



**LINKING BANKING SECTOR COMPETITION AND ACCESS TO FINANCE: THE  
CASE OF SELECT SUB-SAHARAN AFRICAN COUNTRIES**

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## **ABSTRACT**

Using multi-year firm-level data of 27 Sub-Saharan countries from the World Bank Enterprise Survey (WBES), this study investigates the link between banking sector competition and firms' access to finance. The paper employs a probit model to measure the link between banking sector competition and access to finance by observing the impact of the four measures of competition namely: CR3, the Panzar and Rosse H-statistic, the Lerner index and the Boone indicator on credit constraints and financing obstacles whilst controlling for certain firm-level and country-level factors. The results are dominantly in line with the market power hypothesis which posits that banking sector competition improves access to finance. Additionally, the link between competition and access to finance depends on other firm-level variables such as top manager experience and industry as well as country-level variables such as institutional quality, credit information and strength of legal rights. The results of this paper are overall consistent with evidence provided by other studies that support the market power hypothesis which suggests that competitive conduct in the banking sector improves access to finance. The policy implications drawn from this study are that policymakers in the SSA region need to implement policies that strengthen competition in the banking sector without hindering efforts to strengthen banks. Policymakers need to also regulate the financing of business by banks to ensure that funds are directed at growing sectors and businesses that will in turn influence the growth of the economy.

## 1. INTRODUCTION

Access to finance is still a topic of interest for people all around the world, more especially in emerging and developing countries. More recently, Runde et al. (2021) looked at how blended finance may be implemented to assist with filling the access to finance gap. Interestingly their study makes mention of how firms led by female managers still face greater obstacles to finance which is in line with results of earlier studies like Beck et al. (2004). There are difficulties experienced by SMEs when conducting business in the SSA region. These challenges are partially due to the lack of financial access (Asongu & Odhiambo, 2019). There is an urgent need to solve issues related to the lack of finance in SSA especially amongst the small and medium-sized firms because of the positive spillovers that may arise as a result like job creation which will subsequently have a positive impact on economic growth (Brixiova et al. 2020). (Brixiova, Kangoye, & Yogo, 2020) (Asongu & Odhiambo, 2019) (Runde, Savoy, & Staguhn, 2021). There is a growing concern from policymakers that benefits produced by financial institutions and markets are not adequately widespread throughout populations and across different economic industries. Small businesses have been reported to have less access to external financing and to experience greater growth constraints (Galindo & Schiantarelli, 2003). Recently, the World Bank Group (2018) reported that SMEs still face higher financing obstacles than larger firms. Additionally, firms that are small and credit constrained are likely to remain stagnant and not grow in size (Makina et al., 2015).

For many politicians and scholars, a major growth obstacle for emerging and developing countries is the lack of access to bank credit. It has been shown that financial (banks) and legal institutions play an imperative role in bringing ease to firms that are financially constrained. Beck (2013) posits that banks bring ease to obstacles faced by firms and as a result unemployment decreases and poverty reduced. Access to finance also positively impacts innovation in emerging markets (Adegboye & Iweriebor, 2018). Therefore, by expanding SME's access to external financing, financial and institutional development helps lessen the growth obstacles on those businesses. Financial and institutional development puts firms in a situation where everyone has the same advantages and disadvantages and the conditions of the competition are fair to everyone (Beck & Demirguc-Kunt, Small and medium-size enterprises: Access to finance as a growth constraint, 2006).

The level of financial exclusion faced by firms in emerging countries is higher (Beck & Demirguc-kunt, 2006). There are currently a lot of small and medium-sized businesses

operating in Africa, however, limited access to finance hinders them from growing at their optimal levels (Fowowe, 2017). SMEs invariably report higher growth impediments as a result of financial exclusion than large firms (Schiffer & Weder, 2001), even though they are the ones that stand to gain the most from access to finance (Beck & Demirguc-Kunt, Small and medium-size enterprises: Access to finance as a growth constraint, 2006).

An effective financial system is essential for both the expansion of financial services and long-term economic growth. There are two literary subgenres that discuss competition and effectiveness in the banking industry. The first emphasizes how competition helps to increase efficiency, and the second emphasizes how competition affects financial stability and issues with optimal contracting (Mlambo & Ncube, 2011). This study will focus on the former strand that links competition and efficiency. According to this strand, competition reduces monopoly rents. Monopoly rents are a situation in which firms with more market power are without competition and can therefore sell goods and services at prices that are far above what the competitive market prices would be, and this is at the expense of the consumer. When the banking industry is competitive monopoly rents are reduced and therefore banking prices and all other operation costs decrease. Therefore, according to this strand, competition impels banks to be cost efficient and this can result in welfare gains to the consumers (Chen, 2009). Banks are then forced to expand their services at competitive prices, increasing access to finance as well as financial inclusion.

Existing theory makes contradictory predictions on the connection between the structure of the banking industry and financial access. The limitations of market power are discussed in general economic theory, which are that there are fewer loans at a greater cost. However, agency costs and information asymmetries may result in a positive or nonlinear connection between bank concentration and the ability of opaque borrowers to receive financing (Beck et al., 2004). SMEs may be particularly sensitive to fluctuations in the supply of loans and credit due to their opacity. Banks are therefore by far the main source of external funding when the capital markets in a country are barely developed and there are few corporate bond markets.

This study investigates the impact of bank competition of access to finance. It looks at businesses that choose to apply for a loan or new line of credit in the previous year as well as businesses that decided not to apply for a variety of reasons. For those that applied we will observe the number of loans approved vs loans rejected and for those that did not apply we will look at the different reasons behind opting to not apply. The reasons range from anticipation

of being turned down, to unfavourable collateral requirements to high interest rates. We will examine the level of concentration and bank market competitiveness of banks within the nation where we discover the surveyed companies rather than the actual banks that approved or denied these loans.

One problem that may arise is that the data on loan applications could be limited. It is for this reason that we do not only look at the loan applicants but also take into account those firms that were discouraged from applying. A poor proxy for credit constraints results from not representing the discouraged enterprises (Leon, 2015). According to research by Brown et al. (2011), the proportion of businesses that are deterred from applying is around twice as high as the proportion of businesses that applied but had their applications denied. This highlights the significance of including the discouraged borrowers(firms).

The debate on whether competition assists or impedes access to finance is still on going in economic literature. For recent studies in this area see for example Owen & Pereira (2018) who investigates how far financial institutions and systems stretch across country and find that industry concentration is closely related to more access to credit. Leon (2015) in his attempt to investigate the link between the two did not only find the nature of the relationship but also concluded that concentration probably is not a strong indicator of credit access. There is an extension by Bongomin et al (2017) that adds financial literacy in the conversation and how it can act as a moderator is the relationship between access to finance and competition. In the West African region, there are different factors influencing this relationship for example firm size and ownership for firm-level controls and legal rights and depth of credit information for country controls (Quartey, 2017), it would be interesting to observe if the variables that influence this link in West Africa would remain the same when observe the Sub-Saharan African region. Competition in the banking industry is frequently cited as a key factor affecting access to credit. According to (Ayalew & Xianzhi, 2019), bank competition makes credit restrictions worse. This is because it affects the financial system and the economy as a whole. Given the above, it therefore goes without saying that the level and impact of competition in the banking sector is crucial. Other things impacted by competition in the financial system include efficiency, quality of services provided as well as the standard of innovation of these services.

Studies have been conducted on banking competition in Africa. Fosu (2013) in his study finds the existence of monopolistic competition across African subregional markets, suggesting that

this is significant impact on the nature of competition in Africa may be due to structural reforms. Contrary to that Mlachila, Montfort et al. (2013) find that the banking sector in the SSA region is highly concentrated, even though there are little barriers to entry and exit indicated by foreign banks having dominant market share. Banking competition in the region has evolved (Moyo et al. 2014), thus it is worth investigating what the current state of banking competition in the region is and how that could potentially affect firm access to finance.

### ***Research question and objectives***

The main objective of this study is to examine the effect of banking industry competition on access to finance. More, specifically the study seeks to achieve the following objectives:

1. To investigate the impact of banking sector competition on firms' access to finance.
2. To investigate whether the relationship between banking competition and firms' access to finance differs across firm characteristics and institutional environments within countries.
3. To investigate and test whether the link between bank competitiveness and access to financing vary by firm size.

The following are the corresponding questions emanating from the above objectives:

1. What is the effect of banking sector competition on firms' access to finance?
2. Is the relationship between banking competition and firms' access to finance different across firm characteristics and institutional environments within countries?
3. Does the link between banking competitiveness and access to financing vary amongst small, medium, and big businesses?

Previous literature on this topic, for the most part, focused on the effect of the availability of finance on economic growth (Mazanai and Fatoki, 2012). The link between banking competition and efficiency is also widely studied (Mlambo & Ncube, 2011; Ayalew & Xianzhi, 2019; Kiemo & Kamau, 2021). There are not many studies that look at the relationship between bank competition and access to finance in the context of African countries and firms. Ayalew & Xianzhi (2019) is the only study we have found that looks at banking competition and access

to finance in Africa. This study makes use a bigger sample and panel data which is convenient and has limited statistical uncertainty.

### ***Significance and contribution***

The impact of bank competition on enterprises' access to credit is unclear from the theoretical literature. The market power hypothesis, on the one hand, contends that increased banking competition makes it easier for businesses to get financing. Conversely, the information hypothesis postulates that informational asymmetry leads to a nonlinear connection between market structure and credit availability. This study uses questionnaire information from the World Bank Enterprise Survey about the perception of financing obstacles by businesses as well as information on their loan applications and relate this data to the country's banking market competitive environment. It is important to control for the institutional environment as well as ownership structure, then, while controlling for other business characteristics, the study will assess how the bank market structure impacts enterprises of various sizes (Beck et al., 2004). The vast majority of empirical work on this topic has concentrated on specific nations, and this particular study will look into the various countries of Sub-Saharan Africa. The study makes use of cross-sectional data. Getting a snapshot will allow us to observe a wide range of variables at the same time, this will give us a comprehensive view of the behaviours and interactions between firms and banks at a point in time. This will also allow us to identify common trends.

There is significance in conducting this study, especially in Sub-Saharan Africa, because capital markets in the region are less developed, and the region is characterised by a more significant number of SMEs which are in need of external financing. Because capital markets in the region are still in their embryonic phases of development, firms mainly depend on banks for external access to finance. Since firms in the region rely mostly on banks for credit, competition within the banking industry might facilitate access to capital and effective resource allocation.

The focus of the research is focused on establishing a connection between banking sector competitiveness and access to financing, particularly in Sub-Saharan African nations. This region is the focus of the investigation due to the existence many notable issues in the continent on one end, but it also possesses excellent prospects. The continent still suffers from the effects of its past; as a result, it still experiences issues relating to lack of development and economic

growth. Poverty is to this day still prevalent; there are low rates of economic growth and development and high levels of inequality. There is still a lack of efficient and competent governance and institutional capacity. The continent also sees infrastructure development issues and poor investments and regulations. By making the Sub-Saharan Africa region the cornerstone of this research, we are using standardized data. The use of standardized data allows us to make interesting comparisons.

The conclusion on the status of the banking industry in the area remains uncertain, and this research provides new data to support this contention. According to Mlachila et al. (2013), the Sub-Saharan African banking system remains underdeveloped. Greater concentration exists within the industry, and it is not efficient when it comes to financial intermediation. Although the sector is characterized by low intermediation and although there are minimal barriers of entry and exit which can be seen through the high levels of market share in the hands of international banks; competition is still low. Given this information, access to finance in the region is low and results in low growth rates of businesses. This in turn affects economic growth in the continent.

Contrary to that, we have Bempong Nyantakyi and Mouhamadou Sy (2015) who argue that even though the banking sector in Africa is not so penetrated and relatively shallow, it is able to compete in the level of developed regions as well as other emerging regions. They say the continent has enhanced its financial sector innovation and development, and now and again has jumped in front of the other regions. As far as regulations are concerned, they say banks in Africa are well regulated and the level of competition as well as regulations on entry and exit are as good as those in the bigger and developed regions. Despite this, this continent has seen gigantic advancements in controlling for systemic crises in the region.

Lastly, this research employs four proxies to quantify banking competitiveness. The proxies are the concentration ratio, the H-statistic, the Lerner Index, and the Boone indicator. The study makes use of all four to avoid relying on one measurement which may produce misleading results. The concentration ratio is the proportion of a company's market share relative to the total market size. This method is critiqued on the grounds that the proxies used to calculate the concentration ratio are imprecise because they disregard the connection between market competitiveness and bank income (Beck, et al., 2004). The H-statistic derived from the Panzar and Rosse (1987) model is computed via reduced-form revenue models and assesses the sensitivity of total revenue to changes in factor input prices. This approach evaluates the degree

of how a change in factor input prices is represented in a bank's (equilibrium) revenues. This technique has the benefit of using bank-level data and allowing for bank-specific differences in output. Nevertheless, the model disregards variations in bank size, product, and regional differentiation (Bikker, et al., 2012). Recent publications contend that these findings are erroneous due to improper specification issues. Its claim that increases in input costs in imperfectly competitive marketplaces lead total revenue and marginal costs to move in opposite directions is only true if the industry in issue is in equilibrium, which is seldom the case in reality. The third approach is the Lerner Index developed by Lerner (1934). In addition, it is based on the theory of equilibrium firm models. It determines the price-to-cost margin. It emphasizes the pricing power that may be seen in the gap between price and marginal cost to demonstrate market power. Finally, there is the Boone indicator created by (Boone, 2008). It evaluates the level of competition as estimated by the marginal cost elasticity of profits. The indicator is based on the notion that more efficient banks generate more profits. Therefore, as the indicator becomes more negative, the level of competition increases (Boone, 2008).

## **2. LITERATURE REVIEW**

The literature review is made up two important sections: theoretical framework and empirical evidence sections. The theoretical framework section looks at the two theories that explain the link between bank competition and access to finance: the market power hypothesis and the information hypothesis.

### **(a) Theoretical Framework**

***Market Power Hypothesis*** - The market power hypothesis asserts that when there are high levels of market power or rather when the market is concentrated then access to finance is low. It argues that whenever there is competition in the sector, then cost of funds is decreased and the supply of credit rises. How the market power theory suggests that inadequate levels of competition would reduce access to financial resources is because in a relatively highly competitive sector, there is pressure that pushes for the individual banks to expand their services and be innovative, this then causes an increase in the availability of finance to even more firms (Love & Peria, 2015).

According to Beck et al. (2004), the market power argument is supported by the fact that bank concentration enhances the chance that enterprises perceive finance as a significant barrier to

expansion. Chong et al. (2013) endorse the market power approach, which asserts that credit availability is restrained in China's concentrated industries. A study conducted by Rakshit and Bardhan (2023) examining whether banking competition enhances or hinders firm's access to finance for firms in India found that competition in the banking sector actually enhances access to finance and positively influences firms' decision to apply for credit. However, the impact of banking competition is more enhanced for small and medium-sized enterprises than large businesses. Saeed and Sameer (2015) empirically examined how Pakistani firm investment is impacted by the impact of bank market concentration on financial constraints. Using a dynamic panel analysis, it was discovered that small and medium-sized businesses are financially constrained in the lending market. Their key findings imply that reducing bank concentration by increase banking competition eases financing constraints, and this benefit is especially evident for SMEs. This is in line with the market power hypothesis. Additionally, they show that more opaque firms are financially constrained and that the competition in the bank market is less favourable to the more opaque firms.

The market power concept asserts that within a competing financial system, banks with smaller profitability may strive to expand their reach, boost their levels of efficiency, while also becoming more client-driven (Boot & Thakor, 2000), hence increasing the availability of financing in the sector. Moreover, banks with market dominance in a competitive industry that are at fear of losing their market dominance may end up lending to even small loan applicants (Berger, et al., 2009). The loan portfolios that banks hold may decrease in quality but even if that is the case the outreach is stretched. When a market is more competitive, the monopoly rents are reduced and thus the exposure to risk for banks is lowered (Berger, Klapper, & Turk-Ariss, 2009). Bruhn and Love (2014) in their study on Mexico discovered that greater access to financial services enabled existing owners of informal businesses to keep running their businesses rather than shutting them down. This is in line with what other researchers like (McKenzie and Wooruff, 2008; De Mek, McKenzie, and Woodruff, 2008) found that microentrepreneurs have extremely high rates of return on capital and would thus profit from greater access to financing. In addition to this Bruhn and Love (2014) demonstrate that actual GDP per capita growth rates have likewise risen from an increase in banking competition through the entrance of a new bank player. Overall, their findings suggest that financial access can greatly lessen poverty.

The structure-performance hypothesis states that, according to standard economic theory, any divergence from perfect competition leads borrowers to have less access to credit at a greater

expense. Using an endogenous model of growth Pagano (1993) attributes the gap between loan and deposit rates to the "X-inefficiency and market power of the intermediaries." This is because resource absorption leads to a saving-to-investment ratio that is less than one. A monopoly banking market is more probable than a competitive banking market to result in credit rationing. Credit rationing reduces the rate of capital accumulation by lending institutions restricting the provision of new loans to borrowers who require funds at a defined quoted rate by the banking institution, this is demonstrated by Guzman (2000).

A couple of industrial literature shows that concentration classically means there is a reduction in competition, this leads to increased prices and output and the welfare of consumers are decreased. Because of deregulation, we have seen in more recent years that countries have experienced remarkable changes in bank competition (Vives, Competition policy in banking, 2011). Higher bank competition increases supply and consequently reduces fees paid. High competition also leads to a growth in the number of banking institutions and branches in the sector and ultimately drives industry participants to be efficient, improve the value and diversity of their products (Vives, 2016). All of these lead to an increase in access to finance.

***Information Hypothesis*** - On the contrary extreme, the information hypothesis puts forward that low competition promotes access to credit because banks are better able to internalize the investment in creating connections with borrowers. It contends that when confronted with asymmetric information and transaction cost, banks in a competitive banking industry struggle to internalize the cost of investing in developing connections with their borrowers. As a consequence of knowledge asymmetry between banks and their borrowers, there are adverse selection and moral hazard issues. For this reason, institutions are compelled to spend in tracking and acquiring consumers' private information. Therefore, banks with more market strength, i.e., less competitive pressures, are incentivized to spend in gathering information and establishing long-term lending relations with their customers. This is because they may internalise the expenses and, since the market is concentrated, there are less chances of borrowers switching to a different bank (Petersen & Rajan, 1995). Consequently, according to the information theory, market concentration increases access to financing, especially for opaque enterprises (Love & Peria, 2015).

The information hypothesis calls attention to the possibility that bank competition may not always support access to finance. Because of information asymmetries, there is a need for banks to screen if their loan applicants are worthy of being granted access to the finance they

need and that they are not risky. In a competitive banking environment, there is reduced motivation for banks to performing screening on their loan applicants using forecasts because there exist information asymmetries ( (Marquez, 2002); (Hauswald & Marquez, 2006)). Therefore, where market concentration is low (higher competition), the likelihood of banks granting loans to applicant is low which then affects access to finance (Pham, Nguyen, & Nguyen, 2018)

Exclusive information that banks acquire through the lending process can affect the industry. When an industry is open for competition, information relating to the borrower becomes even more scattered because each bank acquires some information about a certain small pool of borrowers. This leads to more low-quality borrowers being granted access to finance because inefficiencies were created due to the decreased ability of banks to screen their customers caused by the increase in bank competition.

Banks collect and screen information about their borrowers, separating the creditworthy to the noncreditworthy. This information is unique to the bank, and as a consequence, banks are able to collect rents from their current clients. Despite this, there is an increase in adverse selection and moral hazard as a result of bank competition, such that the borrower has more information about their prospects than the lender. This explains how more low-quality borrowers are granted access to finance when there is high bank competition (Marquez, 2002).

There exists the concept of sector specialisation. Where banks have to develop expensive expertise to allow themselves to acquire value from relationship loans. Typically, monopolists seize all the rents from the additional value loans add for borrowers. In the event that the market is open for new entrants to enter, marginal rents that were gained from the relationship lending are reduced and the returns from investing in sector specialisation are also reduced. The competition within the banking industry has an impact on both the relationship lending as well as transactional lending profit margins. Aiming at investing in relationship lending assists in part by cushioning banks from pure price competition, as a result, when a bank experiences increased competition from other banks, their profits from transactional lending are affected more than profits from relationship lending (Boot & Thakor, 2000).

Increased competition causes a decline in the motivation to acquire information about borrowers further leading to low rates and also more inefficient lending decisions. Banks opting to merger with other competitors is the best reaction to industry consolidation. Because of the information hypothesis the merger of two competing banks is good for the independent banks

because they are able to increase their market share from the merging banks (Hauswald & Marquez, 2006).

Tacneng (2014) supports the information hypothesis view by using a similar methodology as that of Beck et al. (2004) to analyse data from the Philippines and according to the findings of the study local banking market concentration is often associated with a rise in loan availability. Also compatible with the information concept are the findings of Gonzalez and Gonzalez (2008).

**(b) Empirical Evidence**

Mlambo & Ncube (2011) examine how competition and efficiency in the South African banking sector evolved in the years between 1999-2008 by looking at the bank level data. Their methodology consists of three steps: first, they determine the efficiency level in the banking industry using the data envelopment analysis method, then they use the well-known Panzar-Rosse method to determine the h-statistic, which reveals the nature of bank sector competition in the country and lastly re-estimating the Panzar and Rosse model by using the DEA scores as the x-variable to capture the effect of managerial ability on competition. They found that efficiency was increasing in the years, however, the number of efficient banks was decreasing. The h-statistic of 0.575 revealed that the South Africa banking market was characterised by monopolistic competition. The authors go on to mention that these results may be a reflection of the 5 large banks which accounted for 85% of the country's total banking assets. According to classical concentration measures, this should be a depiction of an oligopoly market, the author however does not delve into explaining this link that they have drawn.

Kiemo & Kamau (2021) similar to Mlambo & Ncube (2011) assess efficiency and competition dynamics in Kenya using firm-level data from 2001-2017. They adopt the methodology used by Mlambo & Ncube (2011) to use data envelopment analysis for efficiency, the h-statistic for competition and finally to investigate effect of efficiency on competition. Their results show an upward trend of efficiency that averaged around 69%, with an h-statistic of 0.59, the banking industry was characterized by monopolistic competition and conclude that managerial ability is an important factor in improving the country's level of banking sector competition.

Ayalew & Xianzhi (2019) investigate the effects of bank competition on credit availability limitations using firm-level data from 27 African nations. They use structural and non-structural variables to determine the degree of competitiveness in these nations. They discover that bank competition exacerbates credit/financing constraints, supporting the information

hypothesis. Even if their research demonstrates that banks competition exacerbates funding constraints, it has a significant statistical beneficial impact on enterprises' decisions to apply for new lines of credit and their demand for external finance.

This study will focus on the Sub-Saharan African region and the private sector in the continent is characterised by many SMEs Claessens & Tzioumis (2006). Focusing on nations in sub-Saharan Africa will enable us to employ a much more uniform group of countries that share similar features. Beck and Demirguc-Kunt (2006) report research on small and medium-sized firms' access to capital. Although there is little evidence to establish a direct relationship between SMEs and economic prosperity, there is sufficient information that growth constraints harm small enterprises compared to bigger firms and that SMEs have limited access to capital. This explains why SMEs do not contribute to growth as much.

### **3. RESEARCH METHODOLOGY**

#### ***Data***

The World Bank Enterprise Survey (WBES), BankFocus, World Governance Indicators, Doing Business database, and the World Bank's World Development Indicators are the primary data sources utilized in this study. The WBES provides firm-level data, BankFocus provides our primary bank competition indicators, and the World Development Index provides country-level data. To decide on which country to include in this study, I will adopt a method utilized by Ayalew and Xianzhi (2018) where at least one measure of competition should be available for each country for us to investigate the link.

The World Bank Enterprise Survey (WBES) consists of responses to firm surveys from about 180,000 businesses in 154 countries. It primarily focuses on variables that affect how businesses operate as well as variables that support or constrain businesses and are crucial for the growth of a nation. There are many questions in the survey about the commercial climate in which the businesses operate, including an evaluation of the challenges to business growth. Our study is based on survey responses indicating how much finance entrepreneurs believe is a barrier to firm growth.

Authors investigating the issues of access to finance have made use of the World Bank Enterprise Survey. Huang (2006) mentions that the WBES is beneficial in that it was the only dataset at the time that used the same survey tools for both nations the authors was

investigating. This characteristic of the survey enables us to make some-what systematic comparisons between countries. The survey gathers surveys from manufacturing and service companies across the globe including countries in the Sub-Saharan African region. Another important feature of the WBES is that it emphasises of entrepreneurial businesses. Other fundamental benefits of using the WBES which makes use of uniform survey tools and sampling techniques across nations are that measurement error is reduced and statistics that can be compared across economies are produced. This is crucial to understand how the business climate varies among nations and how it affects firm performance.

There may be concerns about a firm's response being impacted by the economic, institutional, and cultural atmosphere of the country when using data that businesses self-report, like the WBES. Additionally, there is proof that the survey responses accurately reflect the financing challenges. Using instrumental factors to correct for endogeneity, Beck et al. (2001a) show that even after controlling for a number of company and country characteristics, the reported firm financing constraints are substantially, negatively related to firm growth. Hellman et al. (2000) demonstrate the close relationship between the survey replies and quantifiable results in a subsample of 20 nations. The survey responses do not appear to be systematically biased.

Credit shortages are caused by an imbalance between the availability and demand of credit at the time. Credit can be evaluated in a number of ways, such as the likelihood of asking for a loan (Cavalluzzo et al., 2002), the availability of bank funding (Beck et al., 2007), the difficulty of obtaining financing (Beck et al., 2004), or credit restrictions (Popov and Udell, 2012). The main empirical model for this investigation adopts the approaches of Beck et al. (2004) and Popov and Udell (2012).

We use survey data to ascertain how much financing is perceived by entrepreneurs as a barrier to firm growth, following Beck et al. (2004). The survey question k30, "How much of a barrier is access to finance?" will be the one we use. We shall refer to this categorical variable as finance obstacle. Those who were surveyed were given 5 categories of possible answers to choose from, namely: no obstacle, minor obstacle, moderate obstacle, major obstacle, and very severe obstacle. In order to simplify the analysis, we will merge firms that have cited financing obstacles as a major obstacle and very severe obstacle into one group called the major obstacle and will be represented as category 4. Therefore, the categories will be as follows; 1- no obstacle, 2 – minor obstacle, 3 – moderate obstacle and 4 – major obstacle. More than 75% of companies claimed that lack of access to capital was a barrier to their expansion. Only 22.83%

of companies claimed that financing was not a barrier to expansion. 35.82% of businesses reported that finance was a major obstacle to the expansion of their company, a higher percentage than the 22.83% of businesses who did not. We examine how frequently organizations responded to questions about their credit histories in the year before to the survey in order to identify businesses that had credit constraints.

**Table 1:** Financing Obstacles for Firms in SSA

Financing Obstacle	Freq	Percent	Cum
No obstacle	3182	22.83	22.83
Minor Obstacle	2874	20.62	43.46
Moderate Obstacle	2888	20.71	64.18
Major Obstacle	4991	35.82	100.00
Total	13208	100.00	

Source: Own calculations from WBES

The firm's financing application is the subject of the first query. It is critical to distinguish between companies that did not apply because they were discouraged and those who did not apply because they did not need it. Therefore, the question asked was “In the last fiscal year, did establishment apply for new loans/line of credit?” Thus, only 15.81% of businesses requested additional loans or lines of credit during the previous fiscal year, while 84.19% opted not to. Question k17, "Main reason for not applying for new loans or new lines of credit," was used to find out why businesses didn't submit any new loan or line applications during the most recent fiscal period. According to the data collected, 52.19% of the businesses who did not apply for a new loan or line of credit did so for a variety of reasons, with 47.81% of them doing so because they did not need one and had enough money. Companies that stated a different justification than the fact that they did not require a fresh loan are regarded as discouraged firms. We get at 8073 firms (56.56%) of firms that require external financing when we combine the 2256 firms that applied for a fresh loan and the 5817 firms that were deterred from applying. Banks rejected about 13.49% of the loan applications. On the day of the interview, those applicants whose applications had either been withdrawn or were still being reviewed were neither accepted nor rejected. Using the Popov and Udell (2012) methodology, we have classified firms as credit constrained if they were deterred from requesting a loan or were denied when they did. The metric enables us to recognise businesses who have formally expressed a need for funding that has not been met by supply (Leon, 2015).

Table 2 below illustrates notable country-to-country variations in credit availability and approval rates in Sub-Saharan Africa. More than 50% of businesses in Ghana, Rwanda, Sierra Leone, Tanzania, Zambia, and Zimbabwe are credit constrained. Less than 30% of businesses

in Botswana, Lesotho, and South Africa, on the other hand, are credit constrained. The majority of businesses in Burkina Faso consider access to financing to be a moderate to major obstacle to their ability to grow with average being 3.61 while South African firms rate access to finance as no to minor obstacle to firm growth and have the lowest rate being 1.72. Majority of the firms in the SSA region rate financing obstacles at more than 2.5 which indicates that businesses subjectively find that access to finance impedes their growth one way or another.

**Table 2:** Access to finance variables for firms in SSA

Country	Credit Constraint	Financing Obstacle	Firms Applied	Firms Need	Discouraged Firms	No. of Firms
Angola	0.39	3.21	0.11	0.49	0.38	360
Benin	0.35	2.65	0.31	0.65	0.34	150
Botswana	0.21	2.39	0.24	0.45	0.21	268
Burkina Faso	0.47	3.61	0.34	0.80	0.46	394
Cameroon	0.39	2.91	0.18	0.56	0.37	361
Cape Verde	0.30	2.81	0.31	0.61	0.30	156
Chad	0.40	2.59	0.039	0.44	0.39	153
Cote d'Ivoire	0.46	3.24	0.21	0.64	0.42	361
DRC	0.49	2.77	0.17	0.60	0.43	529
Ethiopia	0.46	2.43	0.29	0.73	0.44	848
Ghana	0.56	3.28	0.23	0.76	0.53	720
Kenya	0.30	2.46	0.24	0.53	0.29	1001
Lesotho	0.28	3.02	0.28	0.55	0.27	150
Liberia	0.46	2.76	0.19	0.64	0.45	151
Malawi	0.45	2.75	0.27	0.66	0.38	523
Mali	0.37	3.21	0.31	0.64	0.33	185
Niger	0.32	2.41	0.23	0.54	0.32	151
Nigeria	0.42	2.48	0.05	0.47	0.42	2676
Rwanda	0.50	1.99	0.19	0.67	0.48	360
Senegal	0.46	3.18	0.15	0.61	0.46	601
Sierra Leone	0.57	3.27	0.19	0.72	0.53	152
South Africa	0.13	1.72	0.03	0.16	0.13	1097
Tanzania	0.55	3.12	0.12	0.67	0.54	813
Togo	0.33	2.93	0.37	0.68	0.31	150
Uganda	0.44	2.67	0.08	0.52	0.44	762
Zambia	0.55	2.76	0.11	0.64	0.53	601
Zimbabwe	0.66	3.07	0.15	0.77	0.62	600
<b>SSA</b>	<b>0.42</b>	<b>2.70</b>	<b>0.16</b>	<b>0.57</b>	<b>0.41</b>	<b>14 273</b>

Source: Own calculations from the WBES

In comparison to the other countries, South African firms are substantially less discouraged as borrowers. Our sample suggests financing is a significant obstacle to expansion. In general, more than 55% of firms in the Sub-Saharan African region require financing, but only 15.81%

of them actually request for loans due to discouragement. More than 40% of firms in the region lack access to bank loans.

According to the dataset's breakdown by firm size, small businesses make up the majority of the sample, accounting for 8276 (57.98%) of the surveyed firms, followed by medium-sized firms which are 4232 (29.65%) and lastly the large businesses which account for about 1765 (12.3%) of the entire sample. From the interview data, we find that the average age of the firms is 24 years, the median age is 21 years, minimum age 2 years and maximum age 222 years.

**Table 4: Summary Statistics**

Variable	Obs	Mean	Std. Dev.	Min	Max
Dependent variable					
Credit constraint	14273	.424	.494	0	1
Finance obstacle	13935	2.695	1.177	1	4
Firms Applied	14273	.158	.365	0	1
Firms Needing Loans	14273	.566	.496	0	1
Firms Accepted	1705	.865	.342	0	1
Firm-level control variables					
Size	13954	66.075	475.682	.333	45000
Age	13653	17.748	14.688	1	153
Experience	13750	15.366	10.073	0	60
Manufacturing	14273	.436	.496	0	1
Service	14273	.368	.482	0	1
Subsidiary	14273	.202	.402	0	1
Publically listed	14273	.057	.231	0	1
Privately held	14273	.183	.387	0	1
Large owner share	14273	.831	.281	0	1
Domestic	14273	.821	.384	0	1
Foreign	14273	.15	.357	0	1
Audited	14273	.453	.498	0	1
Female	14273	.154	.361	0	1
Competition independent variable					
Boone Indicator	26	-.093	.159	-.832	.042
CR3	27	.671	.161	.356	1
Hstatistics	25	.189	.316	-.405	.654
Lerner Index	18	.287	.094	.157	.528
Country-level control variables					
Institutional development	28	-.568	.521	-1.592	.638
Credit Information	27	4.815	3.53	0	8
Legal rights	27	6.481	2.833	1	11
Private credit	26	20.862	14.914	5.61	63
GDP per capita	27	3623.112	3293.908	873.391	13884.478
GDP per capita growth	27	1.696	1.663	-2.087	6.161
Inflation	27	8.895	14.569	.873	77.52

Source: Own calculations from WBES, BankFocus, World Governance Indicators, Doing Business and World Bank World Development Indicators

In order to account for apparent firm-level variability, the study takes into account factors including age, size, top manager experience, and the proportion of assets controlled by large owners. There are dummy variables that indicate if the company is a manufacturer, a service

provider, a subsidiary of another large company or firms, publicly listed, privately held, domestically owned, foreign owned, and an exporter. The study also includes a dummy variable audited to capture variance in accounting standards.

By using the dummy variable 1 for female managers and 0 otherwise, we can control for the gender effect. We incorporate additional country-level factors to evaluate the strength of the relationship between market structure, firm access to external funding, and growth. Since businesses in nations with faster economic growth are anticipated to grow quicker and encounter fewer impediments, we include the GDP per capita growth rate. We assume that businesses in more stable monetary settings have fewer challenges and use the inflation rate as a proxy for monetary instability. Additionally, factors like the strength of legal protections are taken into consideration when deciding a firm's access to credit across various countries and thus included in this study. Controlling for the degree of a country's institutional development is essential when examining the impact of banking competition on the availability of loans for businesses.

As a result, we include institutional development, a summary variable from Kauhmann, Kraay, and Zoido-Lobaton (1999) that averages accountability, rule of law, political stability, regulatory quality governmental efficacy, and corruption management. We included them in the analysis since the extent of credit information and the standard of legal protections can differ between nations when deciding a firm's access to credit. We consider the percentage of claims made by financial institutions to the private sector in GDP as a measure of financial intermediary development private credit. Most of these variables are also used by Love and Martinez Peria (2015) and Beck et al. (2004).

Table 5 in the appendix is a correlation matrix. Several country-level factors have strong correlations with one another. This emphasizing how crucial it is to account for these national factors when evaluating how bank competition affects access to financing.

### **Empirical Approach**

This study investigates the relationship between banking sector competition and access to finance by firms in SSA. It specifically looked at how banking rivalry affects financial access. It is imperative for us to choose an appropriate proxy for competition to get the best results. Unlike previous empirical studies which mostly utilised one measure of competition, this study uses four proxies of bank competition: the Concentration Ratio, H-statistic, Lerner Index and the Boone Indicator.

It is important to remember that whereas concentration measures market structure, competition measures market behavior. Depending on how the institutional development within that specific sector appears, a market might be both concentrated and competitive at the same time.

It is essential to select the appropriate proxy of bank competition. Studies that employ bank market concentration as a stand-in for competition have identified a number of significant issues. Numerous contributions have questioned the consistency and robustness of the structural approach as a valid indicator of banking competitiveness (Degryse et al., 2009). Theoretical and empirical studies clearly demonstrate that relying on a single measure of competition and market power may not be adequate and may even be rather deceptive. This is because each measure of bank competition has its own weaknesses and strengths. Hence in order to quantify banking market competition, the study examined four different proxies.

**Concentration Ratio** - The concentration ratio is calculated using balance sheet data for banks. It is calculated using the following equation:

$$CR_{kt} = \sum_{i=1}^n S_i$$

Where:  $S_i$  = each of the bank's share in the total assets of the banking industry

A greater concentration ratio value indicates that a small number of banks have monopoly power in the industry. The limitation of this ratio is that concentration does not always mean less competitive conduct.

**Panzar and Rosse H-statistic** - The second strategy was created by (Panzar & Rosse, 1987). This method of measuring competitiveness is based on a revenue equation in reduced form (Barros & Mendes, 2016). This model has variations for each bank. The h-statistic is used to quantify competition. The elasticities of revenue with regard to input prices are added to obtain the h-statistic. The model comes from:

$$\ln(\text{Revenue}_{it}) = \alpha + \sum_{l=1}^n (\beta_l \ln(Wl_{,it})) + \sum_{k=1}^n (\gamma_k Pk_{,it}) + \mu_i + \varepsilon_{it}$$

Where:

Revenue = total revenue from bank i in period t

Wl,it = the three inputs (labour, capital and fund)

Pk = firm-specific control variables

$\mu$  and  $\varepsilon$  = bank fixed effects and error term respectively

Therefore, the h-statistic is given by:

$$H - statistic = \sum_{l=1}^n \beta l$$

The idea of the H-statistic as an efficient measure of market power has been questioned. (Sanchez-Cartas, 2020) test the effectiveness of this measure and conclude that although it may correctly fit other models, this will not always be the case because the H-statistic is a marginal revenue pass-through rate, and this limits its ability to correctly measure and represent competition.

**Lerner Index** - The Lerner Index is a measurement of a company's market power based on a relative price markup above marginal cost (Lerner, 1995) It shows how firms differ in behaviour from monopoly and perfect competition. It is calculated as follows:

$$L_i = \frac{P - MC}{P}$$

Where:

P - price of output

MC – marginal costs

$L_i$  = the value of the Lerner Index for bank i

The Lerner Index will lie between 0 and 1. If the Lerner Index is 0 then that means there is perfectly competitive behaviour and no market power by a firm. The more the monopoly power, the more a corporation may charge above its marginal cost, the higher the value of the Lerner Index. The Lerner Index is almost 0 in areas of the banking sector where there is intense competition.

**Boone Indicator** - The Boone indicator measures the level of competitiveness in the banking industry based on profit efficiency, which is determined by the elasticity of earnings to marginal costs. It can be calculated as follows:

$$\ln(ROA_{it}) = \alpha + \beta_1 \ln(MC_i) + \varepsilon_i$$

Where:

$\beta_1$  – Boone indicator

ROA - Return on Assets

MC Marginal Costs

$\varepsilon$  - Error term

An increase in the Boone Indicator signals a decline in banking industry competition. The level of competition in the industry is inversely correlated with the Boone Indicator's negativity.

### **Empirical Model Specification**

The study's goal is to investigate the impact of bank competition on businesses' access to credit in SSA. A binary model is preferable to a linear one given the dependent variable's binary character. The binary baseline model this study adopts is a probit model. The probit model shows the impact of each of the independent variables on the likelihood of witnessing a specific result. The ability of the probit model to capture non-linear relationships between the predictor and the predicted variables allows for more accurate predictions. They are robust to violations such as heteroscedasticity and non-normality of error terms:

The baseline model for this research will be:

$$\text{Access to Finance} = f(\text{bank competition, control variables})$$

The dependent variable takes on a binary form. In order to explore the impact of competition on enterprises' access to funding, I shall employ a binary model. The model specification is given by:

$$\Pr(\text{Access}_{ij} = 1) = \Phi(\alpha + \beta \text{competition} + \theta \text{firm}_{ij} + \lambda c_j)$$

Where:

*Access* is a dummy variable taking a value of 1 if firm *i* in country *j* has access to finance and 0 otherwise.

*firm* is a vector for firm-specific control variables, and *c* is a vector of country level control variables.

The parameter  $\beta$  is our parameter of interest. There will be different  $\beta$ s for the different models:

For CR3: a positive  $\beta$  tells us that increased competition increases access to finance. If  $\beta$  negative, then this tells us that increased competition reduces access to finance.

For H-stat: a positive  $\beta$  tells us that increased competition decreased access to finance. If  $\beta$  negative, then this tells us that increased competition increases access to finance.

For Lerner index: a positive  $\beta$  tells us that increased competition increases access to finance. If  $\beta$  negative, then this tells us that increased competition reduces access to finance.

For Boone indicator: a positive  $\beta$  tells us that increased competition decreased access to finance. If  $\beta$  negative, then this tells us that increased competition increases access to finance.

To take firm-level heterogeneity into account, whether the company is manufacturing, retail, or service is captured by a dummy variable in the study. Other dummy variables also capture the following aspects: whether the company is privately held, publicly traded, or foreign owned; gender-related impacts. The size of the firm and the age of the firm are additional firm characteristics that are covered in this study.

Control variables will include variables at a country level that are relevant to banking competition and credit accessibility. The level of overall economic progress is captured by the log of real GDP per capita. The rate of inflation and real GDP growth reflect macroeconomic conditions.

#### **4. RESULTS**

The study investigates the link between competition in banking and access to finance. This section presents the results of the probit model. Access to finance is represented by two variables, the one being credit constraints and the other being financing obstacles. Table 7 presents the results of the link between banking competition and credit constraints. Credit constraints takes on the value of 1 if a loan application for a particular firm is rejected and when a firm has stated any other reason besides not needing a new loan on the reasons for not applying for new line of credit, these are the firms we describe as discouraged and 0 otherwise. The second column presents the results of the main empirical model with CR3 as the measure of competition. The third column shows the results of the main empirical model with the H-statistic as a measure of competition. The fourth and fifth columns present the results of the

main empirical model with the Lerner index and Boone indicator as measures of competition respectively.

The coefficient of CR3 is negatively statistically significant at 5%. This means that an increase in the concentration in the banking market decreases credit constraints and that a decrease in competition reduces credit constraints. This implies that banking competition increases credit constraints and thus decreases access to finance. This is in line with the information hypothesis. The H-statistic is negatively statistically significant at 5%. This shows that an increase in the H-statistic decreases credit constraints therefore more competition decreases credit constraints implying that banking competition is positively related with access to finance and this is in line with the market power hypothesis. The Lerner index is positively statistically significant at 5%. This means that an increase in the Lerner increases credit constraints, meaning access to finance decreases. However, since a higher lerner index symbolizes lesser competition, therefore less competition decreases access to finance and higher competition increases access to finance. Therefore, the results are in line with the market power hypothesis. The Boone indicator is positively statistically significant at 10%. Meaning, an increase in the Boone indicator increases credit constraints. An increase in the Boone indicator, represented a least negative value implies a decrease in competitive conduct and increase in credit constraints imply decreasing access to finance. Therefore, according to the results of the empirical model that utilizes the Boone indicator banking competition has a positive effect on access to finance and this is in line with the market power hypothesis.

In addition to the main relationship discussed above we also look at the impact of a number of control variables, both at firm and country level. The manufacturing sector is positively statistically significant at 1% for all the models as shown in the columns. This implies that firms in the manufacturing sector experience more credit constraints and less access to finance. Publically listed firms are statistically significant at 5% for the CR3 model and 1% for the model with the H-statistic, Lerner index and Boone indicator. This means that publically listed firms experience less credit constraints and in turn have more access to finance in all models. Subsidiary is statistically significant at 5% for all the models. This implies that firms that are subsidiaries experience less credit constraints and more access to finance. This proves that subsidiaries of larger companies typically have access to additional funding sources by virtue of them being subsidiaries and are less prone to experience credit or financial constraints. Experience is negatively statistically significant at 1% meaning that firms with more experienced managers experience less credit constraints and more access to finance. The log

of the age of the establishment is also negatively statistically significant at 5% meaning that older firms experience less credit constraints and more access to finance. The same goes for audited firms. In the results we also see that small and medium sized firms face greater credit constraints. These are the firms that are considered as being the drivers of economic growth in SSA. The coefficient is negatively statistically significant coefficient at 1%, implying that with an increase in the firm size the credit constraints are lower and there is more access to finance.

**Table 7: Bank Competition and Credit Constraints**

Credit Constraints	CR3	H-statistic	Lerner.	Boone.
Banking competition	-.35** (.141)	-.127** (.056)	.965*** (.216)	.134* (.075)
Domestic	.062 (.086)	.092 (.089)	.054 (.096)	.062 (.086)
Exporter	-.075* (.04)	-.076* (.04)	-.07 (.045)	-.072* (.04)
Female manager	-.038 (.034)	-.033 (.034)	-.005 (.038)	-.047 (.034)
Foreign	.03 (.09)	.056 (.094)	.03 (.102)	.032 (.091)
Manufacturing	.114*** (.033)	.119*** (.033)	.121*** (.037)	.12*** (.033)
Privately held	-.047 (.037)	-.08** (.038)	.009 (.043)	-.057 (.037)
Publically listed	-.144** (.057)	-.195*** (.058)	-.256*** (.068)	-.178*** (.057)
Service	-.027 (.033)	-.033 (.034)	-.008 (.037)	-.025 (.033)
Subsidiary	-.097*** (.031)	-.103*** (.032)	-.094*** (.035)	-.098*** (.032)
Experience	-.013*** (.003)	-.012*** (.003)	-.012*** (.003)	-.013*** (.003)
lnAge	-.043** (.018)	-.042** (.019)	-.045** (.021)	-.046** (.018)
lnExperience	.201*** (.037)	.194*** (.037)	.185*** (.041)	.201*** (.037)
Insize	-.153*** (.012)	-.154*** (.012)	-.152*** (.013)	-.153*** (.012)
Audited	-.194*** (.026)	-.185*** (.027)	-.212*** (.03)	-.194*** (.027)
Credit information	-.002 (.006)	.001 (.006)	.019** (.008)	.001 (.006)
Legal rights	-.009 (.006)	-.007 (.006)	-.018** (.008)	-.005 (.007)
Private credit	-.013*** (.001)	-.015*** (.001)	-.022*** (.002)	-.016*** (.001)
lnGDPpc	-.133*** (.041)	-.083*** (.031)	-.051 (.042)	-.019 (.039)
GDPpc growth	.049*** (.018)	.063*** (.014)	.031* (.017)	.078*** (.013)
Inflation	.015*** (.001)	.015*** (.001)	-.006 (.005)	.014*** (.001)
Institutional development	.212*** (.039)	.165*** (.036)	.15*** (.042)	.13*** (.042)
Constant	1.638*** (.427)	1.00*** (.279)	.81** (.363)	.449 (.336)
Pseudo r-squared	0.081	0.082	0.084	0.081

Prob > chi2	0.000	0.000	0.000	0.000
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Notes: \*, \*\*, and \*\*\* stand for 10%, 5% and 1% levels of significance. Standard errors are in brackets.

On country-level variables, private credit is negatively statistically significant at 5%. This indicates that firms that receive financial resources by domestic banks are less like to have credit constraints and have more access to credit. Institutional development is positively statistically significant at 1% and this means that the higher the institutional development the higher the credit constraints and the lower access to finance is. When institutions are developed, sectors are heavily guarded and highly regulated and the increase of regulations especially where banks are concerned could lead to banks' lending out less due to the nature of the banking business.

In the short-term, this could make acquiring credit more difficult for firms. GDP per capita growth is negatively statistically significant at 10% for the model with the Lerner index and negatively statistically significant at 1% for the models with CR3, H-statistic and Boone indicator. This means that an increase in the GDP per capita of the country decrease credit constraints thus increasing access to finance.

Table 8 presents the results of the link between banking competition and finance obstacles. Finance obstacles takes on the value of 1 if a firm has cited access to finance as a minor, moderate and major obstacle, and 0 if a firm has responded that access to finance is not an obstacle. The second column presents the results of the main empirical model with CR3 as the measure of competition. The third column shows the results of the main empirical model with the H-statistic as a measure of competition. The fourth and fifth columns present the results of the main empirical model with the Lerner index and Boone indicator as measures of competition respectively.

The coefficient of CR3 is negatively statistically significant at 1%. Therefore, an increase in concentration leads to a decrease in financing obstacles and this means that a decrease in concentration which imply competitive conduct leads to a decrease in finance obstacles implying improved access to finance. Thus, competition is positively related to access to finance, and this is in line with the market hypothesis. The H-statistic is positively statistically significant at 1%. An increase in the H-statistic leads to an increase in finance obstacles. A higher h-statistic indicates more competition therefore the results show us that increased competition leads to decreased access to finance, and this is in line with the information hypothesis. The Lerner index is positively statistically significant at 1%. An increase in the

Lerner index leads to an increase in finance obstacle. Because a higher Lerner index implies less competitive conduct, therefore a competition leads to more access to finance which is in line with the market power hypothesis.

**Table 8:** Bank competition and finance obstacles

Finance obstacles	CR3	H-stat	Lerner index	Boone indicator
Bank competition	-1.542*** (.153)	.227*** (.06)	2.795*** (.286)	.132* (.08)
lnAge	-.03 (.02)	-.034* (.021)	-.055** (.024)	-.033 (.02)
Audited	.228*** (.03)	.244*** (.031)	.221*** (.035)	.246*** (.031)
Domestic	.237** (.097)	.356*** (.099)	.225** (.107)	.285*** (.097)
Exporter	.066 (.044)	.05 (.044)	.029 (.049)	.059 (.044)
Female manager	-.043 (.036)	-.047 (.037)	-.044 (.042)	-.064* (.036)
Foreign	.022 (.101)	.125 (.104)	.012 (.112)	.067 (.101)
Large owner share	-.177*** (.06)	-.247*** (.06)	-.043 (.069)	-.243*** (.06)
Manufacturing	.092** (.038)	.081** (.038)	.052 (.043)	.107*** (.038)
Privately held	-.156*** (.04)	-.183*** (.041)	-.067 (.049)	-.218*** (.04)
Publically listed	-.035 (.064)	-.107* (.064)	-.153** (.076)	-.16** (.063)
Service	-.002 (.038)	-.019 (.038)	-.03 (.043)	-.009 (.038)
lnExperience	.073*** (.02)	.08*** (.02)	.073*** (.022)	.067*** (.02)
lnSize	-.123*** (.013)	-.121*** (.013)	-.124*** (.014)	-.122*** (.013)
Subsidiary	-.006 (.035)	-.024 (.035)	.001 (.039)	-.019 (.035)
Credit information	-.026*** (.007)	-.031*** (.008)	.003 (.01)	-.02*** (.008)
Institutional development	.294*** (.045)	.114*** (.043)	.008 (.05)	.054 (.049)
Legal rights	-.092*** (.007)	-.081*** (.007)	-.091*** (.011)	-.078*** (.007)
GDPpc growth	-.079*** (.02)	.066*** (.017)	-.013 (.024)	.052*** (.016)
Inflation	.015*** (.001)	.009*** (.001)	-.015** (.006)	.011*** (.001)
Private credit	-.013*** (.002)	-.017*** (.001)	-.025*** (.002)	-.019*** (.001)
lnGDPpc	-.329*** (.047)	-.019 (.038)	-.014 (.053)	.014 (.044)
Constant	5.791*** (.476)	2.011*** (.333)	1.654*** (.454)	1.828*** (.371)
Pseudo r-squared	0.096	0.093	0.119	0.090
Prob > chi2	0.000	0.000	0.000	0.000

Notes: \*, \*\*, and \*\*\* stand for 10%, 5% and 1% levels of significance. Standard errors are in brackets.

The Boone indicator is positively statistically significant at 10%. An increase in the Boone indicator leads to an increase in financing obstacles. The higher the Boone indicator is the less competition there is, therefore, competition leads to more access to finance, and this aligns with the market power hypothesis. In addition to the main relationship discussed above we also look at the impact of a number of control variables, both at firm and country level. The manufacturing sector is positively statistically significant at 5% for the CR3 and H-statistic mode and positively statistically significant at 1% for the Boone indicator model as shown in the columns. This implies that firms in the manufacturing sector experience more financing obstacles and less access to finance. Domestic is statistically significant at 5% for the CR3 and Lerner index model and positively statistically significant at 1% for the H-statistic and Boone indicator model. This shows that domestic firms are more likely to experience financing obstacles due to not having access to external finance like a foreign owned firm would.

The log of the size of the establishment is also negatively statistically significant at 1% meaning that older firms experience less financing obstacles and more access to finance. In the results we also see that small and medium sized firms face greater financing obstacles. These are the firms that are considered as being the drivers of economic growth in SSA. The coefficient is negatively statistically significant coefficient at 1%, implying that with an increase in the firm size the credit constraints are lower and there is more access to finance. Legal rights is negatively statistically significant at 1%. This means that the greater the legal rights at a country level the less financing obstacles reported by the firm, therefore meaning that there is more access to finance. Inflation is positively statistically significant at 1%. This means that the greater the inflation in the country the greater the financing obstacles firms face and the lesser the access to finance. Private credit is negatively statistically significant at 1%. This indicates that firms that receive financial resources by domestic banks are less like to have financing obstacles and have more access to credit.

## **5. CONCLUSION**

This study sought to investigate the link between banking competition and access to finance. A probit model was used for the main empirical model due to the binary character of our dependent variable. One of the qualifying properties for which SSA country to include in this study was that it had to have at least one measure of competition between the four, namely: CR3, Lerner index, H-statistic and Boone indicator. Therefore, 27 countries qualified for the

investigations and there are a total of 14,273 observations. Access to finance was represented by two variables. Firstly, credit constraints which incorporates the number of firms whose loans were rejected and the discouraged firms. Lastly, finance obstacles which observes firms which have cited finance as a minor, moderate or major obstacles.

Running the model (with the different measures of competition) against the first dependent variables we find that the coefficient of CR3 is negatively statistically significant at 5% supporting the information hypothesis, the H-statistic is negatively statistically significant at 5% supporting market power hypothesis, the Lerner index is positively statistically significant at 1% supporting the market power hypothesis and lastly, the Boone indicator is positively statistically significant at 10% supporting the market power hypothesis.

Using the second dependent variables which is finance obstacles, the results show that the coefficient of CR3 is negatively statistically significant at 1% supporting the market power hypothesis. The H-statistic is positively statistically significant at 1% supporting the market power hypothesis. The Lerner index is positively statistically significant at 1% supporting the market power hypothesis. The Boone indicator is positively statistically significant at 10%. Supporting market power hypothesis.

Overall, eight models are run, four for each of the two proxies of access to finance and six out of eight of the models support market power hypothesis. Additionally, with credit constraints as a dependent variable, the model which utilized CR3 as a measure of competition is the one that differed to the rest supporting the information hypothesis while on the model with finance obstacles as a dependent variable the model that used the H-statistic as a measure of competition differed to the rest by supporting the information hypothesis. Given that both the former and latter measures of competition have received critiques as effective measures of competition and that this study was run to ensure that results are not misleading, we are inclined to conclude that the relationship between bank competition and access to finance is in line with the market power hypothesis.

Government ought to protect bank competition without impeding efforts to strengthen banks in order to make it easier for SMEs to receive financing. Regulators need to recognize and keep an eye on banks that hardly contribute to fostering competition in the banking sector. In order to promote competition in the financial system, regulators should also identify and keep an eye on the financial institutions making a small contribution towards the economy. The study suggest that policymakers consider measures to de-concentrate the banking industry, thereby

expanding access to finance in countries within the region, in order to support growth. To ensure that the benefits of competition are internalized within the productive sectors of the economies, policies supporting not only a more competitive banking environment but also those ensuring that credits are directed at the right sectors of the respective economies should be pursued.

## APPENDIX

Table 3: Variable descriptions

Credit constraint	Firms whose loans have been rejected and discouraged firms
Finance obstacle	Firms who have rated access to finance as a minor, moderate, and major obstacle
Firms needing loan	Firms who have applied for loans and discouraged firms
Age	Age of the establishment
Female	Firms with female top managers
Institutional development	a summary variable from Kaufmann, Kraay, and Zoido-Lobaton (1999) that averages accountability, rule of law, political stability, regulatory quality governmental efficacy, and corruption management
Credit information	Depth of credit information index
Legal rights	Strength of legal rights
Experience	Years of industry experience of the top manager
GDPpc	GDP per capita
GDPpc growth	GDP per capita growth

**Table 10:** Country-level variables correlation

Variables	Credit information	Institutional development	Legal rights	Private credit	GDPpc	GDPpc growth	Inflation
Credit information	1.000						
Institutional development	0.233***	1.000					
Legal rights	0.516***	-0.224***	1.000				
Private credit	0.133***	0.505***	-0.181***	1.000			
GDPpc	0.263***	0.512***	-0.201***	0.706	1.000		
GDPpc growth	-0.182***	-0.099***	-0.001	-0.184***	-0.510***	1.000	
Inflation	0.061***	-0.362***	0.329***	0.152***	-0.128***	0.261***	1.000

Source: own calculations from WBES

**Table 9:** Firm-level variables correlation

Variables	Domestic	Foreign	Manufacturing	Service	Size	Subsidiary	Publically-listed	Privately held	Large owner share	Experience	Female manager	Exporter	Audited
Domestic	1.000												
Foreign	-0.898 ***	1.000											
Manufacturing	-0.041 ***	0.035 ***	1.000										
Service	0.011 ***	-0.009 ***	-0.671 ***	1.000									
Size	-0.085 ***	0.092 ***	0.033 ***	-0.004	1.000								
Subsidiary	-0.170 ***	0.156 ***	-0.029 ***	0.025 ***	0.080 ***	1.000							
Publically listed	-0.186 ***	0.181 ***	-0.001 ***	0.019 **	0.070 ***	0.132 ***	1.000						
Privately held	-0.047 ***	0.053 ***	-0.025 ***	0.042 ***	0.022 ***	0.058 ***	-0.116 ***	1.000					
Large owner share	0.333 ***	-0.246 ***	-0.023 ***	-0.023 ***	-0.068 ***	-0.183 ***	-0.222 ***	0.146 ***	1.000				
Experience	-0.031 ***	0.049 ***	0.069 ***	-0.025 ***	0.055 ***	0.029	0.067 ***	0.057 ***	-0.058 ***	1.000			
Female manager	0.069 ***	-0.064 ***	-0.076 ***	0.012	-0.028 ***	-0.028 ***	-0.055 ***	0.090 ***	0.055 ***	-0.090 ***	1.000		
Exporter	-0.195 ***	0.215 ***	0.102 ***	-0.050 ***	0.068 ***	0.065 ***	0.095 ***	0.043 ***	-0.112 ***	0.027 ***	-0.031 ***	1.000	
Audited	-0.152 ***	0.176 ***	-0.027 ***	0.060 ***	0.081 ***	0.140 ***	0.109 ***	0.104 ***	-0.235 ***	0.119 ***	-0.030 ***	0.090***	1.000

Source: own calculations from WBES

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