market in Africa. From this, we can say that whatever the banking sector and stock market development is, the capital structure of firms in Africa is highly influenced by financial distress cost, profitability, collateral value and growth opportunity. Firm size has strong effect on the capital structure of firms in countries with relatively developed banking sector and stock market but not for firms in countries with under developed banking sector. Non debt tax shield found to be strongly associated with leverage of firms in countries under lower, middle and upper categories of Banking sector development whereas is insignificantly associated with firms' leverage in countries categorized as lower and middle stock market development. However, Non debt tax shield has strong association with firms' leverage in countries with developed stock market. Corporate tax rate also affects the capital structure of firms in countries with lower development of banking sector and lower stock market development. Rule of law is found to have strong relationship with leverage of firms in countries having lower development of banking sector but not have such strong relationship in all other cases. Development of private sector to GDP, also have strong correlation with leverage of firms in countries with low level of banking sector development. Banking sector development, stock market development, GDP, inflation rate, interest rate have no that much strong effect on firms' leverage in countries under all categories. Hence, we found that asset tangibility, growth opportunity, financial distress cost, Non debt tax shield and profitability and firm size are the most significant firm specific determinants of firms' leverage in Africa. We also found from countries legal system indexes, rule of law has a significant determinants of firms' capital structure in Africa.

Table 5: Category of Countries based on mean of Banking sector and stock development

Banking sector development					
Lower	score	Middle	score	Top	score
Nigeria	0.13	Botswana	0.33	South Africa	2.33
Tunisia	0.134	Egypt	0.518	Morocco	0.97
Ghana	0.03	Namibia	0.6	Mauritius	1.07
Tanzania	0.058	Swaziland	0.7	Kenya	1.36
Ivory Coast	0.084				
Stock market development					
Tanzania	0.06	Swaziland	0.3	South Africa	0.77
Ghana	0.06	Botswana	0.3	Kenya	0.82
Ivory Coast	0.09	Tunisia	0.4	Mauritius	0.6
Nigeria	0.116	Egypt	0.38	Namibia	0.6
				Morocco	0.66

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Table 6: Categorical Analysis

	Panel A: Banking sector development			Panel B: Stock market development		
TD	lower	Middle	Upper	Lower	Middle	Upper
TAN	5.949(0.146)*	-0.173(0.06)*	-0.242(0.031)*	6.171(0.175)*	-0.121(0.046)*	-0.244(0.031)*
SZ	0.044(0.096)**	-0.050(0.020)*	0.051(0.0112)*	0.126(0.123)**	0.062(0.016)*	0.052(0.0111)*
FDC	-0.299(0.054)*	0.102(0.106)**	0.031(0.001)*	-0.288(0.063)*	0.204(0.072)*	0.0311(0.001)*
Growth	-0.0009(0.0005)*	4.31(2.87)**	0.0001(0.0002)***	-0.0009(0.0006)**	4.08(2.89)**	0.0001(0.0002)***
PROFIT	-3.86(0.194)*	-0.96(0.138)*	0.275(0.016)*	-3.595(0.233)*	-0.988(0.104)*	0.274(0.016)*
NDTs	5.823(1.5108)*	-1.155(0.340)*	-1.27(0.100)*	2.513(4.646)***	0.086(0.170)***	-1.271(0.099)*
Tax	-0.066(0.034)*	0.001(0.002)***	0.001(0.002)***	-0.205(0.111)*	0.0016(0.002)**	0.0009(0.002)***
Control	0.531(0.463)**	0.071(0.07)**	0.034(0.045)**	0.677(1.106)***	-0.043(0.048)**	0.043(0.044)**
Rule	-0.862(0.435)*	-0.125(0.09)**	-0.016(0.06)***	-1.351(0.89)**	0.0105(0.049)***	-0.048(0.056)**
Bank	-0.056(0.039)**	0.001(0.001)**	0.00003(0.001)***	-0.087(0.066)**	-4.6(0.0014)***	0.0008(0.001)**
Private	0.050(0.025)*	0.001(0.002)**	-0.0001(0.0008)***	0.110(0.063)*	-0.0006(0.0013)***	-0.0001(0.0008)***
Market	-0.018(0.012)**	0.0002(0.0008)***	-0.0002(0.0004)***	-0.043(0.026)*	0.0004(0.0008)***	-0.0001(0.0003)***
GDP	0.013(0.013)**	-0.0007(0.006)***	-0.002(0.004)***	0.005(0.016)***	-0.0009(0.004)***	-0.002(0.0042)***
Inflation	-0.002(0.004)**	0.003(0.002)**	-0.0008(0.004)***	-0.008(0.005)**	0.0017(0.003)	-0.0018(0.0037)***
Interest	0.008(0.023)***	0.002(0.007)***	-0.0008(0.003)***	0.016(0.031)***	-0.0011(0.006)***	0.0011(0.002)***
_cons	-0.235(1.227)***	0.623(0.156)*	0.312(0.147)***	2.759(2.757)**	0.188(0.109)*	0.239(0.137)*
Obs	1054	592	2383	734	864	2434
Prob > F	0.0000	0.0000	0.0000	0.000	0.000	0.000
Adj R-squared	0.9666	0.09	0.26	0.9666	0.14	0.26
Mean	0.9(12.64)	0.47(0.24)	0.52(0.42)	1.13(15.13)	0.44(0.25)	0.32(0.41)

This regression run separately for each groups (Lower, Middle and Upper) as measured by the mean value of banking sector development and stock market development, Countries categorized as Lower, Middle and Upper are presented on the appendix of this study, *, ** and *** denotes the significant level at 1%, 5% and 10% respectively, the figures out of bracket are coefficients whereas the figures in brackets are the standard errors, TD, Total Debt ratio calculated as total liability to total assets; TAN, Asset tangibility calculated as fixed assets to total assets, SZ is firm size measured as logarizm of total assets; FDC is financial distress cost determined as standard deviation of EBIT to total assets; Growth is defined as Growth opportunity of firms calculated as the ratio of sales growth to assets growth; profit is defined as profitability of firms measured as net income over total assets; NDTs denotes Non debt tax shield calculated as depreciation expense to total assets, Tax is corporate tax rate, control stands for control of corruption; Rule is defined as rule of law' Bank is defined as the development banking sector development; Private is private sector credit to GDP; Market stands for Stock market development, GDP is GDP growth rate, Inflation is inflation rate as consumer prices index; Interest is defined as lending interest rate; cons is constant and Mean is the mean of debt ratio (figures in bracket are standard deviations)

6.Conclusion

This study examined the firm specific, country specific and country's legal system determinants of capital structure of 254 non-financial publicly listed firms of 13 African countries. The 16 years panel data from the year 2000 to 2015 has been used in this study. The data sources of this study are World Bank development indicator data base, doing business, Global financial development database and world governance indicators. Descriptive statistics followed by correlation analysis and OLS regression have been employed in this study. The result of this study confirms the trade-off theory and pecking order theory. Our study found that asset tangibility, financial distress cost, profitability, Non debt tax shield are strong firm specific determinants of capital structure of firms in Africa. This study also found that corporate tax rate, banking sector development, GDP growth rate, and lending interest rate are the most important country specific determinants of capital structure of non-financial firms in Africa. From the legal system indexes, rule of law is found to be strong determinants of capital structure of African firms.

In this study, we categorized countries as lower, middle and upper based on the level of development of banking sector and stock market. Countries categorized as lower has lower mean score of banking and stock market development indexes and countries grouped as upper has highest mean score of banking sector and stock market development whereas countries grouped as middle has mean score of banking sector and stock market development in between countries' grouped as lower and upper. Based on this category, this study found that the mean value of total debt ratio is highest for firms in countries with lower banking sector and stock market development. The mean value of the debt ratio also shows a steady increment as we move from middle to upper category in banking sector developments. This study also found that asset tangibility, growth opportunity, financial distress cost, and profitability significantly affect the capital structure of firms which are categorized under lower, middle and upper in the case of banking sector and stock market development. Firm size has strong effect on the capital structure of firms in countries with relatively developed banking sector and stock market but not for firms in countries with under developed banking sector. Non debt tax shield found to be strongly associated with leverage of firms in countries under lower, middle and upper categories of Banking sector development whereas is insignificantly associated with firms' leverage in countries categorized as lower and middle stock market development. However, Non debt tax shield has strong association with firms' leverage in countries with developed stock market. Corporate tax rate also affects the capital structure of firms in countries with lower development of banking sector and lower stock market. Rule of law is found to have strong relationship with leverage of firms in countries having lower development of banking sector but not have such strong relationship in all other cases. Development of private sector to GDP, also have strong correlation with leverage of firms in countries with low level of banking sector development. Banking sector development, stock market development, GDP, inflation rate, interest rate

have no that much strong effect on firms' leverage. The result of this study confirms that the capital structure of firms is not influenced by only firms' own characteristics, rather is influenced by institutional differences and country specific factors, and thus, the firms' capital structure decision should consider those institutional and country specific factors as well. This study further suggested that future researchers should do categorical analysis by considering the target debt level and speed of adjustment.

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