KADIR HAS UNIVERSITY
SCHOOL OF GRADUATE STUDIES
DEPARTMENT OF ADMINISTRATIVE SCIENCES

ACCESS TO FINANCE AND FIRM PERFORMANCE IN AFRICA

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Ph.D. THESIS IN BANKING & FINANCE

ISTANBUL, JULY, 2022

ACCESS TO FINANCE AND FIRM PERFORMACE IN AFRICA

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A thesis submitted to
the School of Graduate Studies of Kadir Has University
in partial fulfilment of the requirements for the degree of
Doctor of Philosophy in
Banking & Finance

Istanbul, July, 2022

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I, Lawrence NGALIM; hereby declare

- that this Ph.D. Thesis that I have submitted is entirely my own work and I have cited and referenced all material and results that are not my own in accordance with the rules;
- that this Ph.D. does not contain any material from any research submitted or accepted to obtain a degree or diploma at another educational institution;
- and that I commit and undertake to follow the "Kadir Has University Academic Codes of Conduct" prepared in accordance with the "Higher Education Council Codes of Conduct".

In addition, I acknowledge that any claim of irregularity that may arise in relation to this work will result in a disciplinary action in accordance with the university legislation.

Lawrence NGALIM

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Date (01/07/2022)

To My Dearest Mum, V.B. NGALIM of Blessed Memory

ACKNOWLEDGEMENT

I thank M**s. Aslı Togan-Eğrican, Ph.D**., thesis supervisor for her guidance and expertise in assisting me put-up/complete this research. To my jury members, I acknowledge the insightful comments/suggestions from monitoring committee meetings and final defense.

A debt of gratitude is equally owed to:

1. Department of Banking and Finance, Kadir Has University.
2. Previous academic institutions that ignited my curiosity towards this path.
3. My (a) **Family** (b) Friends.

Access to Finance and Firm Performance in Africa

ABSTRACT

Firm growth potentially translates positive effects to the economy, and thus likely to spur growth. Importantly, firm growth is heavily conditioned on financing. This thesis takes an interest on firms' financing and investigates the importance of external finance for firm-growth in Africa—a geography where financial constraints significantly restrain firms from growth compared to other parts of the world. To understand these effects, I focus on two important regions within Africa— first is a monetary union known as CEMAC zone (Central African Economic and Monetary Community) and the second, Sub-Saharan Africa (SSA) to understand whether external finance matters for firm growth. To capture these effects, the study constructs and employ a novel instrument of external finance—colonial transportation routes i.e., colonial railroads and ports' distances to firms' current location in the CEMAC zone. Findings are robust to alternative specifications and lend credence to the view that external finance matters for firm growth. Turning to SSA, similar question is raised which investigates the effects of external finance on firm growth by focusing on an alternative financing channel, private equity. Results indicate recipients of private equity financing have a higher survival probability than non-recipient peers, equally, recipients are strongly associated with firm growth as proxied by IPO or acquisition. In order to have a complete picture of alternative financing sources available to firms within Africa, I discuss the growth and merits of alternative financing options over traditional methods in driving greater financial inclusion within SSA in the third part. Notwithstanding, Africa is one of the regions for which financial resources are important and capital markets need further development, the region is not as densely analyzed in the literature because of lack of data. I aim to contribute to "access to finance" literature by providing an overview of the state of financial access to firms in important geographical regions in Africa. As Africa faces challenges in access to finance, it is therefore important for this region to have financial reforms that can accompany policy. This thesis has implications for decisionmakers as it provides empirical support

on the importance of external financial opportunities for firms which in turn is crucial for growth.

Keywords: Access to Finance, Firm Growth, Colonialism, Economic Development

ÖZET

Şirket büyümesi potansiyel olarak ekonomi üzerinde olumlu sonuçlar doğurur ve bu nedenle büyümeyi teşvik etme olasılığı yüksektir. Önemli olarak, şirket büyümesi büyük ölçüde finansmana bağlıdır. Bu tez, şirketlerin finansmanı üzerinde durmakta ve finansal kısıtlamaların şirketleri dünyanın diğer bölgelerine kıyasla büyümeden önemli ölçüde kısıtladığı bir coğrafya olan Afrika'daki şirket büyümesi için dışarıdan alınan finansmanın şirketlerin büyümesindeki önemini araştırmaktadır. Tezde etkileri anlamak için Afrika'daki iki önemli bölgeye odaklanılmaktadır—CEMAC bölgesi (Orta Afrika Ekonomik ve Parasal Topluluğu) olarak bilinen bir mali birlik ve, dış finansmanın şirket büyümesi için önemli olup olmadığını anlamak için kurulmuş Sahra Altı Afrika (SSA). Bu etkileri ampirik olarak doğru çalışmak ve içsellik sorununu çözmek için ilk aşamada çalışma bir araç değişken kullanmaktadır. Araç değişken sömürge ulaşım yolları, yani sömürge demiryolları ve limanların şirketlerin CEMAC bölgesindeki konumlarına olan mesafelerini finansmana erişimi açıklamak için kullanılmaktadır. Bulgular değişik yöntemler kulllanılarak denenmektedir ve sonuçlar hepsinde dış finansmanın şirket büyümesi için önemli olduğu görüşüne varmaktadır. Tezin ikinci kısmında alternatif bir finansman kanalı olan özel sermayeye odaklanarak dış finansmanın şirket büyümesi üzerindeki etkilerini araştırmayı amaçlayan benzer bir soruya bakılmaktadır. Bu sefer ampirik analiz SSA'daki şirketler üzerinde yapılmaktadır. Sonuçlar, özel sermaye finansmanı alıcılarının, alıcı olmayan şirketlere göre daha yüksek hayatta kalma olasılığına sahip olduğunu, aynı şekilde alıcıların halka arz veya satın alma yoluyla vekaleten şirket büyümesiyle güçlü bir şekilde ilişkili olduğunu göstermektedir. Afrika'daki şirketlere sunulan alternatif finansman kaynaklarının tam bir resmini elde edebilmek için, tezin üçüncü bölümü SSA'ya daha fazla finansal katılım sağlamada geleneksel yöntemlere göre büyümesini ve esasını ortaya koymaktadır. Afrika, finansal kaynakların önemli olduğu ve sermaye piyasalarının daha da geliştirilmesi gereken bölgelerden biri olmasına rağmen, veri eksikliği nedeniyle bölge literatürde bu kadar yoğun analiz edilmemiştir. Bu tez Afrika'nın önemli coğrafi bölgelerindeki şirketlere finansal erişimin durumuna genel bir bakış sunarak "finansmana erişim" literatürüne katkıda bulunmayı hedeflemektedir. Afrika finansmana erişimde zorluklarla

karşılaştığından, bu bölgenin finansal reformlara sahip olması önemlidir. Bu tez karar vericilere şirketler için dış finansal fırsatların önemi konusunda ampirik analizlerle konunun önemini ortaya koymaktadır.

Anahtar Sözcükler: Finansmana Erişim, Firma Büyümesi, Sömürgecilik, Ekonomik Kalkınma

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LIST OF ACRONMYMS AND ABBREVIATIONS

ACFA	African Crowd Funding Association
BAO	Banque de l'Afrique Occidentale
BEAC	Banque des États de l'Afrique Centrale
CEMAC	Communauté Économique et Monétaire de l'Afrique Centrale
CNEP	Comptoir National d'escompte de Paris
COBAC	Commission Bancaire de l'Afrique Centrale
ECCU	Eastern Caribbean Custom Union
EPS	Earnings Per Share
FDI	Foreign Direct Investment
FSB	Financial Stability Board
GABAC	Groupe d'Action contre le blanchiment d'Argent en Afrique Centrale
GDP	Gross Domestic Product
HTE	Heterogeneous Treatment Effects
IMF	International Monetary Fund
IPO	Initial Public Offering
ISIC	International Standard of Industrial Classification
QGIS	Quantum Geographic Information Systems
REC	Regional Economic Communities
ROA	Return On Assets
ROE	Return On Equity
ROI	Return On Investments
SDG	Sustainable Development Goals
SSA	Sub-Sahara Africa
UDEAC	L'Union Douaniere et Economique de l'Afrique Centrale
UEMOA	West African Economic and Monetary Union
UN	United Nations
UNECA	United Nations Commission for Africa
WAEMU	West African Economic and Monetary Union
WBES	World Bank Enterprise Surveys
WDI	World Development Indicators

1 INTRODUCTION

Does access to finance help firms grow? If demand for external finance generates its own supply, it becomes unlikely to capture the exact effects of external finance, thus, academic literature is still unsettled on the exact role played by external finance in enhancing firm performance and growth. It is empirically challenging to address and analyze this question due to endogeneity concerns such as reversed causality or omitted bias. That is, it could mean firms experiencing growth have more options or access to finance as well as it could mean firms that are recipients of external finance are the ones experiencing growth, thereby, suggesting countries with more developed capital markets are those that will channel finance to eligible users or there might be some omitted variables that empirical models might not capture. It is therefore essential to understand the effects of external finance on firm growth especially for regions like Sub-Saharan Africa— where severe financial gaps are quite visible at almost at all segments despite her growth potential as well as enormous financial reforms that have taken place this past while.

In the first instance, I tackle this question by focusing on firms that operate within the CEMAC[1] zone to understand whether external access to finance fosters firm growth. This region is comparatively homogenous and is one of the oldest economic groupings in Africa that sits on huge natural reserves coupled with its geostrategic position. Understanding how financial constraints affects firm growth across countries is difficult because of heterogeneity. CEMAC zone offers an opportunity for such analysis given its relatively homogenous environment which can be of interest to policy. To capture the effects of access to finance on firm growth, I begin by tracing the history around CEMACs' formation, its current state of financial development compared to its Sub-Saharan African peers and other developing/emerging market economies. Next, I construct two instruments for access to finance where one is based on history/colonialism, and another based on current state of financial development. The former makes use of colonial transportation routes i.e., railways and seaports while the latter is a normalized measure of financial development i.e., state of each regions' financial

[1] CEMAC stands for Communauté Économique et Monétaire de l'Afrique Centrale (Economic Community of Central African States).

development within CEMAC economies. Using these instruments, findings overwhelmingly lend credence to the view that external finance enhances firm growth.

After showing that external finance is indeed important for firms within the CEMAC zone, I extend the analysis to Sub-Saharan Africa (SSA), to focus on entrepreneurial firms. Financial constraints limit firm growth and obtaining finance is a challenge especially for small and entrepreneurial firms around the world. It gets exacerbated in regions such as SSA partly due to lack of well-developed capital markets, high rate of informality as well as acute asymmetry of information. Thus, identifying alternative sources that can ease financial constraints for firms is important. In this second instance, I analyze the landscape of private equity financing by estimating firms' survival probability, next I test the effects of access to finance on firm growth. I proxy for firm growth by considering firms that are involved in Initial Public Offerings (IPO) and Acquisitions—such a status signals tremendous efforts that have been made by the firm in recent times. Findings support the view that this new financing vehicle assist firms to grow.

Lastly, in order to understand an alternative financing source that has recently emerged and is prominent within SSA economies such as crowdfunding that relies on digital technologies as compared to traditional financing methods. I discuss its merits in delivering financial services and assisting the financially excluded thanks to technological advancements.

This thesis is structured into three main parts—Part one has two chapters and conducts analysis on firm growth within the CEMAC zone. Its first chapter begins by tracing the historical origins of the CEMAC zone, next it discusses the importance of the region and highlight economic reasons why these six countries converged their economies immediately after gaining political independence around the 1960s. In the second chapter, I discuss access to finance and firm growth, develops hypotheses, and conduct empirical analysis on firms in the CEMAC zone.

In part two, I look at entrepreneurial firms and ask whether access to external financing channels offered by the private equity industry enables firms survive and grow within SSA economies. Finally, in part three, I present a short discussion on the alternative source of financing—crowdfunding. The last chapter presents concluding remarks and policy implications. Given that access to external financial resources for start-ups and entrepreneurial firms translates positive effects on the firm and the economy at large in terms of firm growth

as well as employment, this work therefore aims to accompany policy design by highlighting crucial aspects regarding firms' external financial sources within Africa.

PART I. ACCESS TO FINANCE AND FIRM GROWTH: EVIDENCE FROM CEMAC SUB-REGION

2 THE CEMAC SUB-REGION: ORIGINS AND STATE OF FINANCIAL DEVELOPMENT

The Central African Economic and Monetary Community known by its French acronym as CEMAC is a product of colonial history—where five out of its six members (except Equatorial Guinea) were former French territories. Regionalization was a form of governance used in the colonial era to ease administration, where four of these five countries were jointly administered from the capital of Congo, Brazzaville alongside Cameroon.[2] Upon achieving independence, these countries decided to regroup themselves for various reasons amongst which was the economic motive. As regards economic motives, the sizes of these economies were small with two members being landlocked. Regrouping themselves to improve upon their economic conditions was important, such as to overcome market frictions that may arise from transaction costs; reap the benefits of economies of scale that may arise from a large market, establish stable financial system amongst others. Theoretically, the optimum currency area analysis can partly explain the institutional arrangements of a monetary union such as that of CEMAC. The overall economic reason why economies should converge in a monetary union should be to enhance its development and growth especially for resource-rich economies like CEMAC, which has been identified as an economically important. The IMF considers CEMAC as one of the most important regional groupings in Africa and calls it the "heart of Africa" as the continent's fortunes are tightly linked to those of the region (Lagarde, 2016). Within this union, Chad, the Republic of Congo, Equatorial Guinea and Gabon are known to be among Africa's top ten oil producers and overall Central Africa is rich in natural resources including gold, tin, bauxite, uranium, timber, and iron ore in addition to petroleum. Even though this region has vast natural resources, in recent years, the countries of CEMAC have been hit hard by a series

[2] Four countries that constituted 'French Equatorial Africa' were Gabon, Chad, Congo-Rep, and Central African Rep. After the First World War, France administered part of Cameroon as Mandated Territory of the League of Nation and later a Trust Territory of the United Nations, thus, in this thesis I refer to these five countries as "French Equatorial Africa and French Cameroon"

of severe shocks: a sharp decline in oil prices, civil conflicts in some parts, heightened security threats and natural disasters among other reasons. The CEMAC region has one of the lowest financial development indicators that is lower than the average of the entire African continent. This highlights the need for reforms that can foster growth and as such, it would be of interest to policy makers, especially as CEMAC is an important region to understand the effects of financial constraints on firms. This is because firms are important in spurring economic growth. A motivation for focusing on CEMAC economies is that within a group, there is enough version to understand the effects of access to finance on firms. The current arrangement within CEMAC economies suppresses these heterogeneities as the union has several similarities compared to SSA. Thus, this research aims at shedding light and equally guide policy on the importance of firms and entrepreneurship given that financial access is improved upon or financial inclusion as a policy is prioritized.

The chapter mainly makes use of data from the International Monetary Fund (IMF), that reflects the state of financial development per country and observes that the financial system in the CEMAC region when compared to other regions is poorly developed and likely not to fully meet the needs of its economies including firms. Overall, the chapter traces the origins of CEMAC, presents the economic motive for economic convergence, and notes that these economies still lag in terms of financial development with severe financial gaps. This then connects or lays the groundwork for the central research question—to be answered in chapters three and four, which seeks to investigate the effects of financial constraints on firms in the first part, and on another part to identify external sources of finance to firms.

The chapter is organized in three sections: In its first, the chapter traces the historical background of CEMAC. Next, the chapter reviews the economic motives why these economies converged. Thirdly, discusses the state of financial system development.

2.1 Origin And Reasons For CEMAC's Formation

2.1.1 Background and context

The current view of the African continent was designed in the 19th century in a process of colonial occupation, that led to an arbitrary demarcation and partitioning of the continent by some European countries. Craven (2015) and Idejiora-Kalu (2019) highlight that the history of colonialism dates as far back as 1884—where in a Conference, in Berlin-Germany, the incursion and penetration southwards by erstwhile colonizers was certified[3]. In this process former political entities were subsumed within different colonial agenda, with far reaching implications for future institutional structures (Decker, Estrin, & Mickiewicz, 2020). As of date, Africa still rely on some of these colonial institutions/heritages for its functionality in areas like the law, where the continent is largely split between British common law system and French Civil law, with implications in terms of development and growth.[4]

The Central African Economic and Monetary Community (CEMAC), which is one of the oldest regional groupings in Africa, is a product of colonial history that regrouped former French colonies in the Central African Region except for Equatorial Guinea. Decolonization process in Africa, was characterized by the formation of nation-states around 1960s, during which Pan-Africanism —an intellectual movement of African descent around the globe, aimed at uniting and creating a global community of Africans was at its apex. The desire to have a unified economic community for the new independent states animated political and social discourse across the continent. One of the ways to achieve this objective was to first, encourage the formation of regional economic bloc, which will subsequently ease the process African (re)integration. This was a suitable way of regaining previous unity amongst African communities as throughout the colonial era, the continent had been differentiated by various institutions, put in place by their respective colonial masters, thus, achieving continental unity

[3] Idejiora-Kalu (2019) notes that amongst the motives to go southwards by Europe, the quest for natural resources was capital and secondarily—there was deep yearnings for trade and cooperation with the Africa Continent

[4] A country's legal systems can help shed some light as to the state of its development. In fact, the Law and Finance theory stresses on the importance of legal institutions in explaining differences in financial development (La Porta et al., 1998). In general, legal systems that enforce property rights, protects private contracts, are friendly to investors and thus, depositors are willing to finance firms and hence, capital markets flourish. If a legal system tends to do the opposite, it inhibits finance/credit market and hence stunt growth. Research provides strong evidence that while the latter occurs in Civil law institutions the former resides in Common law institutions.

was bound to be a process and not an event. It is important to note that as the Organization of African Union was formed in 1963, it created so much interest towards an alliance of newly independent states to reunite especially after the colonization period. Against this backdrop the General Assembly, recommended the United Nations Commission for Africa (UNECA) which was already in existence since 1958, to encourage the formation of Regional Economic Communities (REC), which will subsequently act as pillars of African unity. These regional economic blocks were tasked with facilitating regional integration through trade, movement of people and protocols. As of date, there exist 8 REC in Africa. According to Tang and Tavares (2011) REC was assigned to ensure that by 2028, African economies must have been fully integrated with proper structures such as a common market, central bank/monetary union. The African Union on its part, put forth an agenda—African-Agenda 2063 which is deeply rooted in its pan-African doctrine and advocates for an integrated continent, inclusive and sustainable economies capable of financing its development with REC playing a critical role as building blocks (African Commission, 2015). Though the process is still confronted with lots of challenges, amongst which are conflict trap, natural resource trap, governance trap, landlocked/bad neighbor trap to name a few. Finally, the process of regional groupings and its overall benefits for the economies of CEMAC can likely be situated under a well-known economic theory —optimum currency regions which opines that countries or region can facilitate geographical integration by converging their currency as highlighted in Mundell (1961), who discussed factor Mobility followed by McKinnon (1963) who proposed trade, and subsequently with Kenen (1969) who extended the analysis with product diversification. All these theories support the union of economies, in order to reap the full benefits of economic integration, which CEMAC seems to be in that direction.

To further the ideals of regional economic integration and reap the full benefits accruing from such an arrangement like; single market, stable currency, and free movement of capital and labour, some former French colonies went ahead to establish a monetary union. These countries have been regrouped in to two monetary unions i.e., Economic Community of West African States (CEMAC) and the West African Economic and Monetary Union (UEMOA). Each has its currency and operates under a fixed exchange rate regime which is pegged to the euro and backed by the French treasury. Another similar monetary arrangement is the Eastern Caribbean Custom Union (ECCU) whose currency is pegged to the dollar. The rationale behind regional economic groupings or economic communities around Africa, was to prepare each sub-region

as a pillar that will later be used by African Economic Community in building a single solid common market in Africa, as will be discussed in the subsequent sections.

2.2 Origin And Economic Reasons Behind CEMAC

Prior to independence, five of the countries that later constituted the CEMAC zone, were under the French rule and the region referred to as 'French Equatorial Africa and Cameroon'. This was done to ease colonial administration in the area. Thus, the idea of Regionalization wasn't too new to former French colonies since they were jointly ruled as part of France during the colonial era (Fielding, 2015), coupled with accords signed at independence that explains Frances' heavy presence on its former colonies. Lavelle and Lochard (2018) notes that, at independence, France and its former colonies entered an accord aimed at protecting her former colonies and their new regimes while equally managing their resources (reserves).

The formation went through a lengthy process from the late 1950s to early 1990s. On June 29, 1959, Equatorial Custom Union was created, with objective to ease trade and integration in the sub region. A few years after independence (all except Equatorial Guinea had their independence in 1960), Customs and Economic Union of Central Africa *(L'Union Douaniere et Economique de l'Afrique Centrale*-UDEAC) was formed. This was an effort towards establishing a unified common market while focusing on reduction of tariffs. Equatorial Guinea joined the custom union of UDEAC in 1983. For close to three decades, the union was ineffective and therefore unable to realize its goals. The various heads of states met in Chad on the 16 of March 1994 and decided to substitute UDEAC with CEMAC in March 1994 five years later, the union became operational (1999) with headquarters in Bangui, Central African Republic. The revised objectives were geared towards achieving a free or common market i.e., ensuring the movements of goods, persons & capital, improving the situation of governance and human rights, within the sub-region.

Besides the steps that led to formation of CEMAC, it also suffices to highlight that the process of decolonization in French colonies was somewhat intriguing as negotiations on the terms of independence led to the signing of two types of secret cooperation agreements (Lavalle and Lochard, 2018). The first offered France privileged access to raw materials and the second was to protect African leaders and their new regimes. This has reenforced Frances' presence and influence in Sub-Saharan Africa which has had far reaching implications that can be argued or

linked to the origin of the CEMAC zone, so as to better manage their resources from a well centralized angle. The monetary cooperation with France sits on 4 points: Unlimited convertibility guaranteed by the French Treasury; Fixed Parities; Free Transferability within the region and centralization of foreign exchange reserves at the Central Bank-BEAC; 50% of these reserves must be deposited in the "operation accounts" at the French Treasury.[5] Besides the CEMAC region that functions under the fixed exchange rate regime, other examples include WAEMU[6] (which also belongs to the CFA franc zone), and the Eastern Caribbean Custom Union (ECCU).

The economic reasons or motives behind CEMAC can be summarized as described below:

- To overcome Market frictions (Transaction costs) by exploiting economies of large scale that accrues from a common and large market.
- Financial Stability, Fixed Exchange Rate, ceteris paribus leads to low inflation rates than flexible rates. One devaluation so far has been witnessed since creation (Fielding, Lee and Shields, 2012)
- According to Banque de France (2010), convertibility is guaranteed by French Treasury with an overdraft facility for CEMAC states. This therefore enhances trade, coupled with Mobility of Capital, persons, and goods, thus creating a business hub that may attract foreign direct investments
- Converge economies towards sustainable economic and financial performance through joint policy coordination aimed at moderating national fiscal policies to be in consistency with common monetary policies

2.3 State Of Financial Development: Financial Development Indices

Theory and practice highlight the importance of an inclusive financial system and supports the view that a well-functioning financial system plays an important role in production of

[5] The new framework of operation account signed in 2007, fixed the reserves to be deposited in the French Treasury at 50% and as from July 2009, this has been the case (Banque de France, 2010).
[6] WAEMU stands for the West African Economic and Monetary Union (Union Economique et Monétaire Ouest-Africaine) which is part of the CFA (Communaute Financière Africaine) franc zone and comprises the West African States of Benin, Burkina Faso, Côte d'Ivoire, Guinea Bissau, Mali, Niger, Senegal, and Togo. The CFA franc (XOF for WAEMU and XAF for CEMAC) was anchored to the French franc until January 1999 after which the euro became the anchor currency.

information, savings, payments, credit, and risk amelioration (Levine, 2005; Demirguc-Kunt & Klapper, 2013; Beck, Demirguc-Kunt & Levine, 2008; Beck, Buyukkarabacak; World Bank, 2014). Relieving financial constraints particularly for firms has a ramification of positive effects to the firm and to the society at large. It suffices for a country to put in place policies or institutions that support and secure property rights, promote private sector development to attract investments and spur financial development. The literature underscores the primacy of institutions in facilitating economic development such as in La Porta, Lopez-de-Silanes, Shleifer and Vishny (1998) and Levine (2002) and Demirguc-Kunt & Maksimovic (1998). Furthermore, Ayyagari, Demiguc-Kunt and Maksimovic (2011, 2012, 2020), provide strong evidence on the importance of access to finance by showing how access to finance facilitates entry of new firms, and improves productivity and growth of existing firms. Butler and Cornaggia (2011) looks at access to finance and its effect on firm productivity by studying an external shock in the demand for a product, which is a U.S. regulation change in corn markets and provide strong evidence on the link between financial development and economic growth. As regards financial inclusion—improved access and usage of financial products/services has high probability of facilitating firm growth (as well as alleviating poverty), as evidenced in Beck, Buyukkarabacak, Rioja and Valev (2012); Demirguc-Kunt and Klapper (2013).

The CEMAC zone supports shared economic policies aimed at improving its economies—for instance, the decision to create a stock market may be an opportunity for companies to raise capital. However, looking at various indicators of financial development from a multi-dimensional perspective as in Sahay et al. (2015)[7], where depth, access and efficiency is measured, one can observe that the state of CEMAC's financial system and its efforts towards financial development. As pointed by Demirguc-Kunt and Klapper (2013), a broad-based accessibility to financial services and products is the hallmark of an inclusive financial system, otherwise, income gap and weak growth may be the consequence. The data obtained from the IMF (see the Appendix A. for much more detailed presentation or Figures presented in 2.1 for summarized version) shows that financial development both at country, regional or continental levels, remains comparatively weak. The various tables indicate the extent to which financial markets are poorly developed. From the panels, the share of financial markets to the overall

[7] The multi-dimensional framework assesses depth, access, and efficiency of the financial system in overcoming market imperfections. The 9 indices were introduced by Sahay et al. (2015). Depth reflects the size and liquidity of markets; access reflects how firms and household are able to access and use financial services and Efficiency highlights the possibility of institutions to allocate financial services to the most eligible users with minimal costs.

index of financial development is insignificant. Even as the financial systems seem heavily bank-led, the overall performance still points to the fact that in terms of intermediation banks barely enhance financial development.

As shown by the clustered columns in figure 2.1, financial development in terms of financial institutions in the CEMAC zone seem to be making an effort towards efficiency arising from Bank Net Interest Margin (%), Bank lending-deposit spread, Bank noninterest income to total income (%), Bank Overhead cost to total assets (%), Bank return on assets & return on equity (%, after tax). Furthermore, panel A reveals that since the year 2000 until 2017, the index for financial efficiency ranges between 0.4 to 0.5. Financial institutions access as measured by the existing bank branches or number of ATMs per 100.000 adults reflects how inaccessible the financial system in the CEMAC zone has been from since the year 2000 until 2017 with an index averaging less than 0.1. Private credit allocated to the private sector in an economy contributes significantly to development as well as the activities of institutional investors such as mutual & pension fund, insurance premium—jointly explain how deep financial institutions are. Unfortunately for CEMAC, the average index of financial depth has been less 0.1 since 2000. Turning to financial markets and their contribution, the index performed worst—indicative of lack or poorly developed capital markets.

Figure 2.1 Financial Development Within CEMAC zone 2000-2017

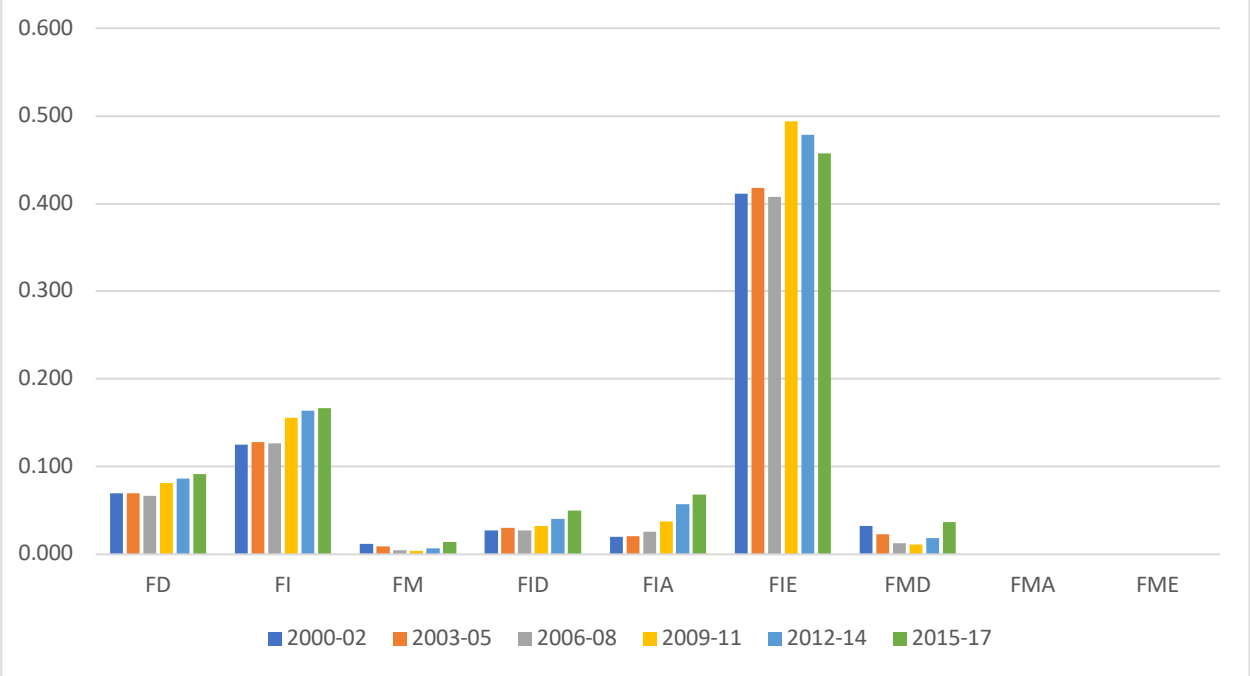

Figure above is a Clustered Columns depicting the state of financial development within the CEMAC sub-Region. FD stands for Financial Development, FI for financial Institutions, FM for financial markets, FID for Financial Institution Depth, FIA for Financial Institution Access, FIE for Financial Institution Efficiency, FMD for Financial Market Depth and FME for Financial Markets Efficiency. Figures that reflect the overall depth, access, efficiency of the financial system in each country are obtained from the IMF. Figures are averaged over a three-year period from 2000 to 2017, further details as to the calculation of this indices at country, CEMAC and SSA level are presented in the Appendix A.

Looking at the clustered bar presented on figure 2.2, as well as the picture on figure 2.3, that presents financial development through time in the CEMAC region, one can observe an overall performance of the index at country level between 2000 to 2017. The mean values of financial development suggest that Gabon and Congo have recently performed better than their peers who are generally below 10% but somewhat stable. The Central African Republic continue to lag, and in the last two periods it witnessed a drop. In conclusion, though being bank-based financial institutions in the CEMAC region are making little effort when it comes to the provision of financial services to the most eligible users at lowest cost i.e., efficiency, while financial depth and access remain very shallow when compared with other African peers. Stock markets are poorly developed at all levels (depth, access and efficiency, see Appendix for greater details).

Figure 2.2 Financial Development Within CEMAC 2015- 2017

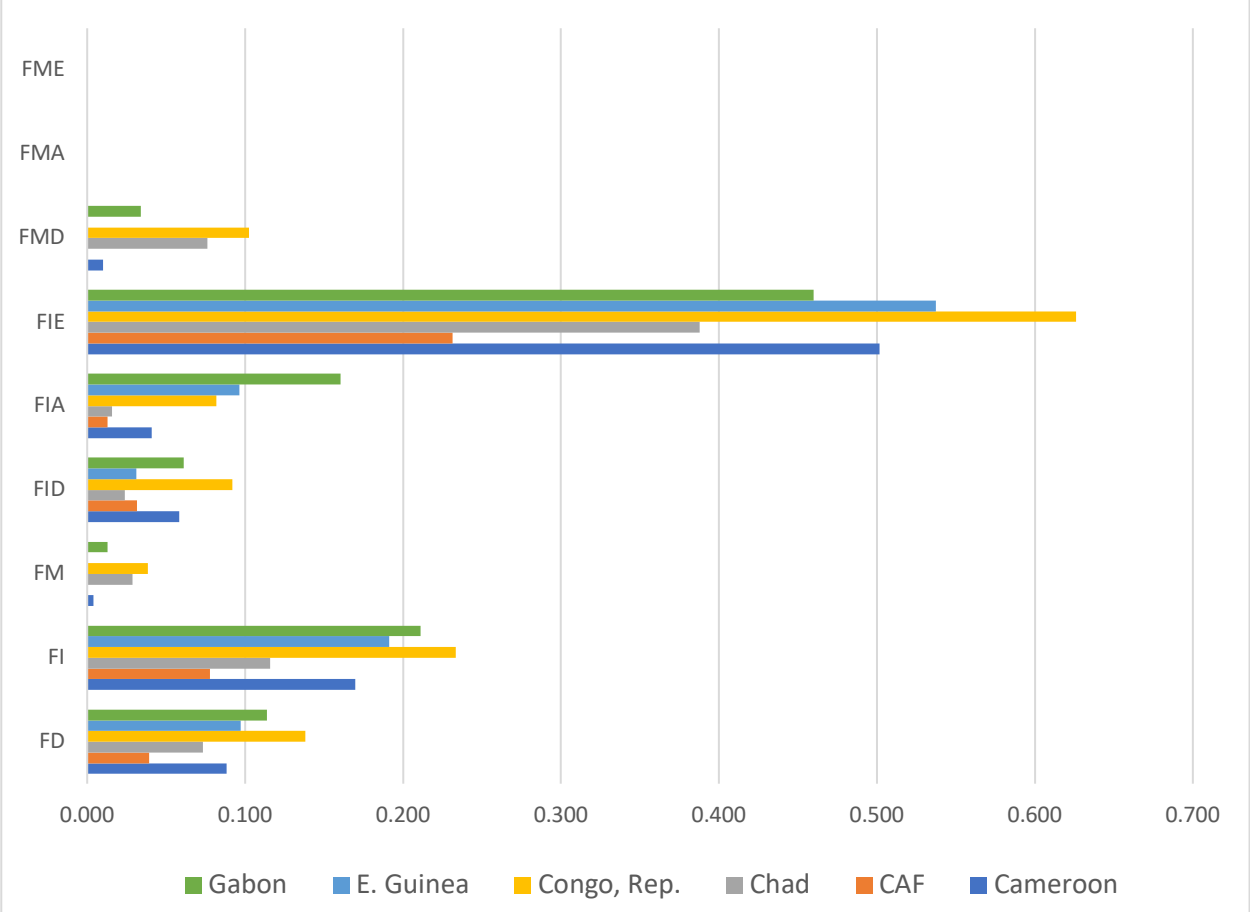

Figure above is a Clustered Bar which depicts the state of financial development in the CEMAC sub-Region. Figures reflect the overall depth, access, efficiency of the financial system in each country and data is obtained from the IMF. Figures are averaged over a three-year period, further details as to the calculation of this indices at country, CEMAC and SSA level are presented in the Appendix A from 2000 to 2017.

Figure 2.3 Financial Development Through Time between 2000-2017 in CEMAC

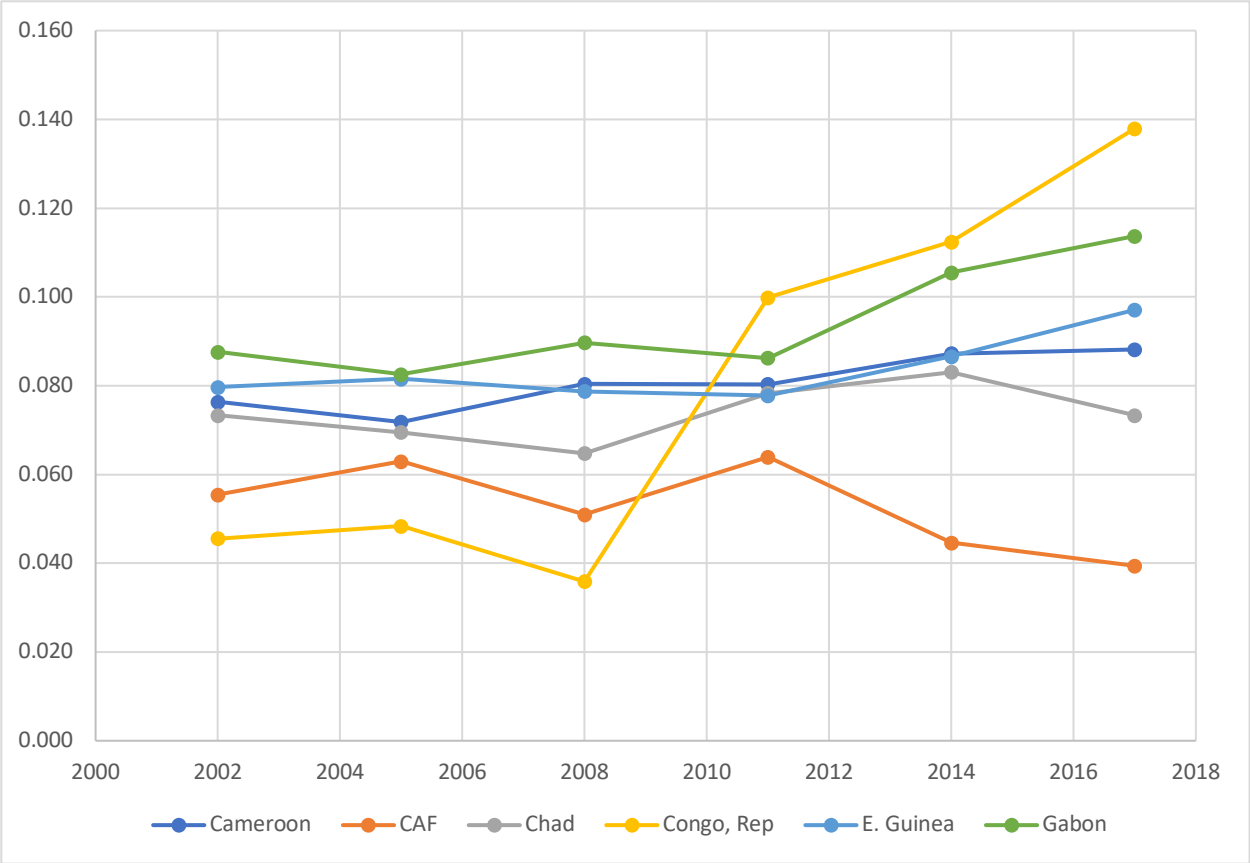

Figure above depicts the state of financial development through time within the CEMAC sub-Region. Figures reflect the overall state of financial system in each country and data is obtained from the IMF. Figures are averaged over a three-year period from 2000 to 2017, further details as to the calculation of this indices at country, CEMAC and SSA level are presented in the Appendix A. From the figure, one can observe modest improvement in financial development through time for three countries, Congo seems to have improved significantly after 2008. Central Africa Republic and Chad seemed to have witnessed a downturn after 2014 and 2011 respectively.

From the various figures presented above (2.1-2.3), one can observe that the financial system in CEMAC when compared to other regions as well as other Sub Sharan African peers, it is poorly developed and likely not to meet the demands of its economies—thus, severe financial gaps are bound to emerge such as financial constraints for firms.

Despite mixed evidence from the literature regarding whether to be in a monetary union, there is a logic of maintaining a fixed exchange rate regime for CEMAC countries due to the limited sizes of its economies. The union so far has registered some substantial benefits. CEMAC zone has enjoyed financial stability that has contained the effects of possible inflation, with just a

single devaluation in 1994 (Samba, 1994). The World Bank Development Indicators[8] reveal that between 2009 to 2011 inflation rates in the CEMAC region averaged 2.9% as compared to 5.6% for Sub-Saharan Africa (SSA) economies with the former having a per capita income 3.4 times higher than the latter, (see appendix A, for more comparison and a detailed version). At individual country level, Cameroon has enjoyed a stable inflation rate than its peers. Thus, a fixed exchange rate regime, ceteris paribus, translates low inflation rates which enhances financial stability and equally attracts foreign investors. Foreign Direct Investment (FDI) as a share of Gross Domestic Product (GDP) averaged 5.6% as compared 2.7% for Sub-Saharan Africa economies between 2009-2011. As of 2015-17, figures stood at 6.5% as against 2.1% for CEMAC and SSA, respectively. This suggest that the CEMAC area is very much attractive in terms of investing opportunities with a leading role from the Republic of Congo. As economies converge, there is the potential of a large single market, they overcome market frictions such as transactions by exploiting economies of scale. This may improve the economic conditions of its citizens. Furthermore, as convertibility is guaranteed by the French Treasury with an overdraft facility for its members, it therefore gives them an opportunity to obtain funds that can assist them meet some important special needs. Lastly, CEMAC advocates for free movement of persons and capital, this fosters economic integration, increases the region's attractiveness, thereby creating or transforming the area into a veritable business hub. Conversely, despite the claim that a geographical integrated region might enjoy increased trade and economic integration amongst its members, the literature finds mixed effects on these claims, thus rendering the union sub-optimal. Belonging to a currency union takes two phases, either you choose to fulfil the criteria ex-ante as in seen the Euro zone or you choose to fulfil these criteria while in the union—sustainability hypothesis. As noted by Couharde et al. (2013), CFA franc zone remains sub-optimal. More recently, Kangami and Akinkugbe (2021) questions the intra-regional trade in CEMAC and conclude that the region has not witnessed any contribution to its growth arising from intra-trade. Fielding and Shields (2005) find that bilateral trade for those sharing the same currency—franc zone seems effective only amongst landlocked countries and their maritime neighbors. The insufficiency of a veritable transportation corridor or infrastructure across CEMAC explains the weak state of intra-trade. Furthermore, the substantial similarity in its natural resources coupled with weak diversification of the economy equally limit their internal trade—oil remains the principal

[8] Compiled data that permits international comparison sourced from https://databank.worldbank.org/source/world-development-indicators

export and only Cameroon has somewhat diversified economy. Lastly, CEMAC has faced the consequence or cost that comes with currency unions—unified monetary policy but a decentralized/federated fiscal policy, it is bound to transmit some inflation differentials arising from the conduct of fiscal policy and country specific fundamentals or consumption pattern. Figures from WDI reveal that inflation rates were far higher in the non-oil exporting CEMAC country of Central African Republic. Other obstacle that confronts the regions' growth potential is the poorly developed financial system which will be discussed in the subsequent section— financial institutions operating in the CEMAC zone are somewhat shallow, inefficient, and inaccessible at both individual country level and regional level, suggesting that funds are hardly channeled towards eligible users or investments coupled with a dormant capital market to enhance direct financing. This explains low domestic credit provided to private sector as percentage of GDP is almost 4 times less in CEMAC states as compared to its SSA peers. Also, the World Bank's ease of Doing Business (2020), ranked CEMAC states as follows: Cameroon (167th), Gabon(169th), Equatorial Guinea(178th), Republic of Congo(180th), Chad (182nd) and Central Africa (184th) out of 190 countries. At the SSA level they appear in the 34th, 35th, 41st, 42nd, 43rd and 45th respectively, out of 48 SSA countries. Finally, the region is entrapped with a series of developmental traps spanning through war/conflict, Governance/Leadership. In fact, World Governance Indicators estimates of political stability and absence of war, corruption, and government effectiveness averages for 3-year period, comprising 3 period for each country are presented on table 2.1. The figures summarize the quality of governance by many stake holders comprising enterprises, experts, think tanks and views on the state to implement regulations that supports and promotes private sector development.

It is important to note that CEMAC economies do have policies aimed at improving and strengthening financial inclusion through its regional institutions. According to the World Bank (2018)[9] CEMAC has Project Development Objective (PDO) that is focused on implementing mandates that foster financial stability, inclusion, and integrity through selected financial institutions such as BEAC, COBAC and GABAC. The objectives revolve around increasing financial services by improving analytical tools that support monetary policy, improving regulations and supervision of banks and microfinance sectors, enhancing payment

[9] World Bank (2018) Strengthening Financial Regional Institutions and Intermediation in the CEMAC Region (P161368)

infrastructure and oversight. The regional strategy identifies priorities and gaps that needs reforms. Consultation of national and regional actors as part of governance structure and strategy. Support to (1) understanding data i.e., data diagnostics, so as to inform on major gaps and binding constraints on financial inclusion with particular attention to challenges that retard innovation, (2) putting up a joint platform structure for the preparation and implementation of regional financial inclusion strategy, (3) develop a regional financial inclusion strategy and (4) Coordination and implementation of the strategy and progress monitoring. This strategy also targets vulnerable groups as well as gender gaps in order to address financial inclusion.

Table 2.1 Basic Economic Indicators

Table below presents basic economic indicators at country, CEMAC and SSA level averaged over three years period from 2009 to 2017.

Economic Indicators of CEMAC States 2009-2017					
Year	**Country**	**GDP per capita (current US$)**	**Domestic credit to private sector (% of GDP)**	**Inflation, consumer prices (annual %)**	**Foreign direct investment, net inflows (% of GDP)**
2009-11	Cameroon	1409.64	10.92	2.42	2.25
2012-14	Cameroon	1511.83	13.03	2.21	1.79
2015-17	Cameroon	1421.74	14.21	1.40	2.13
2009-11	CAR	504.96	8.15	2.07	2.15
2012-14	CAR	456.85	12.38	9.12	1.03
2015-17	CAR	410.17	11.75	3.51	0.30
2009-11	Chad	893.66	4.34	3.30	3.10
2012-14	Chad	989.15	6.57	3.14	1.29
2015-17	Chad	711.81	9.29	0.68	3.72
2009-11	Congo Rep	2989.09	6.01	2.19	8.57
2012-14	Congo Rep	3861.11	9.15	3.52	8.74
2015-17	Congo Rep	2222.84	17.32	2.27	25.44
2009-11	E. Guinea	18532.89	6.10	5.76	12.30
2012-14	E. Guinea	20498.66	6.60	3.64	2.61
2015-17	E. Guinea	10067.19	13.86	1.28	1.58
2009-11	Gabon	9126.68	9.28	1.54	5.02
2012-14	Gabon	9720.17	13.62	2.62	4.24
2015-17	Gabon	7199.85	12.88	1.47	5.99
2009-11	SSA	1634.87	49.21	5.55	2.66
2012-14	SSA	1876.73	43.99	5.29	2.46
2015-17	SSA	1602.38	42.27	4.74	2.09
2009-11	CEMAC	5576.15	7.47	2.88	5.56
2012-14	CEMAC	6172.96	10.23	4.04	3.28
2015-17	CEMAC	3672.27	13.22	1.77	6.53

Data is obtained from World Bank Development Indicators, and later averaged over a three-year period, permitting comparison within countries, that operate in the CEMAC zone.

Six countries regrouped to form the CEMAC states for economic reasons such as trade, competition, economies of scale, attract foreign direct investments as well as foster regional economic integration. The union dates to colonial days and do have a semblance of an optimum currency area arrangement and has registered some strides in terms of financial stability, perhaps its the reason why it has so far attracted FDI more than its other SSA peers. Despite this outlook, CEMAC region has not done much, despite their reasons for coming together such as having a large market and possibility of pooling savings, ensuring free movement of people and capital. Given the role of a well-functioning financial system especially in enhancing private sector development, the discussions in this chapter clearly point to the fact that CEMAC's current system has not made meaningful efforts towards the allocation of financial services to the most eligible users at lowest cost when compared to other regions or its SSA peers. On this note, it is therefore incumbent on policy makers to seek various avenues that can be explored to enhance development such as improving access to finance for firms.

After understanding the environment in which firms operate in the CEMAC zone, I next move to conduct empirical analysis. Such an analysis assists in assessing the objectives of the study, aimed at understanding the effects of external finance firm growth.

3 ACCESS TO FINANCE AND FIRM GROWTH

3.1 Introduction And Background

From the previous chapter, one can observe that the financial system in the CEMAC zone as compared to other regions or Sub-Saharan Africa is poorly developed and might be unable to fully meet the financing needs of its economies. In such a context, firms' financial constraint exacerbates both the 'financing-gap' and 'missing middle' The former reflects the condition where firms are willing to expand operations but are credit constrained whilst the latter points to a mismatch in lending, where, either firms are out of the formal credit market because they lack collateral or firms are too large to access microloans. This leaves a missing middle in the sector which retards firms from growth and global competition as highlighted by Quartey (2017). The World Bank (2014) global financial report sees an inclusive financial system as one of the fundamental drivers of growth and is of the view that well-functioning financial systems serve in ensuring a veritable payment systems, savings, credit and proper risk management to individuals and firms. Therefore, one of such ways to overcome financial underdevelopment, suffices to increase access and usage of external finance for firms and especially for Small and Medium Sized Enterprises (SME), since they are more likely to be financially constrained. It is important to focus on these firms because they have the likelihood of creating employment. Enriching discussion on Africa has been discussed in the literature such as Piabuo et al. (2015); Wang (2016); Fowowe (2017); and Ouartey (2017).

Firm growth is seen to be an important determinant of development, thus, relaxing financial constraints can potentially enhance firm' performance with potential benefits to the firm and society at large. There are so many studies that justify the positive association between access to finance and firm performance (Allen, Carletti, Cull, Qian, Senbet and Valenzuela, 2021; Burgess and Pande; 2005, Demirguc-Kunt and Levine, 2008; Rajan and Zingales, 1998).[10] There are still many parts in the world where severe financial gaps and obstacles to getting external finance hinder firms in terms of growth (Rahaman, 2011; Allen, Carletti, Cull, Qian, Senbet and Valenzuela, 2014). Regions such as CEMAC in particular and Sub-Saharan Africa

[10] Evidence specific to Africa is documented in Murinde (2012) as well as a critical review by Andersen, Jones and Tarp (2012).

(SSA) in general, where despite their potential, growth remains sluggish with a business atmosphere that's marred by risks at almost every segment. The discussions in the previous chapter regarding financial system[11] revealed that stock markets within Africa are poorly developed with heavily bank-led economies that are shallow, inefficient, and inaccessible. World Development Indicators reveal that as of 2020, Mali and Cameroon had less than 20 commercial banks each, serving a population of more than 20 million; Nigeria's more than 200 million inhabitants accessing less than 25 commercial banks, with generally few bank branches largely positioned in big cities. Even though many financial reforms took place within the last decades, lack of access to finance is still an important factor for firms in determining their growth (IMF, Financial Development Indicators, 2020).

If firms are engines of economic development and if firms are financially constrained or lack access to finance especially in this region where financial markets are underdeveloped, then it becomes important to understand the role and importance of finance to firms. I therefore look at firms situated in the CEMAC region and try to understand whether access to finance helps firms to grow.

The contribution of this chapter to the literature is threefold: its identification strategy which aims to address potential endogeneity issues by using a novel instrument within access to finance and firm growth literature. Second, by using such an instrument, the study connects two fields - geographical proximities, transportation networks and firms. Third, the chapter presents additional evidence on the view that finance matters for growth.

The chapter is organized as follows; the first section reviews relevant literature in the light of finance-growth nexus; finance-transport infrastructure; colonial banking in the CEMAC zone; history of ports in the CEMAC. After these discussions, the chapter establishes it hypothesis and equally discuses some suggested theories of financial inclusion. The third section presents data, design and models employed in the study. The last section discusses the results before concluding.

[11] See Appendix A. for IMF index on financial development that captures financial markets and financial institutions.

3.2 Related Literature

3.2.1 Financial development and economic growth

Finance-growth nexus has been discussed in the literature even as far back as Bagehot (1873) Schumpeter (1911) and more recently King and Levine (1993) and Levine (2005) who identified that one of the core functions of a financial system is to screen, monitor and allocate funds to the most eligible users. Prior to King and Levine (1993), finance-growth nexus had no precise channel or direction in academic research. They addressed this concern by empirically extracting causality from finance to growth using a cross country analysis and found that various measures of financial development like financial depth (banking size to GDP) was strongly linked to real per capita GDP growth. Their findings attracted more research on the importance of finance for economic growth. Beck and Levine (2004) investigated the link between financial sector (financial markets and banks) and economic growth, their findings lend credence to the view that financial markets and banks contribute to growth. Guiso et al. (2004) observed the effects of disparities in local financial development in an integrated financial market setting, that is characterized by high capital mobility and asks whether local financial development could still matter for growth by exploring various credit/savings channels and its effects on (a)firms' creation i.e., probability of starting a business (b) financial development i.e., on productivity and growth of firms. The study concludes that in spite the movement in capital, local finance matters for small and large firms.

Beck, Demirguc-Kunt and Maksimovic (2004), looked at access to finance for Small and Medium Sized (SMEs) in 74 countries vis-à-vis banking market structure and found that bank competition retards access to finance for SMEs in countries with weak economic and institutional arrangements. Such findings highlight the primacy of well-functioning institutions, in enhancing development and growth as discussed in the literature (La Porta et al., 1998; Beck and Levine, 2003). In another study, Beck, Demirguc-Kunt and Maksimovic (2004), showed that, where there is a sizeable share of foreign-owned banks and a proper credit record system, it reduces the effects of bank concentration on access to finance.

As time went on, theories emerged justifying the importance of a financial system on basically two fronts: bank-led or market-led, in allocating scarce economic resources to eligible users. According to Levine (2002), the debate between market-led or bank-led is unimportant because financial-service-view is better in explaining the structure of the financial system. Be it a bank-led or market-led financial system, researchers are of the view that a well-functioning financial

system should play important role in production of information, savings, payments, credit and risk amelioration (Levine, 2005; Demirguc-Kunt & Klapper, 2013; Beck et al. 2007; Beck et al.2009; World Bank, 2014).

Other studies focused on the effects of legal foundations on financial development and growth (Levine, 2002), the *Law and Finance* theory stresses on the importance of legal institutions in explaining differences in financial development (La Porta et al., 1998). In general, legal systems that enforce property rights, protects private contracts, are friendly to investors and thus, depositors are willing to finance firms and hence, capital markets flourish. If a legal system tends to do the opposite, it inhibits finance/credit market and hence stunt growth. Research provides strong evidence that while the latter occurs in Civil law institutions the former resides in Common law institutions.

Levine (2005) proposed a theory of development and growth, aimed at eliminating the potential market frictions through some channels: allocating capital to investments, exerting corporate governance, ameliorating risks via quality diversification, mobilizing savings, and facilitating exchanges or payment systems.

Finance-growth nexus has had considerable attention from the academia and today, there is some degree of consensus amongst scholars that a well-functioning financial system allocates resources efficiently (Levine, 2005; Demirguc-Kunt & Klapper, 2013; Levine et al. 2007; World Bank, 2014).

3.2.2 Access to finance and firm growth

The ability of financial institutions and markets to establish proper financial contracts, such that ensures the screening of investment opportunities; monitoring or enforcing corporate governance after the provision of funds; ensuring the pooling of savings; and facilitating exchange matters in an economy. Proponents of financial inclusion (loosely defined as access and use of financial products/services), suggest that the more financially inclusive a firm is, the higher the probability to perform better (Demirguc-Kunt and Klapper, 2013) and this could translate a positive effect on job creation and growth. Other studies emphasize the aspect of digital/financial literacy in enhancing a broad-based financial inclusive system (Kass-Hanna and Lyons and Liu, 2021). A functional financial system should assist the poor in savings, payment, credit and risk management products. Nowadays, financial inclusion has become important because it encourages financial development and economic growth, World Bank

(2014). The IMF data on financial access presents two financial indicators (ATM & Bank Branch) that have been adopted by the international community to track the progress of Sustainable Development Goals (SDG), target 8.1 which aims at strengthening the capacity of financial intermediaries to extend access to banking and financial services. Firm growth has various dimensions, it could be growth (compounded) in sales or employment, growth in assets or simply performance (looking at some financial ratios). Measures of firm growth will be addressed properly in our methodology section.

Inferring into the link between access to finance and firm growth, academic research has more recently relied on survey-type and randomized-experiment approaches to extract causal effects. Survey-type analysis, such as in Ayyagari, Demiguc-Kunt & Maksimovic (2011, 2012, 2020), provide strong evidence on the importance of access to finance. They show how access to finance has a likelihood of facilitating entry of new firms, improving the productivity and growth of existing firms, thereby enhancing development and growth. The studies bring out a strong and positive relation that reside in the link between access to finance and growth or employment levels. Similarly, Demirguc-Kunt et al. (2017), pinpoint the importance of access to credit on entrepreneurship (Jayachandran, 2020). Financial inclusion has a high probability of facilitating firm growth, eradicating poverty because finance enhances the productivity and performance of firms, thus, improving the economic conditions of firms. This is evidenced in Beck et al. (2009); Dupas and Robinson (2013); Demirguc-Kunt & Klapper (2013); Prina (2015); Jayachandran (2020). The consensus in the finance constraint literature is that unfreezing finance for firms that heavily rely on external financing favors factor accumulation, hence development and growth as highlighted in Rajan & Zingales (1998); Demirguc-Kunt & Maksimovic (1998), Claessens, Ueda &Yafeh (2010).

With respect to Africa, studies underscore that there is indeed a financing gap and goes further to assert that unfreezing financial constraints, could act as a miracle by creating jobs and reducing the gap between existing large and small firms, (Alter & Yontchev, 2015; Piabuo et al., 2015; Wang, 2016; Quartey, 2017; Fowowe, 2017; Otchere et al., 2017).

Establishing the connection between access to finance and firm growth is a major challenge (endogeneity) to researchers. This work introduces new instruments within the context of finance constraint literature that addresses the issue of potential endogeneity by instrumenting indicators of access to finance with exogenous determinants of financial development. The

choice of instrument is inspired by the idea that improved infrastructural development reduces the distance(cost) between the lender and borrower and as such, it leads to realization of business projects. The rationale is similar to that discussed in Petersen and Rajan (2002) and even more recently, Regasa, Fielding and Roberts (2020) employed similar strategy. To achieve this, it situates the analysis within the framework within history. The study therefore identifies and traces two colonial institutions in the CEMAC zone, from 1910 to 1958: Railways and Seaports as will be discussed in the subsequent sections.

3.2.3 Connecting access to finance and transportation infrastructure

History seems intuitive in understanding the current state of African economies especially as the continent witnessed two important historical events— slave trade and colonialism, that seem to have restructured the continent. Studies argue that these two periods are at the origin of Africa's reversal of fortunes and its persistence.[12] The intension of this chapter is not to delve into these issues but to point out that an ahistorical understanding of Africa's current economic problems might be of limited significance i.e., it suffice to examine Africa's socio - economic, and political progress over a "longue durée" otherwise, one will be doomed to misunderstand the reasons for the continents comparative backwardness in today's global economy (Akyeampong, Bates, Nuun and Robinson, 2014). A study by Decker, Estrin and Mickiewic (2020) underscore that political entities were subsumed within different colonial agenda, with far reaching implications for future institutional structures. Equally, Acemoglu, Johnson &Robinson (2001), gives an overview of the kind of institutions that emerged in the colonial days. On this note history matters, geography matters as well and can give an idea regarding the type of institutions that emerged in Africa as results of early European contact with Africans, slave trading, and colonialism. These patterns can enrich our understanding as regards current access to finance and firms' growth or performance. The idea is that progress is a process, and it takes place gradually or slowly. Historical environment as well as historically developed infrastructures affects development and can determine firms' ease to finance today. This evidence is supported by Guiso, Sapienza, and, Zingales (2004); Banerjee, Duflo and Qian (2020); Pascali (2016), just to name a few.

[12] For example, in a study, Nunn and Wantchekon (2011) justifies the present state of (mis)trust in Africa as a consequence of the transatlantic slave trade. This can be devasting to lending as it relies so much on trust for its functionality, thus, lack of trust increases or widens the financing gap.

As Lucas (1988) notes, “a city is simply a collection of factors of production capital, people and land”. Jedwab, Kerby and Moradi (2017) using railroad building during colonialization from Kenya show that path dependence is important in the city locations. Similarly, Jedwab and Moradi (2016) consider the construction of colonial railroads in Ghana, and most of the rest of Africa and find that railroads had large effects on the distribution of economic activity during the colonial period and these effects have persisted to date, although railroads collapsed, and road networks expanded considerably after independence. Many studies use historical transportation networks to measure economic development. Banerjee, Duflo and Qian (2020) estimate the effect of access to transportation networks on regional economic outcomes in China over a twenty-year period of rapid income growth. Their results show that proximity to transportation networks have a moderately sized positive causal effect on per capita GDP levels across sectors, but no effect on per capita GDP growth. Michaels (2008) examines the effect of highway construction in the United States in the 1950s and exploits the variation in access caused by the fact that highways tended to be built in either a North-South direction or an East-West direction starting from big cities. Donaldson (2018) studies the effects of railroad construction in 19th century India using a DD approach. Keller and Shiue (2008) use a similar strategy to examine the opening up of railways between regions within Germany. Also, Chandra and Thompson (2000) use historical U.S. data to find that connections to highways have heterogeneous effects across industries. While Atack, Bateman, Haines, and Margo (2010) primarily construct an instrument for the distance to the railroad based on the straight line between the start and end points of a railway line. Of late, Gao, Qu and Shen (2021) tie geographical proximity to a transportation network to show that financial market efficiency increases with transportation proximity.

Jedwab et al. (2016), explores the era of colonialism regarding railways infrastructure and provides strong evidence that path dependence explains present day development in cities where colonial powers settled. This is the case with the present study, where a greater majority of firms sampled are in the cities/towns that were heavily inhabited by the colonial master. Hence, colonial cities/towns can be used to understand the present-day developmental pattern as highlighted by the literature.

3.2.4 Colonial pathways, colonial banking, and development of hypotheses

3.2.4.1 History of ports and rails in the Cemac region

Africa's past and geography matter in explaining the institutions that have emerged as results of early European contact with indigenous Africans (Nunn and Wantchekon, 2011; Jedwab and Moradi, 2016; Jedwab, Kerby and Moradi, 2017; Saupin, 2020). These patterns can enrich our understanding with respect to the establishments and behavior of businesses with respect to their sources of access to finance and their growth opportunities. Inferring into colonial history of the CEMAC zone in a bit to explain railways and seaports in respect to access to finance, is simply motivated by the fact that the development and evolution of these institutions (rails and ports) have been heavily influenced by path dependence patters (from an era of European explorers to an era of transatlantic slave traders and finally to the era of colonization) which shaped the outcome of these institutions.

The German presence in Cameroon and French presence in Central Africa Republic, Chad, Congo and Gabon between 1884 - 1910

The political map of Africa was framed in the 19th century as Europe moved southwards in search of raw materials and trade. In this process, former political entities were subsumed within different colonial agenda, with far reaching implications for future institutional structures such as education/language, and administrative/legal heritage (Decker et al. 2020). The history of colonialism that partitioned the African continent can be traced as far back as 1884 in Berlin-Germany (Craven, 2015; Idejiora-Kalu, 2019)[13]. The Berlin 1884 conference settled squabbles relating to colonization and trade amongst Europeans. By late 1800s or early 1900s, Cameroon was now formally recognized as a German protectorate[14], while Central Africa Republic, Chad, Congo Republic, and Gabon became French Colonies.

Cameroons' Transition from German Rule to French Rule; French Equatorial Africa

The German rule was interrupted by the outbreak of the First World War, a war which led to seizure of German territory of Cameroon and *de facto* partitioning of the German protectorate

[13] The incursion into Africa territory by erstwhile colonizers (Europe) in the 19th Century was officially ratified by this conference. Reasons to go Southwards by Europe was motivated primarily by the quest for natural resources and secondarily, by the deep yearnings for trade and cooperation with the Africa Continent (Idejiora-Kalu, 2019).

[14] Despite the heavy presence of the British along the coast around 1884, the Germans were able to claim the zone as Kamerun (Cameroon). The German imperial consul Gustav Nachtigal through the aid of local chiefs annexed Cameroon in July 1884. The Germans moved inland over the years, extending their control and their claims.

(Cameroon) between Britain and France[15], hence ending her rule in Cameroon in 1916. The partition treaty accorded twenty percent of the former German-Cameroon to Britain and the rest to the French. The formers' share was added to her already existing colony of Nigeria in order to ease administration or governance, meanwhile the latter administered her share together with her central Africa colonies as French Cameroon and French Equatorial Africa. To note, different legal traditions emerged as these territories practiced diametrically opposed systems; while British Cameroons was indirectly ruled from Nigeria under the common law legal systems, the entire French Cameroon and French Equatorial Africa was directly ruled using the civil law (Le Vine, 1964; Awasom, 2000).[16] The transition from German to French rule had some effects on the building and re-construction of railways, seaports as will be discussed ahead.

French Cameroon and French Equatorial Africa: The era of Federation of French Colonies between 1910 - 1934

The constituent entities of French Equatorial Africa were Gabon, Republic of Congo, Chad and Central Africa Republic. Between 1910 to 1934 this entity operated as a federation, with its activities headquartered in Brazzaville (the capital of the Republic of Congo) by a resident governor (Witherell, 1964; Le Vine, 2004). The special international status accorded Cameroon as a mandated territory made it to be ruled by France under special dispensation as a distinct and juridical political entity as documented by La Vine (2004).

French Cameroon and French Equatorial Africa: The era of French Colonies Between 1934 to 1958

The federation was dissolved and simply referred to as French colonies.

Decolonization, Independence, and birth of CEMAC between 1958 to 1960s

Decolonization process was characterized by the formation of nation-states across the continent around the 1960s. During this time, Pan-Africanism which was an intellectual movement of

[15] This *de facto* partition was ratified in 1919 by Versailles Treaties and in 1922 the two territories became Mandated Territories of the League of Nations under Britain and France. Following the League of Nations' failure in 1946, the two mandates were again renamed as United Nations Trust Territories. This lasted until independence around 1960s (Le vine, 1964). In the WBES, there is no coverage from the English-speaking section of Cameroon.
[16] Oto-Peralías and Romero-Ávila (2017) argues that Legal Origins Theory documents that all colonial masters exported their legal systems to their colonies. Also, to get further insights on how legal traditions were inherited or exported through colonization, see Legal Origin or Colonial History by Klerman et al. (2011).

African descent around the globe, aimed at uniting and creating a global community of Africans was a priority. Having a unified economic community for the new independent states animated political discourse across the continent. One of the ways to achieve this objective was to firstly, encourage the formation of regional economic bloc, so as to facilitate integration.

It is important to note that as the Organization of African Union was formed in 1963, it aroused so much interest towards an alliance of newly independent states to reunite or heal the wounds of colonization which had fragmented the entire continent. Against this backdrop the General Assembly, recommended the United Nations Commission for Africa (UNECA) which was already in existence since 1958, to encourage the formation of Regional Economic Communities (REC), which will subsequently act as pillars of African unity. These regional economic blocks were tasked with facilitating regional integration through trade, movement of people and protocols. Today, CEMAC is one of the oldest regional groupings in Africa and its formation was economically motivated by the need to exploit economies of scale, facilitate the movement of human capital, create an enabling environment which attracts foreign direct investments, pool capital, enjoy a common and stable market.

3.2.4.2 Map of seaports/railways

Central Africa Republic, Chad, Congo and Gabon constituted an entity referred to as, 'French Equatorial Africa' from 1910 to 1958. To show the trend in infrastructural developments within this zone, we separate the time-periods in two; period when these colonies operated as 'Federation of French Colonies' 1910 to 1934 and the period when these colonies operated as simply 'French Colony' 1934 to 1958 (see maps elsewhere).

The evolution and development of **seaports** in Cameroon, Republic of Congo and Gabon have been heavily motivated by path dependence patterns, from an era of early explorers around the 14th century, through a period of transatlantic slave trade around the 15th century and finally during an era of colonialism.[17] Seaports are complex institutions that define the position or location, interface with diverse institutions, stakeholders and agencies that are beyond national and local boundaries (Olukoju, 2019). With respect to its development, seaports can translate all kinds of impacts; direct, indirect, induced, or catalytic (Ferrari, 2010).[18]

[17] See Da Silva (2017), Idejiora-Kalu(2019) and Craven (2015)

[18] See Ferrari et al. (2010) in Ports and Local Development: Evidence from Italy. Direct = employment and income raised directly from the construction; Indirect=employment and income caused by chain of suppliers of goods and services; Induced=Employment and Income induced by spending from direct & indirect effects;

French Cameroon and French Equatorial Africa was under direct colonial influence until the late 1950s. The incursion into this zone by France was amongst others motivated by search for raw materials, by a deep need for trade and cooperation. To achieve these lofty targets, construction of railroads and seaports was therefore a *sine qua non* to the successful exploitation and transfer of goods, even if it was going to come at the expense of human life as it did during construction of railways in Cameroon (Ngoh, 1979) as well as in the Republic of Congo (Azevedo, 1981).

Between 1910 to 1934, there was a well-functioning railway system in French-Cameroon which was initiated by the erstwhile master. Between 1906 and 1911, the Northern railway line was constructed and covered 108KM, the line left from Douala (Bonaberi) to Nkongsamba. From 1910 to 1914, the Central railway line was constructed and covered 99 miles, stretching from Douala to Eseka. Before the outbreak of the First World War, the Germans had programmed or planned to extend the central railway eastwards passing through Yaoundé and to the direction of lake chad while another would pass by Mbalmayo, going further southwards (Ouesso), through the Congo, so that it connects a German colony known as Tanganyika (Clarke, 1966).[19] The French Government began construction and re-construction works in both the Northern and Central lines around 1921. The Northern line was extended from Bonaberi, through Mbanga, Njumbe, Penja and Lum while the Central line was extended to Otele and finally to Yaounde (Ngoh, 1979). By 1927 the central railway was completed, and it successfully linked two most important cities, Douala, and Yaoundé (while the former hosted the seaport and majority of industries, the latter became the administrative quarters). It is important to note that there is evidence from the World Bank[20] that seems to suggest the railway system in Cameroon served its neighbors i.e., despite handling general freight within Cameroon, the railway transported transit traffic between the coastline to Chad and Central African Republic.

The maps below (3.1 through 3.3) reflect the development of rails and seaports within the CEMAC zone following important historical period as discussed i.e., from 1910 to 1958

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catalytic=employment and income raised thanks to the role of seaports as a driver of growth and an attractor of new firms

[19] The Trans-Cameroon Railway as highlighted by Clarke (1966) pp55-58 Clearly explains the German efforts in railway construction.

[20] World Bank Railway Reform, Toolkit for Improving Rail Sector Performance. Case study: Camrail P.379-391 via https://ppiaf.org/sites/ppiaf.org/files/documents/toolkits/railways_toolkit/PDFs/RR%20Toolkit%20EN%20New%202017%2012%2027%20CASE3%20CAMRAIL.pdf

Figure 3.1 Colonial Transportation network in the CEMAC zone from 1910-1934

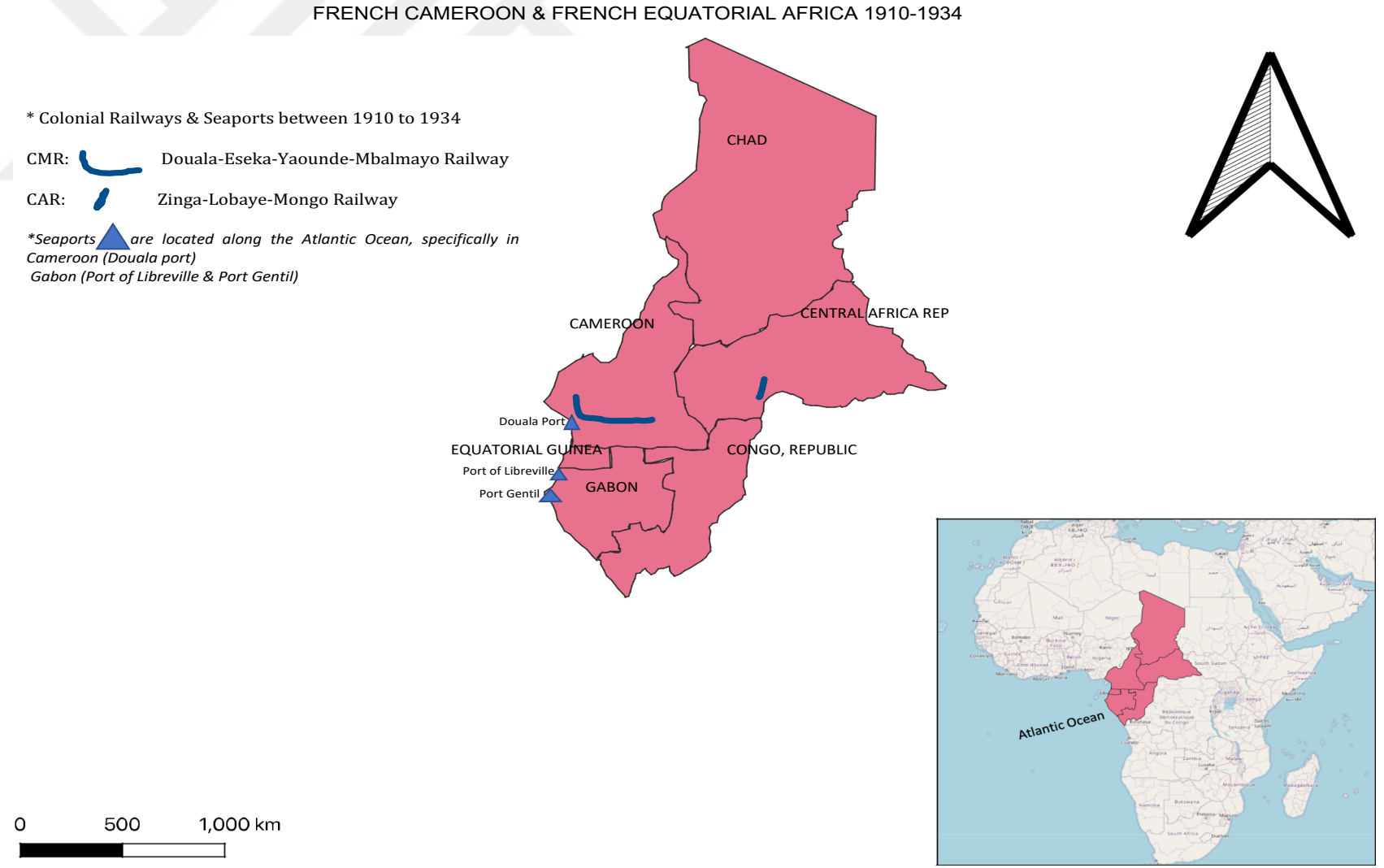


Figure 3.2 Colonial Transportation network in the CEMAC zone from 1934-1958

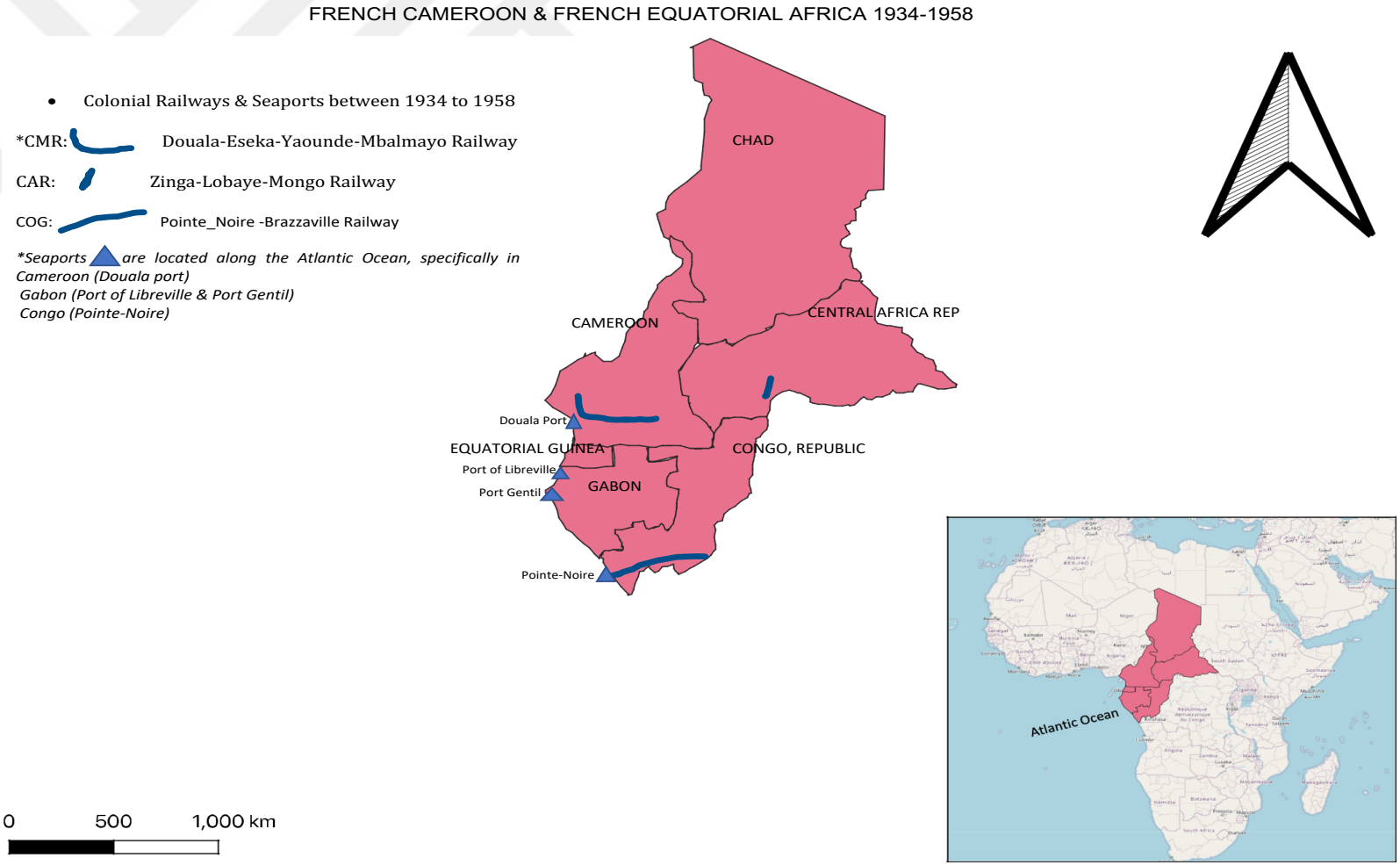
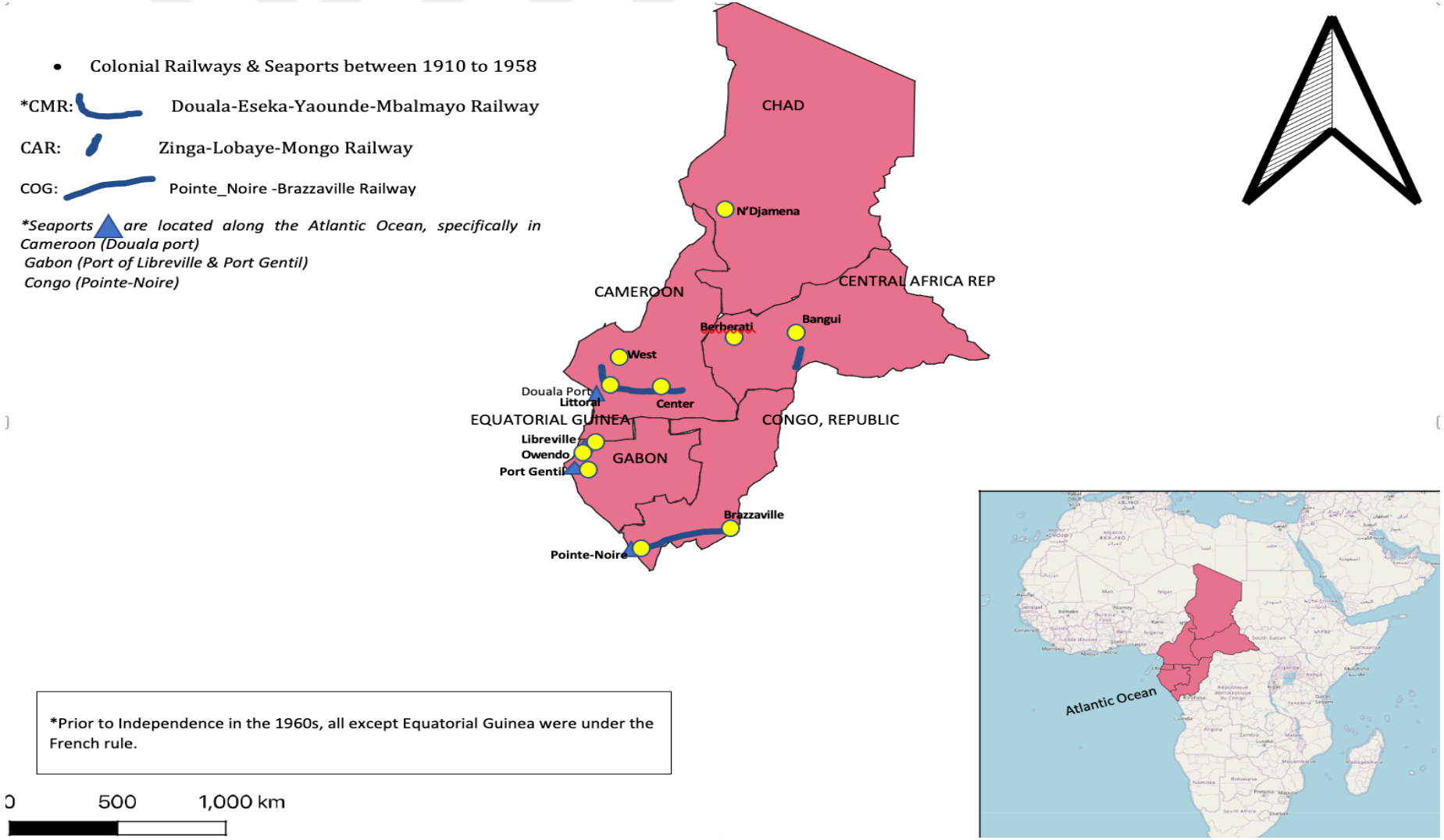


Figure 3.3 Colonial Transportation network in the CEMAC zone from 1910-1958



Another railway system existed in Central Africa Republic, which was just a 6-7KM stretch that was built to overcome rapids on the Ubangi River. After the second World War, work began on the deep-water channel, allowing the river to avoid the rapids, thus, 1962, the railway was no longer operational.[21]

As regards seaports, Cameroon and Gabon had important ports, that facilitated economic activities along the coast. These ports were mainly used to ship goods as well as labor. The port in Cameroon was referred to as the Douala Seaport, which was operational even during the German period. There were two seaports in Gabon, precisely in Libreville and Port Gentil which facilitated the movement of goods and persons.[22] Though Port Gentil was first discovered by Portuguese navigators, it was fully established in the 19th century by the French, to facilitate the exploitation of wood (mahogany). In 1873, the French entered a treaty with the locals and by 1894, they established a custom post that made this port an important centre for timber. The importance of this port increased when oil was discovered around the 1950s. The Seaport in Libreville was mainly used for the resettlement of slaves, but during the French era, this port was crucial in the 1930s as it served as the main port for French Equatorial Africa. The Douala Port in Cameroon had long been in existence, and it equally served the French interest, in connecting the hinterlands, Olukoju (2019) highlights that it served as an outlet to other landlocked countries in the 19th century.

Between 1934 to 1958, the French constructed a railway and seaport in the Republic of the Congo. The Republic of the Congo headquartered the affairs of French Equatorial Africa in Brazzaville. In the Republic of Congo, between 1934 to 1958 the French undertook so much in terms of infrastructure development. Though it came at a very heavy inhuman cost, the Brazzaville – Pointe -Noire railway was realized (Azevedo, 1981; Thomas, 1957).[23] Ngoh (1979) remarks that the improvement of the railway system was clear in Cameroon; between 1938 and 1951 there was a marked increase in railway transportation in terms of tonnage of goods and number of persons who travelled. The development of rails translated a direct

[21] Presently, the railway that existed in the colonial era was closed and added to the UNESCO World Heritage. see https://www.sinfin.net/railways/world/centafricanrep.html
[22] see *http://www.worldportsource.com/index.php*
[23] See Azevedo (1981) *The Human Price of Development: The Brazzaville Railroad and the Sara of Chad*, African Studies Review Vol. 24, No. 1, pp. 1-19 and Thomas (1957) *Railways and Ports in French West Africa* Economic Geography Vol. 33, No. 1, pp. 1-15

increase in agricultural produce and commerce. However, the construction of rails in the colonial era was primarily to connect ports to the hinterlands.[24]

3.2.4.3 Colonial banking in French Cameroon and French equatorial Africa

Financial intermediaries such as banks play critical role in directing finance to eligible users. Banks' location can influence firms' possibility of accessing external finance. However, simply looking at bank financing might not help to answer the question of whether external finance assists firms to grow. Turning to history to understand how the development of these banks occurred over time and how it coincides with the construction of railroads/seaport, can be intuitive in explaining the present-day firms' access to finance. Banking services in French West Africa dates to mid-nineteen century while in French Equatorial Africa & French Cameroun, banking services emerged within the first quarter of the twentieth century. As slave trade was abolished around 1848, French colonial banks such as Banque de la Guadeloupe, Banque de la Martinique, Banque de la Guyane, Banque de La Réunion and Banque du Sénégal were created with former slave owners as shareholders.[25] The first four banks joined Credit Lyonnais while Banque du Sénégal had a different pathway as will be discussed along the line. *Comptoir National d'escompte de Paris* (CNEP) played an important role in the context of French imperial banking sphere of influence around 1848 (Bonin, 2016) as it was assigned the special task of improving the Parisian markets' credit rating in an attempt to reenforce confidence that can foster trade. Thus, this *comptoir* was tasked with rediscounting of micro credit systems that had been instituted in oversea territories during colonization. Bond compensations were accorded slave dealers (mainly Bordeaux merchants) who lost their 'assets' due to the abolition of slave trade (Bian, 2018). It is against this backdrop that first banking institution was created in Senegal in 1855 known as *Banque du Sénégal* (Bian). Later, as colonization became formalized after 1884[26], there was the need to establish a banking institution that could conduct a variety of service as trade and other business activities

[24] There was no inter-connection amongst towns, colonial rails simply connected the hinterlands, specifically where the resources were located to the coastlines i.e., where goods were shipped off to Europe and beyond *https://www.bloomberg.com/news/articles/2015-02-02/how-overlooked-colonial-railways-could-revolutionize-transportation-in-africa*

[25] The first four banks joined Crédit Lyonnais group while Banque du Sénégal had a different trajectory. Bank's initial capital was money subtracted from indemnities that decree of 27 April 1848 credited to the former slave owners: it was made mandatory for one-eighth of all indemnities over 1,000 francs (corresponding to two slaves) to be paid in the form of shares in the equity of these banks, according to the Law of 11 July 1851 (Law of 1 July 1854, in the case of Banque de la Guyane).

[26] As earlier discussed regarding the Berlin Conference on Africa

improved. In 1901, the French restructured and renamed the *Banque du Sénégal* as *Banque de l'Afrique Occidentale* (BAO), headquartered in Paris. The newly restructured *Banque de l'Afrique Occidentale* was tasked with the role of "d'émission, de prêt et d'escompte" (bank of issue, lending, and discount). From Senegal, the bank spread its branches to other West African countries like Guinea, Ivory Coast. After the first world War, BAO extended its services to the capital of French Equatorial Africa— Congo-Brazzaville in 1925. From Congo-Brazzaville other BAO branches were extended to Gabon and Congo in 1925. Central Africa Republic had its first bank branch opened in the city of Bangui, in 1945 (Bian, 2018) while a bank branch was extended to N'Djamena-Chad in the 1950s. After the first World War, banking services were extended to Cameroon in the city of Douala in 1919. By July 1, 1901, the opening balance sheet of BAO was 5.2 million francs and by September 20, 1955, the bank reported assets worth 68.5 million francs. BAO is at the origin of the establishments of the respective central banks of French colonies in both west and central Africa in 1962 where France linked the local currency to the French franc. The central bank of West African states is known as Banque centrale des États de l'Afrique de l'Ouest while that of Central African States referred as Banque des États de l'Afrique centrale.

The development and growth of banking during the colonial era and even after independence was aimed at modernization and assimilation with guided efforts towards reorganization of overseas colonies to suit the interest of the French imperial agenda. French-Africa, France herself and certain business centres in Europe (Geneva) were destinations for the funds being repatriated from Indochina (Bonin, 2016). Thus, the redeployed funds needed solid and sound oversea institutions. Thanks to the banking restructuring that had taken place in 1945 under Gen. Charles De Gaulle, which nationalized major French deposit banks under the authority of the State: Crédit Lyonnais, Société Générale, Comptoir National d'Escompte de Paris and Banque Nationale pour le Commerce et l'Industrie. The objective was to channel savings towards investment opportunities.[27]

In the CEMAC zone, Crédit Lyonnais and Société Générale together with other French banks and foreign banks are present in the CEMAC zone. From a single Bank for the entire French Equatorial Africa and French Cameroun to 15 banks today in Cameroon, 4 banks in Central Africa Republic, 8 banks in Chad, 11 banks in Congo and to 10 banks in Gabon with significant branching, that assists intermediation.

[27] See extract in *Journal officiel de la République française,* Décembre 2, 1945

3.2.4.4 Development of hypotheses

As previously highlighted, historical events coupled with geographical location can matter in explaining the institutions that have emerged because of early European contact with indigenous Africans (Nunn and Wantchekon, 2011; Jedwab and Moradi, 2016; Jedwab, Kerby and Moradi, 2017; Saupin, 2020). These patterns can enrich our understanding with respect to the establishments and behaviour of businesses with respect in line with their sources of access to finance and their growth opportunities. For instance, the evolution and development of seaports as well as railroads in Cameroon, Republic of Congo and Gabon have been heavily affected or motivated by path dependence patterns; from the era of early explorers around the 14th century, through the period of transatlantic slave trade around the 15th century and finally during the era of colonialism and imperialism.[28] Seaports are complex institutions that define the position or location, interface with diverse institutions, stakeholders and agencies that are beyond national and local boundaries (Olukoju, 2019). With respect to seaports, its development can translate all kinds of impacts; direct, indirect, induced or catalytic (Ferrari, 2010).[29] These hubs also initiated the development of financial markets which made it easier for firms to access finance (Ferrari, 2010; Banerjee, Duflo and Qian, 2020; Atak, Bateman, Haines and Margo, 2010, Luca and Luca, 2018).

Ceteris paribus, the hypothesis builds on the rationale that railroads and ports were built and developed to catalyze trade and exchanges. Thus, the enhancement of transportation routes allowed firms to access external finance by traveling to these business centres and financial markets.

Given the historical development and growth of banking during the colonial era and even after independence as discussed above, one can therefore hypothesize that; the enhancement of this trade triggered the development and growth of business centres or hubs. Such a pattern

[28] Portuguese explorers were amongst the first to arrive the boarders see *http://www.worldportsource.com/index.php*; On slave trade, see Da Silva (2017), The slave trade and the development of the Atlantic Africa port system, 1400s–1800s, and finally, the Berlin conference certified Europe's southwards movement.

[29] See Ferrari et al. (2010). Direct = employment and income raised directly from the construction; Indirect=employment and income caused by chain of suppliers of goods and services; Induced=Employment and Income induced by spending from direct & indirect effects; catalytic=employment and income raised thanks to the role of seaports as a driver of growth and an attractor of new firms.

coincides with the extension and establishment of financial intuitions in the CEMAC region, which may have made it easier for firms to access finance.

The extension of bank branches, one of the main sources of external finance, coincides with the construction and development of transportation hubs in CEMAC. Thus, the ease of getting to these banks should unfreeze firms' financial constraints

The construction of these ports and railways coincides with the establishments of financial institutions within the region. The history of banking in French Equatorial Africa can be traced as far back as 1925[30], when the Bank of West Africa (Banque d'Afrique Occidentale), which was in existence in Senegal since 1901, opened a bank branch in Brazzaville -Congo. Other bank branches were opened in Gabon and Congo in 1925.[31] Central Africa Republic had its first bank branch opened in the city of Bangui, in 1945, Bian (2018) while a bank branch was extended to Chad in the city of N'Djamena in the 1950s. After the first World War, banking services were extended to Douala in 1919.[32]

The opening of banks coincides with the building and development of transportation hubs which is a positive support for our hypothesis of transportation and financial development are positively linked.

[30] Decree of June 22, 1925, created a bank branch in Brazzaville (Bian, 2018)

[31] Decree of December 9, 1925, extended bank services to Port-Gentile (Gabon), Pointe-Noire (Congo) and Libreville (Gabon) see Bian (2018)

[32] Cameroon and Togo were German territories that were handed to France by the League of Nations after the First World War (Witherell, 1964). By the year 1919, Banque d'Afrique Occidentale agency was opened in Douala, Bian (2018). See also www.monde-diplomatique.fr/1960/04/A/23550.

3.3 Empirical Analysis: Data, Design And Results

3.3.1 Data

To understand the effects of access to finance on firm performance, I obtain data from the World Bank Enterprise Surveys (WBES). The dataset capture factors that affects productivity and growth of firms' operations.[33] The merits of using the WBES resides in the fact that, the surveys do not only cover publicly traded firms, but focuses on firms that are private as well as public at different sizes and covers many countries. Secondly, the survey is generally administered to firm's representatives of formal private economy which includes manufacturing & service sectors, thus, its methodological uniformity in addressing questionnaire, makes the survey trustworthy in making international comparison across countries and regions as is the case CEMAC zone. The major demerit of the World Bank Enterprise Surveys remains its subjectivity as present in survey data used elsewhere. As the surveys is completed by firm's managers, objectivity of the said data could be an issue as it is based on their 'perceptions'. That said, the coverage of data as well as location of firms at the region level makes this data an ideal set for this research.

Due to the sensitive nature of the surveys especially as it deals with business issues that may have implications on government relations such as bribes collected by government officials during taxation for example, the World Bank executes the data collection exercise through private contractors rather than government agencies, since as the confidentiality of respondents is a necessary condition for their participation. These respondents constitute firm owners or top managers where on average, 1200-800, 360 and 150 interviews are conducted for large, medium, and small firms respectively spanning over the manufacturing and service industries (classified with ISIC codes 15-37, 45, 50-52, 55, 60-64, and 72).

The WBES is a stratified sample by industry, firm-size and region as it is important to weight observations especially when making inferences to the entire population or a subsector within the population. This is because the WBES is structured as a panel dataset to support dynamic analysis as well as fit into econometric models. It is therefore important to adjust or correct

[33] The barriers as documented by WBES are Access to finance; Transportation; Customs and Trade Regulations; Practices of Competitors; Access to Land; Crime, theft and disorder; Tax Rates; Tax Administration; Business Licence permit; Political Instability; Corruption; The Courts; Labour Regulations; Inadequate Workforce; Access to Electricity; Telecommunication.

this weight for different probability of selection for elements within different strata so as to be able to benchmark the business climate patterning to individual countries across the world and as well as groups within each country. The WBES breakdown of firm size is as follows: 5-19, 20-99, and >100 to reflect employees of small, medium, and large respectively. Sector breakdown is usually manufacturing, retail, and other services. Regions are identified based on which cities/regions has majority of economic activity within a country.[34] The WBES through its private contractors try as much as possible during the current year (new interview year) to reconduct the interview with firms that were previously interviewed, to obtain information on a particular firm, across various years. Hence, the resulting panels and their weights need be corrected for the altered probabilities of inclusion in the sample frame. The combined sample for the CEMAC economies, is a pooled-cross-sectional sample.

Table 3.1 Distribution of firms within CEMAC surveyed between 2009-2018

Country	Small	%	Medium	%	Large	%	Manufacturing	%	Services	%	Total
CMR	404	55.8	198	27.35	122	16.85	209	28.87	515	71.13	724
CAF	99	66	40	26.67	11	7.33	37	24.67	113	75.33	150
TCD	87	28.71	183	60.4	33	10.89	134	44.22	169	55.78	303
COG	84	55.63	51	33.77	16	10.6	38	25.17	113	74.83	151
GAB	114	63.69	46	25.7	19	10.61	37	20.67	142	79.33	179
Total	788		518		201		455		1052		**1507**

Source: Adapted from the World Bank Enterprise Surveys (WBES)
Notes:
1. No data so far for Equatorial Guinea
2. CMR, CAF, TCD, COG and GAB are Cameroon, Central African Rep. Chad, Congo Rep. and Gabon country codes.
3. From 2009 to 2018, CMR and TCD were surveyed twice, (CMR: 2009=363 firms & 2016=361 firms) and (TCD: 2009= 150 & 2018=153). The others were surveyed just once, CAF:2011=150, COG:2009=151 and GAB:2009=179

From Table 3.1., one can observe that close to 70% of enterprises are engaged in the service sectors; as regards size, large firms which are at the centre of job creation only constitute 13% while over 52% are small entrepreneurs recruiting less than 20 employees.

[34] See the World Bank Enterprise Surveys Sampling Methodology via *https://www.enterprisesurveys.org/content/dam/enterprisesurveys/documents/methodology/Sampling_Note-Consolidated-2-16-22.pdf*

Table 3.2 First Five Constraints to Business Operations Within CEMAC zone

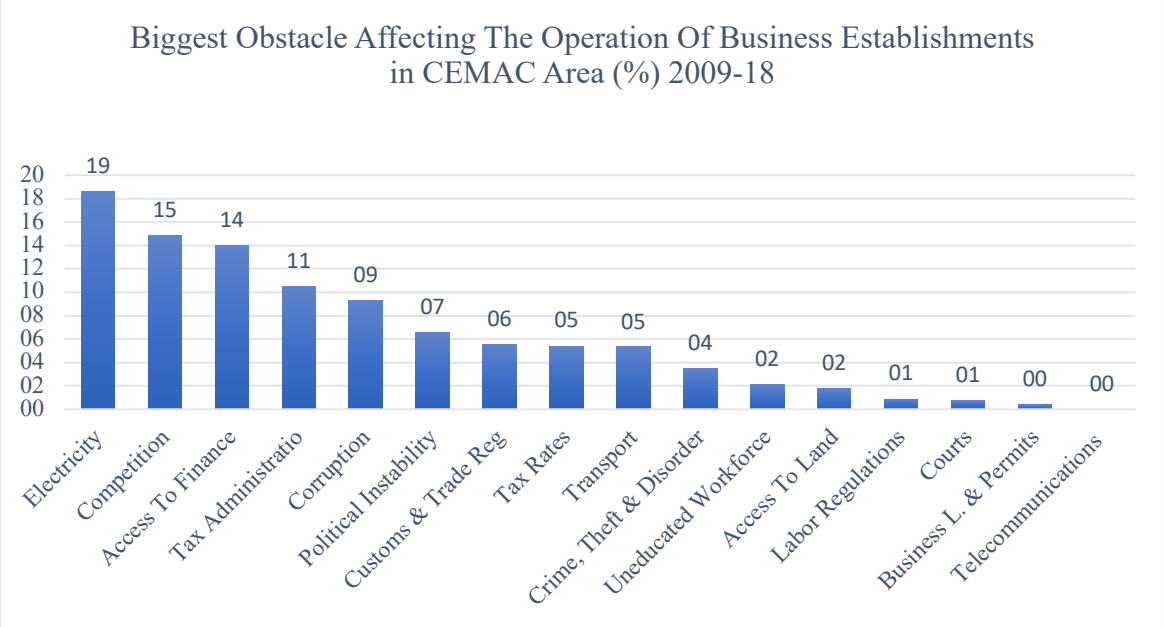
The WBES identifies 16 business constraints amongst which, is access to finance or the extent to which firms identify access to finance as a significant obstacle to its operations. This panel presents the first five constraints identified by firms in each country within the CEMAC region.

CAMEROON	%	CENTRAL A. R	%	CHAD	%	CONGO	%	GABON	%
Competition	23	Electricity	40	Political Instability	19	Electricity	31	Electricity	**22**
Finance	16	**Finance**	19	Electricity	18	Political Instability	16	Transport	**16**
Tax Administrations	16	Competition	8	Corruption	11	**Finance**	15	Corruption	**11**
Electricity	11	Customs & Trade Regulations	7	**Finance**	9	Corruption	8	Workforce	**9**
Corruption	9	Corruption	6	Competition	8	Custom,Trade Regulation	7	Competition	**9**

Source: compiled from WBES

Table 3.2. presents the various obstacles that are linked to business operations in the CEMAC region, amongst which, access to finance seems to constitute a barrier for four CEMAC economies. Finance is identified in all except Gabon as an obstacle to the operation of businesses. The common challenge for these countries seems to be corruption, competition from the informal sector. Equally, figure 3.4., presents the biggest obstacles affecting firms in the sub-region. electricity affected businesses most, followed by competition from the informal sector. Finance as a constraint only comes third, meanwhile, firms worried the least regarding Telecommunications, Business licensing & permits and the court system. Whether or not finance significantly affected the productivity of firms within the CEMAC area, remains an empirical question, which we will be addressed in the subsequent sections.

Figure 3.4 Obstacles to Business Establishments in the CEMAC zone



Source: Compiled from the Enterprise Surveys Dataset_The World Bank, 2009-2018. Reflects the general obstacles, firms in the CEMAC Area face.

Next, The World Bank Enterprise Surveys (WBES) is complemented with additional country specific data from the World Bank World Development Indicators and Worldwide Governance Indicators. World Development Indicators (WDI) are a compilation of national and regional statistics or estimates that relates to development from well-recognized sources by the World Bank. The present study obtains measures of Gross Domestic Product (GDP) from this source. The Worldwide Governance Indicators (WGI) builds on six aggregate indicators that reflect governance at various dimensions by summarizing the views of enterprises, individuals from each country. The six indicators are Voice & Accountability, Political Stability, Absence of violence or Terrorism, Government Effectiveness, Regulatory Quality, Rule of Law and Control of Corruption. The thesis uses regulatory quality estimates which translates perceptions of the ability of the state or government to construct and enforce sound policies and regulations that can enhance the activities of private sector development.

The Tables below (3.3. & 3.4.) excludes missing observations and it's the final sample used for econometric analysis.

Table 3.3 Sampled firms by Size

Table presents the number of firms by country, region, and size between 2009-2018

Country	Region	Total Firms	Small Firms	Medium Firms	Large Firms
CAR	Bangui	108	68	31	9
	Berberati	2	1	1	0
Congo	Brazzaville	16	6	7	3
	Pointe-Noire	28	13	10	5
Cameroon	Center	223	125	69	29
	Coastal	313	159	86	68
	West	80	58	14	8
Gabon	Libreville	66	46	15	5
	Owendo	10	4	4	2
	Port-Gentil	11	9	0	2
Chad	N'Djamena	256	156	71	29
		1113	645	308	160

Source: Compiled from WBES

Table 3.4 Sampled Firms by Industry

Table presents the number of firms by country, year, and sector of activity between 2009 to 2018

Country/ Year Surveyed	**Manufacturing**	**Services**	**Retail**
Cameroon 2009	97	117	104
Cameroon 2016	85	111	102
Central African Republic 2011	26	84	0
Chad 2009	47	67	0
Chad 2018	66	76	0
Congo 2009	9	35	0
Gabon 2009	19	68	0
	349	558	206

Source: Compiled from WBES

3.3.2 Methodology

Four major steps are employed to arrive at results: Identifying determinants via a probit which are later used as controls in the following steps. The second step fits an Ordinary Least Square (OLS) or Baseline model, that evaluates whether access to finance matters for firms' performance. Thirdly, given the endogenous link that reside between access to finance and firm growth, an Instrumental Variable (IV) model is next fitted, and an alternative analysis uses normalized measure of financial development for re-confirmation of prior results obtained from Instrumental variable estimation.

Determinants of Access to Finance

To ascertain whether firms perceive finance as an obstacle to its business operations, that is, if access to finance by firms is influenced by firms' characteristics. These characteristics such as size, age, experience of top management, sector of activity, ownership and legal status can matter in determining firms' access to finance. For example, the literature holds the view that small firms are more cash-hungry than large or big firms as documented in Kuntchev (2013), Demirguc-Kunt & Klapper (2013), World Bank (2014), Demirguc-Kunt et al. (2017), Wang (2016), Quartey (2017), Fowowe (2017), Ayyagari, Demiguc-kunt and Maksimovic (2011, 2012, 2020). This may mean that firms as firms evolve from young to medium, and to mature stage, the firm may tend to perceive finance as a lesser constraint given that it generates sufficient cash flow that that can finance its operations or may be firms must have improved upon its credit record through time, offering her the possibility to obtain financing much more easier than a small firm. Thus, an inverse relationship is bound to prevail between finance and the size of the firm—with small firms identifying finance as greater constraint than medium and large firms. The justification advanced to firms' size is analogous to firms' age as highlighted in Wang (2016), Regassa, Fielding and Roberts (2020). Top managements' experience or longevity can equally have an effect on firms ease of getting credit or finance. It is believed that as top management gets much more experience, it is likely to build interpersonal relationship with several financier that can influence the outcome of a loan application.

As regards sector of activity, firms operating in the service sector perceive finance as a greater threat when compared to manufacturing sectors—especially as to set up a manufacturing firm requires heavy sunk cost, which may suggest that manufacturing are not cash hungry and will

therefore not perceive financial constraints as the service/retail does. Foreign firms are likely to perceive finance as a lesser constraint when compared to domestic-owned. Consistent with the realities of less-developed countries, where greater part of their economy is informal, CEMAC states reported that competition from unregistered firms constituted a major threat. The legal status of firms matters. Of the other legal statuses such as sole-proprietorship, shareholding businesses (with both traded and non-traded shares), results show that limited partnership & partnership businesses worry more about access to finance than their other counterparts. The literature justifies that as sole proprietor is a one-man affair, and has the chances of enjoying an interpersonal relationship with the lender which increases the chances of accessing funds, Piabuo (2015). To estimate the likelihood of firms perceiving finance as a barrier to growth, the following model is estimated:

$$Y_i = \boldsymbol{\alpha}_0 + \boldsymbol{\alpha} X_i + \boldsymbol{\gamma} C_i + \varepsilon_I \qquad (3.1)$$

Where $\boldsymbol{Y_i}$ is a dummy variable and denotes an individual firm, in a particular year that identified finance as a constraint by validating "very severe" or "major" obstacle. The variable takes the value 1 when finance constitute a major/severe barrier to its operations and 0, when otherwise, $\boldsymbol{X_i}$ *are firms'* characteristics such as age, size, legal status, CEO experience, sector, competition and ownership status of a particular firm, Ci is a country specific control such as gross domestic product; ε_I is the error term. The parameters to be estimated are $\boldsymbol{\alpha}$ and $\boldsymbol{\gamma}$. Results appear on Table 3.2 below.

Results obtained reveal that CEO's experience, age, size, legal status, ownership, industry, and competition determine access to finance within CEMAC states. As discussed in the literature, age does have a negative relationship and may mean that as firms grow, they tend to perceive finance as lesser constraint. Small firms tend to identify finance as a bigger obstacle more than large firms. Foreign ownership sees finance as lesser constraint than domestic firms do; competition from the informal sector is likely to constitute a barrier to firms' access to finance.

Table 3.5 Determinants of Access to Finance in the CEMAC region

Table reports probit estimation. The dependent variable is 1 if firms responds that finance constitute "very severe" or "major" obstacle to its activities while the independent variables are firm characteristics such as age, size, legal status, ownership and competition, and a country level control—GDP.

Variable	If firm perceives finance as an obstacle to its operations
CEO Experience	0.0156***
	(0.005)
Firms' Age	-0.00839**
	(0.00388)
Size: Small	0.186**
	(0.093)
Size: Large	-0.0309
	(0.134)
Legal Status: Others	0.605***
	(0.233)
Legal Status: Partnership	0.173
	(0.128)
Foreign Ownership	-0.225*
	(0.117)
Industry: Manufacturing	0.0421
	(0.094)
Other Service Industry	0.208*
	(0.107)
Competition from Unregistered Firms	0.383***
	(0.107)
Per Capita GDP	-0.0603***
	(0.020)
Constant	-0.595***
	(0.150)
Observations	1,045

Standard errors are in parentheses. *** p<0.01, ** p<0.05, and * p<0.1 denote statistical significance at 1, 5 and 10 per cent levels respectively

Results show that the more CEO gets experienced, the more they are likely to observe finance as greater constraint perhaps due to the presence of business opportunities or as a result of mismatches in the credit market—where the financier is only willing to extend microloans, which might not be in line with what CEO wants. Furthermore, as concerns firms' ownership structure, results indicate that caeteris paribus, firms that have at least a 50% foreign ownership are less likely to perceive finance as an obstacle to their business operations when compared to domestic firms.

Financial Inclusion /Access to Finance and Firms' Growth Model

Within the context of financing constraint literature, firm performance or firm growth can easily be modelled using financial statements; return on assets (ROA), return on investments (ROI), earnings per share (EPS) and return on equity (ROE). Such measures are straightforward when it comes to evaluations and interpretations but has a weakness of not being readily available, being historical, and being liable to manipulations and incompleteness, thus offering only lagged information (Santos & Brito, 2012). The situation becomes worrisome when it concerns firms or small and medium size and in a less-developed economy or region as CEMAC economies. Firms in less developed economies have little or no incentive whatsoever in establishing financial statements, because debts/equity (capital) is hardly raised from the financial markets (Quartey et al., 2017). As highlighted in the previous chapter, the level of stock market development in the CEMAC zone is comparatively shallow, inaccessible, and inefficient in in overcoming transactions and information issues that pattern to capital allocation. Thus, I make use of alternative measures of firms' growth or performance such as positive sales growth, positive employment growth and investment inefficiency as will be discussed below.

Firms' Growth Measures (Dependent Variables)

Firm growth is measured by looking at employee growth i.e., if a firm experienced employment growth or not. Mindful that all firms' employee growth is not equivalent due to differences at size level and due to the fact that responses might be subjective, the study calculates firm growth as follows. Making use of World Bank Enterprise Surveys (WBES) the study considers whether the percent difference between last year's employment and three years ago employment is positive. If it holds, then it will be converted into an indicator variable where a positive outcome is coded one (1) and when otherwise, its zero (positive = 1 and zero otherwise). Employee growth has an advantage of measuring the long run impact of growth and assessing its financing constraints simultaneously, further, measuring productivity in this way can be more realistic as the firm has no incentive to underreport the exact situation.

Similarly, the WBES equally presents sales figure just as it does for employment. The study measures firm growth by considering if it witnessed sales growth or not i.e., whether the percent

difference between last year's sales and three years ago sales is positive. If it holds, then it will be converted into an indicator variable where a positive outcome is coded as one (1) and when otherwise, its zero (positive = 1 and zero otherwise). The analysis transforms this continuous variable to an indicator variable so as to minimize the impacts of outliers and also ease its interpretation, that is, to see clearly which firm grew or not. Though sales growth might have a drawback of being subjected to manipulations by firms' managers in an attempt to evade taxes, they still give an idea of firm growth.

The third measure of firm growth (or lack of growth) is based on a measure of Chen, Hope, Li and Wang (2011) for deviations from the expected optimal level of investment. Conceptually, investment efficiency refers to firms undertaking all and only projects with positive net present value. Consistent with prior research (e.g., Biddle et al. 2009), the study measures investment efficiency as deviations from expected investment using a model that predicts investment as a function of growth opportunities. Thus, both underinvestment (negative deviations from expected investment) and overinvestment (positive deviations from expected investment). Here, I focus on the underinvestment portion.

The equation is thus as seen below:

$$Invest_{i,t} = \alpha_0 + \alpha_1 NEG_{i,t} + \alpha_2 Percent\ Rev.Growth_{i,t} + \alpha_3 NEG * Percent\ Rev.Growth_{i,t} + \varepsilon_{i,t} \qquad (3.2)$$

Where investment is the amount invested in purchasing assets and land for firm i during year t (if the respondent said they made a fixed investment but then, if one of these cells is blank, then, investment in assets and land is zero is assumed), NEG is an indicator variable equal to 1(one) if the revenue growth is negative and zero otherwise. Percent revenue growth is calculated as the difference between this year's sales and the establishment's sales figures three years ago. These sales figures are self reported. The additional questions for amounts spent in purchasing assets and land are only asked in four waves in two countries which are Cameroon and Chad. Hence, we conduct our analyses on the firms in these two countries for this dependent variable.

The fourth and the fifth measures of firm growth comes from compounded annual sales and employment growth rate. Compounded annual growth rate (CAGR) is the mean annual growth

rate of the firm or of an investment over a period, generally above a year. Differently put, CAGR reflects the rate of return that would be required or expected for a firm to grow[35].

Independent Variable(s)

Next, I identify and describe the independent variables using three different as presented in the subsequent paragraph. In constructing these proxies, emphasis is laid on ensuring that data or questions asked the respondents is consistent across all waves, all regions as well as the question is answered by all firms. These three measures are account ownership, investments in fixed capital and reliance on internal funds for working capital

As regards a measure of whether a firm participates in the formal financial system, that is, financially included. The study makes use of a section in the WBES that asks if firm has a credit line, has a checking account, has an overdraft facility. The outcome is then coded (1) one if the firm confirms it has a checking account, an overdraft facility, or a credit line and (0) zero otherwise.

Since firms rely on major capital investments and normally these investments are financed through external sources, the second measure of financial access is an indicator variable showing whether a firm invested in fixed assets (1) or not (0) and where the respondents said they have used at least one of these methods: bank financing, state bank financing, non-bank financial institutions, and credit from suppliers (considered here as external source of finance). These fixed asset investments require more than internal cash flows for most firms hence external access to finance is necessary Rajan and Zingales (1998).

The third measure reflects firms' reliance or dependence on internal funds to sustain its day-to-day activities like working capital. Thus, if a firm relies more than fifty percent[36] on internal funds to maintain its working capital needs, then such a firm is less likely to use external finance. The argument rests on the idea that as firms are less likely to use external sources of

[35] Compounded annual sales growth rate is computed as (((d2 / n3) ^ (1/3))-1) *100; where d2 is the total annual sales for the just ended fiscal year while n3 represent sales figures three years ago. Compounded annual employment growth rate is computed as (((l1 / l2) ^ (1/3))-1) *100; where l1 is the number of permanent employees for the just ended fiscal year while l2 is the number of permanent employees, three years ago.

[36] Pecking order considerations can explain capital structure especially as it argues that the cost of financing increases with asymmetric information. The order of financing generally starts with internal funds, debt, and new equity. Thus, the extent to which a firm struggle to meet its day-to-day activities by relying on its internal funds can signal the extent to which it is financially limited. There is no definite cut, as to what percentage of working capital that have been financed using internal sources of finance should denote a firm as 'credit constrained'.

financing there is therefore limited possibility to expand operations which can retard their growth potentials.

Control Variable(s)

The study makes use of the existing literature for additional covariates that may affect firm growth. Some of these are based on firm characteristics, as highlighted by the probit model above. The study considers firm size (small, medium, or large), firms' industry (manufacturing or service), firms' age as well as an indicator of whether a firm is domestically or foreign owned. These characteristics or determinants are from the World Bank Enterprise Surveys (WBES) Furthermore, the analysis incorporates country specific factors including the GDP per capita from the World Development Indicators (WDI); Regulatory Quality estimates for each country from the Worldwide Governance. Worldwide Governance Indicators is an aggregate of country governance indicators using six dimensions. One of these dimensions is regulatory quality which reflects the ability of the government to formulate policies that are friendly to private sector development.

Distance Measure Calculations

Maps have been drawn using Quantum Geographic Information Systems (QGIS); the maps are motivated by the work of Jedwab and Moradi (2016).[37] This measure of "straight-line" as an instrument was initially employed in a study by Banerjee et al (2012). The simple algorithm is conducted by calculating the straight-line distance between the location of the firm to the nearest railway or port city using the QGIS[38] an open-source geographic information system software that locates the railroads and cities as they were built/established. Regions that are far away from these transport infrastructures are identified as those that are likely to be having limited access to financial services. These regions are Bangui, Berberati, N'Djamena and the West region of Cameroon. Conversely, a firm is identified as "close" if it lies closer to this colonial infrastructure, that is, within the top quartile of these distances and identified as likely to have lesser financial constraints.

[37] There was no inter-connection amongst towns, colonial rails simply connected the hinterlands, specifically where the resources were located to the coastlines. The last point is along the port, where these goods were these goods are shipped off to Europe and beyond *https://www.bloomberg.com/news/articles/2015-02-02/how-overlooked-colonial-railways-could-revolutionize-transportation-in-africa*

[38] https://qgis.org/en/site/

Model estimation

Thus, to understand whether financial access has an effect on firm performance and growth, this study identifies and models five dependent variables that capture firm growth and three independent variables that reflects access to finance as presented in equation (2), below. The left-hand side of the model denotes either positive sales growth, positive employment growth, underinvestment, compounded annual sales growth rate or compounded employment growth rates of a particular firm *i*, in a given time *t*. The right hand reflects measures of financial access such as account ownership, investments in fixed capital, and reliance on internal funds for working capital. $X_{i,t}$ represent a matrix of factors or determinants of access to finance as earlier discussed in previous section. Macroeconomic controls such as GDP, regulatory quality is denoted y_t in equation (2). Region specificities is represented by x_i. Mindful that the WBES datasets is a survey, the analysis considers survey weights, which permits inferences on the population of private firms that are not agricultural. Additional definition of the variables employed in this model appears in Appendix B.

In order to identify whether access to finance is important for firms, I conduct the following econometric model as described above:

$$Firm\ Growth\ Measure_{i,t} = \alpha_t + financial\_access_{i,t} + X_{i,t} + y_t + x_i + \varepsilon \quad (3.3)$$

Instrumental Variable Estimation: Discussion on the Instrument and Restriction Exclusion

If demand for external finance generates its own supply, it becomes unlikely to capture the exact effects of obtaining external finance on firm growth, thus, academic literature is still unsettled on the role played by external finance in enhancing firm performance and growth. It is empirically challenging to address and analyze this question due to endogeneity concerns such as reversed causality or omitted bias. That is, it could mean firms experiencing growth have more options or access to finance as well as it could mean firms that are recipients of external finance are the ones experiencing growth, thereby, suggesting that countries with more developed capital markets are those that will channel finance to eligible users or there might be some omitted variables that empirical models might not capture. To understand whether

external access to finance fosters firm growth in the CEMAC zone, I refer to history to construct an instrument for access to finance—colonial transportation routes i.e., railways and seaports operated in the colonial era. As earlier discussed, history can enrich present understanding of persistent disparity or variation at the level of development. The choice of an instrument based on transport is motivated by the idea that greater physical distance between the lender and borrower can preclude firms' access to finance, thus, access to finance is conditioned by the density of banking services (Petersen and Rajan, 2002; Regasa, Fielding & Roberts; 2020). It is therefore expected that cities/regions where banking services are more prevalent, firms are likely to have greater access to finance, and hence financial intermediation will become less monopolistic, thereby decreasing banks' incentive to restrict the supply of credit. The exclusion restriction implied in this IV estimation is that (1) conditional on the controls such as firms' characteristics, region, and country effects incorporated in the regression, colonial transportation routes have no effect on current firm growth other than through access to finance channel (2) no observables are systematically correlated with this measure of colonial transportation routes as well as firms' access to finance.

Azevedo (1981) notes four benefits linked to the construction of railways in French Equatorial Africa; (1) expedited the transfer of agricultural products to the coast and in a some rare cases, facilitated the transfer of goods within the colony (2) enhanced communication by facilitating military intervention and control within the territory (3) increased access, mobility and contact with locals (4) spurred job opportunities for those aspiring to live off wages in the new cash environment or economy. Similarly, construction of seaports can positively affect development, as it translates all kinds of impacts; direct, indirect, induced, or catalytic (Ferrari, 2010). Direct effects, where employment and income are raised directly from the construction; Indirect effects, where employment and income affect a chain of suppliers of goods and services; Induced effect, where employment and Income induce spending from direct and indirect effects; catalytic effects, where employment and income are raised thanks to the role of seaports as a driver of growth and an attractor of new firms.

Here, I posit that the construction and establishment of these structures in the colonial days translated catalytic effects which spurred economic activities as justified by the growth of cities (as will be discussed hereafter). This growth in city can explain why some regions host financial institutions that are key in lending, than other regions, and most interestingly, the persistence over time of these regions or areas in hosting banking institutions as result of colonialism. However, if some locational advantage resides and are not accounted for by the selected

controls that led to the establishment of these colonial institutions and which may simultaneously affect current access to finance, then this instrument will be inappropriate. With this intuition, I therefore establish that once a s set of observed characteristics are controlled for, there is no within-region differences in current level of firm access to finance amongst those regions that became close to the railways and those that did not. Further, current firm growth might equally be associated with factors other than access to finance such as government policy, geographical or economic characteristics. It is therefore instructive to control for the effects linked to country, region, and industry specificities.

Looking at the growth of cities within the CEMAC region, I therefore aim to defend the persistence of this phenomenon over time in order to support the instrument in question. Improved transport systems spurred economic activities in some cities or regions, as it transformed those areas into important business hubs, which became favorable destinations for financial institutions. This is elucidated by the fact that the construction of railway systems coincided with the establishment of banks within the CEMAC zone that produced catalytic effect thanks to heightened economic activities that led to the growth in cities/towns/regions. Cities or regions or areas that were closer to these institutions developed and grew considerably in sizes as compared to those that were far away. This phenomenon persists until date and such areas host more financial institutions comparatively. In Cameroon for example Douala had a seaport and railway system in the colonial days and by the time the French took over its section of the Cameroons after the first world war, the population of Douala was 15,225 of which 13,101 and 933 were locals and African-immigrants respectively and the rest Europeans. By 1927, a railway system connected Douala and Yaoundé, and the population of Douala reached 27,666 inhabitants. A few years to independence, precisely in 1956/7 the entire population of Douala was 124,703 inhabitants of which only 23,075 were locals, and 86,144 were African immigrants (Austen and Derrick, 2001 P. 142 for population figures). Douala continues to be an important city as well as a headquarter of banks and stock exchange market. By the end of 2020, the number of banks operational in Cameroon were 15, the littoral region, where Douala is its headquarters operated 118 bank branches out of a total of 328 bank branches in the country. Similarly, same region had 391 micro-finance institutions (1st, 2nd, and 3rd categories) out of a total of 1,713 in the country.[39] The second region in terms of bank branches was the Centre region with 82 branches while the third region followed with 30 branches. It is important

[39] Comité National Économique et Financier du Cameroun (2020), Rapport annuel

to note that Cameroon has ten regions, and the two regions cited above represent approximately 61% of the bank branches. Interestingly, these two regions cited above were connected by a colonial railway i.e., from littoral region (Douala) to centre region (Yaoundé). Further on Cameroon, the census[40] figures suggested that the littoral region, where Douala is, had a population of 935,166; 1,352,833; and 2,510,263 in 1976, 1987 and 2005 respectively. Comparing the littoral region with the east region of Cameroon with no rails or ports, census results revealed 366,235; 517,198; and 771,755 for 1976, 1987 and 2005 respectively. Further, the east region by the end of 2020 had only 8 banks and 59 microfinance institutions (the least in the country) suggestive that the rails/ports developed in the colonial days can explain this persistence in economic disparities. The analysis put forth for Cameroon was no different from that of French Equatorial Africa. The railway systems as well as seaport existed in the Republic of Congo, while in Gabon just seaports existed in the colonial days. The landlocked countries of Central Africa Republic and Chad had no practical ports/rails, they had to rely on neighbors for these services as highlighted by the World Bank.[41] This meant they were far away from development, and this has persisted until date. More clearly, in Congo, by 1956[42] regions or cities closer to the railway system such as the *pool* region around Brazzaville had a population of 313,000 inhabitants with a population density of 6.8 km^2, another region closer to the seaport in pointe-noire such as *Kouilou* region had a population of 80,000 and a population density of 5.7 km^2. Meanwhile, regions further away from ports and rails such as *Likouala and Sangha* reported a population density of 0.4 km^2 and 0.45 km^2 respectively. Similarly, Gabon's *Estuary* province (where *Libreville and Owendo* are located) in 1956 reported a population density of 2.3 km^2. Equally in Gabon, a province (Ogooue Maritime) that is host to another seaport (Port Gentile) indicated a population density of 1.45km2, while regions/provinces far away from the sea such as Ogooue-Ivindo and Haut-Ogooue reported a population density of 0.8 km^2 and 1 km^2. For the landlocked countries, apart from their national capitals, only regions that were closer to borders had a high population density, perhaps as they were able to make use of

[40] See post-colonial population figures for Cameroon and other countries: https://www.citypopulation.de/en/cameroon/cities/

[41] The World Banks' 2017 Railway Reform: Toolkit for Improving Rail Sector Performance cites that in the beginning of 1947, the government owned Régie Nationale des Chemins de Fer de Cameroun ('Regifercam') play an important role in the commodity-based economy. Railway transport was preferred and was crucial in transporting high volumes of timber products and cotton for export especially as roads were poor and inaccessible during the rainy. The railway system facilitated transit traffic between the coast and Chad and the Central African Republic, and general freight to central and northern Cameroon.

[42] See ''annuaire statistique de l'Afrique occidentale franc, années 1950 à 1954, volume 5'' for further insights

neighboring colonial institutions (rail/ports) such as *Lobaye and Sangha* (where Berberati is) had a population density of 3.26 km^2 and 2.33 km^2, higher than regions that were too far from these services such as *Mbomou* with only a population density of 0.87 km^2. All these suggest that these institutions attracted settlements around them, given the economic importance of road (when a road passes, development ensues).

Another argument against using this instrument i.e., the physical distance between firm and financial intermediaries, revolves around the emergence of financial technology. There is a growing claim that seems to suggest that financial technology has revolutionized banking activities, leading to more decentralized banking services. Financial Stability Board[43] (FSB) defines fintech as a "technologically enabled financial innovation that could result in new business models, applications, processes, or products with an associated material effect on financial markets and institutions, and the provision of financial services". Such a definition underscores the importance of access to internet, electricity, and mobile phones in order to reduce this physical distance. Of the complaints advanced by firms operating in the CEMAC zone, electricity poses a central issue as seen on table 3.1 and figure 3.2. The financial system in the CEMAC zone (as discussed in chapter 2) is heavily bank-led with banks offering typically traditional services. However, the emergence of new financial services such as mobile money in the CEMAC zone fosters financial inclusion as it enhances the payment system. Most importantly, these services do not provide credit to firms, meaning firms have to locate themselves around banks for the purposes of accessing finance easier. On the other side, if physical distance between firms and bank was to be unimportant due to fintech activities, one will expect that the firms in question are high-tech firms with proper modern communication network. The case at hand are firms concerned with retail and service as well as manufacturing that do not even have proper internet coverage. The WBES ask questions such as "does the firm have a high speed, broadband internet connection on its premises? "is the internet used to do research and develop ideas, new products, and, services? "is the internet connection used to order purchases for this establishment? "is the internet used connection used to deliver services to your clients? Even as the surveys were conducted in selected economically important cities and towns the general responses to the above questions were less than 40 out of a total of 1113 firms (as seen on table 3.3, that reports summary statistics). This illustrates that the rising

[43] https://www.fsb.org/work-of-the-fsb/financial-innovation-and-structural-change/fintech/

importance of technology in finance is likely not accompanied by access to credit for firms and hence, does not to affect the instrument at hand. Otherwise, one will expect to see a proper credit registry in these territories but lack or limited availability of these facilities coupled with informality where physical identification is essential on daily basis, makes physical distance more important. Thus, these modern communication networks are not yet fully incorporated into banking services within CEMAC.

Having theoretically established the case for the validation of the instrument in question, I proceed to estimate and understand its effects on current access to finance variable(s). The instrument discussed in this analysis sits on sound theoretical and economic intuition which argues that distance matter for financial institutions. The first stage regression makes use of equation (2) below: The left-hand is a measure of access to finance as earlier discussed and the right hand, the proposed instrument. $\boldsymbol{X_{i,t}}$; $\boldsymbol{y_t}$; $\boldsymbol{x_i}$, respectively is a matrix of firm characteristics, country level effects, and region specificities respectively. The predicted results obtained are used estimate the dependent variable described in equation (2).

$$Financial\ Access\ measure_{i,t} = \alpha_t + Transport\ instrument_{i,t} + X_{i,t} + y_t + x_i + \varepsilon \quad (3.4)$$

In the second instance (robustness checks), I rely on financial development as a measure of ease of access to finance. I therefore construct a normalized measure of financial development within the CEMAC sub-region à la Guizo, Sapienza and Zingales (2004) and use this for robustness analysis. This indicator proxies the state of development within CEMAC zone at regional level and better explains why firms (entrepreneurship) may exist in certain regions/areas than others. The rationale is straightforward— financially developed areas are likely to encourage entrepreneurship through financial intuitions CEMAC states seem uniform in various characteristics, thus, the exercise of conducting an analysis becomes relatively easier because of this uniformity. In the WBES, a question is raised as why firms did not apply for a credit/loan. Of the responses proposed in the survey aimed at understanding this disincentive towards loan application using the following options: application procedures were complex, Interest rates were not favorable, Collateral requirements were too high, Size of loan and maturity were insufficient, did not think it would be approved. The disincentivized or discouraged firms are coded 1 and when otherwise, 0. The next target is to estimate a linear

probability model (the discouraged variable is regressed on the region dummies) to understand the probability of being discouraged from applying for a loan. Following Guizo, Sapienza and Zingales (2004), the estimated coefficient gotten on the regional dummies are then normalized by calculating 1-rejected/max (rejected). The normalized value is therefore seen to be explaining financial development across CEMAC. Results patterning to the construction of this variable are further provided on table 3.10 and on table 3.11 for first stage analysis and test for instrument while the IV estimates for robustness purposes appear on Table 3.12 Panels through E.

Table 3.6 Summary Statistics

Table below presents five-point summary statistics of variables employed in the baseline, first stage and instrumental variable regression. Further details regarding the sources and definition are presented in the Appendix C

Variable(s)	Obs.	Mean	Std. Dev.	Min	Max
Independent Variable(s)					
Account Ownership (dummy)	1,061	0.868	0.339	0	1
Investments in Fixed Assets (dummy)	1,113	0.497	0.500	0	1
Working Capital from Internal Funds (dummy)	1,113	0.779	0.415	0	1
Dependent Variable(s)					
Positive Sales Growth (dummy)	1,113	0.650	0.477	0	1
Positive Employment Growth (dummy)	1,083	0.525	0.500	0	1
Under Investment (dummy)	1,113	0.388	0.488	0	1
Employment: Compounded Annual Growth Rate	1,085	5.446	16.236	-63.160	260.883
Sales: Compounded Annual Growth Rate	1,113	7.611	12.404	-9.144	31.574
Firm and Country Level Controls					
CEO Experience	1,113	16.731	9.764	1	68
Firms' Age	1,113	17.927	12.978	2	86
Foreign Ownership (dummy)	1,113	0.167	0.373	0	1
Per Capita GDP	1,113	1.756	2.088	0.505	8.783
Regulatory Quality	1,113	-0.941	0.193	-1.253	-0.577
Instrument(s)					
Colonial Pathways: Transport Infrastructure (dummy)	1,113	0.401	0.490	0	1
Normalized Measure of Financial Development	1,111	0.316	0.123	0	0.683

3.4 Results And Discussion

To understand the effects that access to finance may have on firms' growth, the study obtained data from the WBES, consulted relevant literature to construct five dependent variables and three independent variables with a set of controls for its analysis as described on Table 6. The results obtained from the baseline regression appear on table 3.7 panels A through E. The results in the first panel (3.7.A) underscore the relative importance of external finance on firm growth, specifically, when firm invests in fixed assets it is likely to perform better and experience higher growth rates in terms of sales, though the significance level drops as controls are introduced. Similarly, when a firm a firm is financially inclusive, that is, owns a checking account/credit line/overdraft facility, it is likely to grow in sales, again, the significance disappears with the introduction of controls. Lastly, when firms heavily rely on its internal funds, there is limited possibility for growth, as confirmed by the results. As regards the second panel (3.7.B), that looks at employment growth, results obtained suggests that if firms can access external finance for the purposes of capital investments, such a firm is likely to register an improvement in its employment rates, account ownership and operating fund seem to exert limited insignificant effects on employment growth. Panel C of Table 3.7. suggest that measures of access to finance have some effects on lack of growth (underinvestment, measured as negative deviation from predicted investment), account ownership is associated with underinvestment. Both compounded annual sales/employment growth rates are influenced by measures of access to finance, though the coefficients lack statistical significance. Equally, the controls employed in the analysis seem to suggest that in countries where regulatory quality is better, firms do perform well, similarly, GDP per capita is associated with firm growth. Firm age and firm growth exhibit an invest relation, suggesting that in the early ages, firms face difficulty in growth, that may be related to limited financial capacity, as time progresses, firm gets older/mature, and experienced. These accumulated experiences plus a possibility of a link/connection with a financial intermediary enhances firms' choices and strategies, so much such that the firm will tend to by-pass business obstacles such as finance. Simply put, over time, firms tend to perceive finance as a lesser constraint, given their improvements in learning, connection with banks or availability of credit history, that eases their access to finance and thus, growth potentials.

Given that the link between access to finance and firm growth is contaminated due to endogeneity, I proceed to handle this issue with the instruments discussed above. Table 3.8

presents the first stage and test for instrument i.e., colonial transportation routes. Results obtained at this stage, suggest that the instruments —rails and ports, built in the colonial era, predict measures of access to finance. Investments in fixed capital or new fund revealed a very strong relation with the instruments. As discussed under exclusion restriction, the instrument sits on sound economic intuition, reflecting the idea that distance between bank and firm still matters in lending and even as financial technology has recently reduced the distance between borrower and lender, that has not been the case in the CEMAC zone for reasons linked to informality, lack of such an infrastructure, financial illiteracy and so on and so forth. Other models of financial technology that have been enhanced by telecommunication networks such as mobile money could have important to look at, however, this model does not extend credit to entrepreneurs. In sum, Table 3.8, below reports the statistically and economically meaningful results, thus, validating the test of a good/strong instrument.

3.4.1 Discussion: Instrumental Variable Estimations

Using the instrument as earlier described, the results obtained and presented in the various panels (A-E) on Table 3.9 report much stronger relationship as compared to OLS estimates. Various measures of access to finance seem to have an effect and on firm growth. In the first panel of table 3.9, investments in fixed capital, account ownership enhances firm growth, and the relationship seems to be stronger, even after controlling for firm specific characteristics, size, industry, and region effects. Results based on reliance on internal funds to sustain working capital suggest that firms with limited financial access are less likely to grow in sales. Similar results are obtained when firm growth is captured by employment growth, compounded annual sales and employment growth.

The third panel presents results based on underinvestment as a measure of lack of growth. Results highlight the effects of investments in fixed capital and those of owning an account in a similar direction, which can be interpreted as thus, firms that did capital investments, and firms that own an account are less likely to underperform or underinvest, reenforcing the claim that increasing firms' financial access translates into firm growth. On dependence on internal funds for the purposes of working capital— its management of day-to-day activities, one can observe from the result that as firms are significantly limited in accessing external finance, thus, they are condemned to heavily rely on internal funds for survival, such firms are more likely to underinvest.

Finally, the next stage is to conduct a robust analysis using a normalized measure of financial development within the CEMAC zone. The calculation of this measure is presented on table 3.10, the relevant first stage analysis appear on the next table, that table 3.11 and the corresponding robustness results are presented on table 3.12, panels A through E. The results obtained using colonial rails and ports are re-confirmed using this normalized measure of financial development.

Results OLS: Tables 3.7 Panel A Through E

Table 3.7 Baseline Estimation: Effects of Access to Finance on Firm Growth

Panel A: Effects of Access to Finance on Sales Growth

This table presents OLS estimates of access to finance on sale growth. The left hand is an indicator variable— positive sales growth, computed as percent difference between last year's sales and sales three years ago, the outcome is coded 1 if sales were positive and when otherwise, coded 0. The right-hand has dummies of financial inclusion/access i.e., if firm invests in fixed capital using external finance; account—if firm owns checking account, overdraft, or a credit line; and reliance on internal funds to finance working capital. Firm characteristics such as Age, CEO experience, Foreign Ownership (a dummy), as well as country level controls such as the per capita GDP and regulatory quality are incorporated in the modelling while making use of survey weights. Each access to finance variable is modelled twice, where the first model has only firm characteristics, and the second includes industry, size and region dummies. T-statistics are reported in brackets, below the estimated coefficients. The symbols ***, **, and* denote statistical significance at 1%, 5%, and 10% levels respectively.

Variable (s)	**1**	**2**	**3**	**4**	**5**	**6**
Investment in Fixed Assets	0.125**	0.074				
	(2.319)	(1.597)				
Account Ownership			0.150*	0.030		
			(1.889)	(0.400)		
Working Capital from Internal Funds					-0.155**	-0.070
					(-2.523)	(-1.319)
CEO Experience	0.002	0.002	0.002	0.002	0.002	0.002
	(0.581)	(0.661)	(0.557)	(0.620)	(0.604)	(0.649)
Firms' Age	-0.003	0.001	-0.002	0.000	-0.003	0.001
	(-0.985)	(0.422)	(-0.886)	(0.237)	(-1.041)	(0.367)
Foreign Ownership	0.037	-0.0992*	0.037	-0.110*	0.021	-0.101*
	(0.548)	(-1.656)	(0.543)	(-1.726)	(0.335)	(-1.685)
Per Capita GDP	0.0224*	1.806***	0.0274**	1.949***	0.0322***	1.971***
	(1.863)	(2.852)	(2.243)	(2.972)	(2.690)	(3.172)
Regulatory Quality	0.118	4.180**	0.099	4.250**	0.059	4.220**
	(0.775)	(2.193)	(0.624)	(2.094)	(0.389)	(2.197)
Firm Size Dummies	NO	YES	NO	YES	NO	YES
Industry Dummies	NO	YES	NO	YES	NO	YES
Region Dummies	NO	YES	NO	YES	NO	YES
Observations	1113	893	1061	849	1113	893
R-squared	0.041	0.246	0.041	0.236	0.041	0.244

Panel B: Effects of Access to Finance on Employment Growth

This table presents OLS estimates of access to finance on employment growth. The left hand is an indicator variable— positive employment growth, computed as percent difference between last year's employment and employment three years ago, the outcome is coded 1 if employment is positive and when otherwise, coded 0. The right-hand has dummies of financial inclusion/access i.e., if firm invests in fixed capital using external finance; account—if firm owns checking account, overdraft, or a credit line; and reliance on internal funds to finance working capital. Firm characteristics such as Age, CEO experience, Foreign Ownership (a dummy), as well as country level controls such as the per capita GDP and regulatory quality are incorporated in the modelling while making use of survey weights. Each access to finance variable is modelled twice, where the first model has only firm characteristics, and the second includes industry, size and region dummies. T-statistics are reported in brackets. The symbols ***, **, and* denote statistical significance at 1%, 5%, and 10% levels respectively.

Variable (s)	**1**	**2**	**3**	**4**	**5**	**6**
Investments in Fixed Assets	0.0997*	0.034				
	(1.746)	(0.602)				
Account Ownership			0.063	(0.065)		
			(0.813)	(-0.799)		
Working Capital from Internal Funds					(0.003)	0.063
					(-0.0448)	(0.894)
CEO Experience	0.004	0.004	0.005	0.00508*	0.004	0.004
	(1.415)	(1.410)	(1.494)	(1.794)	(1.336)	(1.317)
Firms' Age	-0.00580**	-0.00582**	-0.00546**	-0.00609**	-0.00550**	-0.00566**
	(-2.167)	(-2.195)	(-2.037)	(-2.281)	(-2.119)	(-2.128)
Foreign Ownership	0.140*	0.130**	0.116	0.099	0.139*	0.130**
	(1.790)	(2.021)	(1.354)	(1.491)	(1.744)	(2.020)
Per Capita GDP	0.003	2.136***	0.005	2.214***	0.006	2.300***
	(0.217)	(3.276)	(0.381)	(3.368)	(0.421)	(3.629)
Regulatory Quality	0.108	0.816	0.114	1.339	0.104	0.497
	(0.684)	(0.420)	(0.687)	(0.655)	(0.648)	(0.254)
Firm Size Dummies	NO	YES	NO	YES	NO	YES
Industry Dummies	NO	YES	NO	YES	NO	YES
Region Dummies	NO	YES	NO	YES	NO	YES
Observations	1083	865	1033	823	1083	865
R-squared	0.034	0.140	0.026	0.163	0.024	0.141

Panel C: Effects of Access to Finance on Investment Inefficiency

This table presents OLS estimates of access to finance on lack of growth. The left hand is an indicator variable— deviations from predicted investment, the outcome is coded 1 if firms underinvested, that is negative deviation and when otherwise, coded 0. The right-hand has dummies of financial inclusion/access i.e., if firm invests in fixed capital using external finance; account—if firm owns checking account, overdraft, or a credit line; and reliance on internal funds to finance working capital. Firm characteristics such as Age, CEO experience, Foreign Ownership (a dummy), as well as country level controls such as the per capita GDP and regulatory quality are incorporated in the modelling while making use of survey weights. Each access to finance variable is modelled twice, where the first model has only firm characteristics, and the second includes industry, size and region dummies. T-statistics are reported in brackets. The symbols ***, **, and* denote statistical significance at 1%, 5%, and 10% levels respectively.

Variable (s)	**1**	**2**	**3**	**4**	**5**	**6**
Investments in Fixed Assets	0.009	0.013				
	(0.183)	(0.269)				
Account Ownership			0.027	0.152**		
			(0.406)	(1.970)		
Working Capital from Internal Funds					(0.030)	(0.025)
					(-0.492)	(-0.373)
CEO Experience	(0.003)	(0.001)	(0.003)	(0.001)	(0.002)	(0.001)
	(-0.913)	(-0.354)	(-1.154)	(-0.454)	(-0.899)	(-0.342)
Firms' Age	-0.00508***	(0.002)	-0.00508***	(0.002)	-0.00511***	(0.002)
	(-2.684)	(-0.954)	(-2.742)	(-1.112)	(-2.746)	(-0.975)
Foreign Ownership	0.065	0.073	0.086	0.0963*	0.062	0.073
	(1.019)	(1.522)	(1.254)	(1.667)	(0.947)	(1.505)
Per Capita GDP	-0.0770***	(0.128)	-0.0708***	(0.270)	-0.0754***	(0.110)
	(-8.447)	(-0.226)	(-7.430)	(-0.484)	(-7.955)	(-0.201)
Regulatory Quality	0.064	-2.690*	(0.053)	-2.976*	0.052	(2.642)
	(0.505)	(-1.670)	(-0.399)	(-1.774)	(0.408)	(-1.643)
Firm Size Dummies	NO	YES	NO	YES	NO	YES
Industry Dummies	NO	YES	NO	YES	NO	YES
Region Dummies	NO	YES	NO	YES	NO	YES
Observations	1113	893	1061	849	1113	893
R-squared	0.110	0.363	0.115	0.377	0.111	0.363

Panel D: Effects of Access to Finance on Compounded Annual Sales Growth

This table presents OLS estimates of access to finance on compounded annual sales growth. The left hand is the mean annual sales growth rate of the firm— the rate of return that would be required for a firm to grow. The right-hand has dummies of financial inclusion/access i.e., if firm invests in fixed capital using external finance; account—if firm owns checking account, overdraft, or a credit line; and reliance on internal funds to finance working capital. Firm characteristics such as Age, CEO experience, Foreign Ownership (a dummy), as well as country level controls such as the per capita GDP and regulatory quality are incorporated in the modelling while making use of survey weights. Each access to finance variable is modelled twice, where the first model has only firm characteristics, and the second includes industry, size and region dummies. T-statistics are reported in brackets. The symbols ***, **, and* denote statistical significance at 1%, 5%, and 10% levels respectively.

Variable (s)	**1**	**2**	**3**	**4**	**5**	**6**
Investments in Fixed Assets	2.579**	1.982				
	(2.089)	(1.445)				
Account Ownership			1.770	(1.914)		
			(0.801)	(-0.863)		
Working Capital from Internal Funds					-3.014*	(1.339)
					(-1.887)	(-0.737)
CEO Experience	0.005	(0.004)	0.009	(0.002)	0.005	(0.006)
	(0.060)	(-0.0506)	(0.110)	(-0.0195)	(0.061)	(-0.0678)
Firms' Age	(0.072)	(0.001)	(0.073)	(0.012)	(0.070)	(0.003)
	(-1.087)	(-0.0184)	(-1.109)	(-0.178)	(-1.148)	(-0.0483)
Foreign Ownership	1.109	(1.928)	1.682	(1.729)	0.800	(1.979)
	(0.555)	(-0.930)	(0.814)	(-0.791)	(0.413)	(-0.935)
Per Capita GDP	1.304***	46.96***	1.302***	53.56***	1.498***	51.90***
	(3.501)	(3.279)	(3.523)	(3.730)	(4.022)	(3.798)
Regulatory Quality	(6.622)	91.81**	(6.099)	96.99**	-7.757*	91.05**
	(-1.552)	(2.339)	(-1.390)	(2.260)	(-1.786)	(2.309)
Firm Size Dummies	NO	YES	NO	YES	NO	YES
Industry Dummies	NO	YES	NO	YES	NO	YES
Region Dummies	NO	YES	NO	YES	NO	YES
Observations	1113	893	1061	849	1113	893
R-squared	0.059	0.168	0.052	0.165	0.058	0.165

Panel E: Effects of Access to Finance on Compounded Annual Employment Growth

This table presents OLS estimates of access to finance on compounded annual employment growth. The left hand is the mean employment sales growth rate of the firm— the rate of return that would be required for a firm to grow. The right-hand has dummies of financial inclusion/access i.e., if firm invests in fixed capital using external finance; account—if firm owns checking account, overdraft, or a credit line; and reliance on internal funds to finance working capital. Firm characteristics such as Age, CEO experience, Foreign Ownership (a dummy), as well as country level controls such as the per capita GDP and regulatory quality are incorporated in the modelling while making use of survey weights. Each access to finance variable is modelled twice, where the first model has only firm characteristics, and the second includes industry, size and region dummies. T-statistics are reported in brackets. The symbols ***, **, and* denote statistical significance at 1%, 5%, and 10% levels respectively.

Variable (s)	**1**	**2**	**3**	**4**	**5**	**6**
Investments in Fixed Assets	2.152	1.077				
	(1.470)	(0.626)				
Account Ownership			(2.751)	(5.602)		
			(-0.942)	(-1.584)		
Working Capital from Internal Funds					0.232	1.766
					(0.139)	(0.862)
CEO Experience	(0.053)	(0.016)	(0.047)	0.007	(0.059)	(0.022)
	(-0.731)	(-0.202)	(-0.639)	(0.086)	(-0.827)	(-0.285)
Firms' Age	-0.169***	-0.200***	-0.161***	-0.203***	-0.162***	-0.196***
	(-2.879)	(-2.922)	(-2.685)	(-2.898)	(-2.851)	(-2.875)
Foreign Ownership	2.392	2.441	2.367	1.820	2.408	2.424
	(1.098)	(1.007)	(1.010)	(0.685)	(1.089)	(0.995)
Per Capita GDP	0.624	63.75***	0.762	69.27***	0.674	68.76***
	(0.956)	(3.995)	(1.116)	(4.281)	(1.019)	(4.510)
Regulatory Quality	1.646	(39.040)	1.751	(8.299)	1.692	(48.300)
	(0.415)	(-0.843)	(0.437)	(-0.166)	(0.412)	(-1.038)
Firm Size Dummies	NO	YES	NO	YES	NO	YES
Industry Dummies	NO	YES	NO	YES	NO	YES
Region Dummies	NO	YES	NO	YES	NO	YES
Observations	1085	867	1035	825	1085	867
R-squared	0.039	0.080	0.040	0.099	0.035	0.081

Table 3.8 First Stage and Test for Instruments: Colonial Transportation Routes

This Table presents first stage estimates using transport infrastructure (railways and seaports) as an instrument. The instrument is regressed on proxies of access to finance i.e., investments in fixed capital, account ownership, and reliance on internal funds. Firm characteristics controlled for, in this regression include age, years of experience of CEO, and foreign ownership status (dummy). Mindful of the heterogenous nature of firms operating in different industries within the CEMAC region, the analysis controls for firm size, industry, region, and country dummies. The modelling makes use of survey weights. The F-test is highlighted below and demonstrates the strength and significance of the instruments. T-statistics are reported in parentheses, where *** denote statistical significance at 1% level.

Variable	Account Ownership	Investments in Fixed Assets	Working Capital from Internal Funds
Instrument: Transportation Routes	**-3.599*** **	**-3.747*** **	**0.227*** **
	(-4.089)	(-3.294)	(3.252)
Firm Characteristics	YES	YES	YES
Firm Size Dummies	YES	YES	YES
Industry Dummies	YES	YES	YES
Region Dummies	YES	YES	YES
Country Dummies	YES	YES	YES
Constant	7.829***	7.758***	0.218
	(4.606)	(3.552)	(0.912)
Observations	849	893	893
First Stage: Test for Instrument	**16.720**	**10.850**	**10.576**
R-squared	0.15	0.095	0.151

Results above are obtained by estimating equation (3.4) that models first stage IV analysis. The left-hand are measures of access to finance while the right-hand is the novel instrument. Result reveal that, controlling for firm, region, and country specificities, the instrument—*colonial transportation routes* is statistically significant and economically meaningful, thus passing the test for a valid instrument in all the specifications. Put clearly, the first model suggests that the instrument predicts access to finance as measured by financial inclusion—ownership of checking account/credit line/overdraft facility, with a strong F-stats after controlling for firm, industry, and country specificities. The negative coefficient on the instrument reflects the inverse relationship that resides in access to finance and improved transport network i.e., when the odds associated with physical distance between lender and borrower decreases, the likelihood of obtaining finance increases. Similar logic and wording can be offered to the second model that measures access to finance as the ease of investing in fixed assets. The last model depicts severe financial constraints on firms, where firms rely/depend on internal funds for routine/day-to-day activities i.e., working capital. All else equal, the model suggest that when physical distance worsens i.e., increase in physical distance between firm and financial intermediary, firm is condemned to rely more and more on its internal funds for working capital. Thus, having the correct signs at this stage suggest that the monotonicity assumption is satisfied. The predicted results obtained are used estimate the dependent variable described in equation (3.3).

3.4.2 Results: instrumental variable estimation

Having defended the proposed instrument, having also showed its validity in the first stage regression analysis, I proceed and report the second stage estimates as seen in panels A through E below.

Table 3.9 Instrumental Variable Estimation: Effects of Access to Finance on Firm Growth

Panel A: Effects of Access to Finance on Sales Growth

This Table presents 2SLS IV estimates. The left-hand is positive sales growth, the right-hand has measures of financial inclusion/access (investments in fixed capital, account ownership and reliance on internal funds) that have been instrumented using colonial transportation routes—that is, if a firm is located from the second to the fourth quartile away from a colonial railway or seaport, it is considered far and coded 1, when otherwise, it takes 0. Firm characteristics or controls such as Age, CEO experience, Foreign Ownership (a dummy), are incorporated in the modelling while making use of survey weights. Each access to finance variable is modelled five times, the first model only controls for firm characteristics, while second, third, fourth and fifth model incorporates industry, firm size, country, and region specificities respectively. Below the estimated coefficients are T-statistics (in parenthesis). The symbols ***, **, and* denote statistical significance at 1%, 5%, and 10% levels respectively.

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Account Ownership	2.79	2.014**	2.177**	1.840**	1.701***										
	(1.54)	(2.56)	(2.34)	(2.24)	(3.14)										
Investment In Fixed Assets						1.871**	1.612**	1.759**	1.956*	1.589***					
						(2.00)	(2.51)	(2.25)	(1.77)	(2.85)					
Working Capital from Internal Funds											-1.464***	-2.982*	-3.26	-1.793**	-1.117**
											(-2.929)	(-1.716)	(-1.529)	(-2.108)	(-2.465)
Firm Characteristics	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Industry Dummies	N	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y	Y	Y	Y
Firm Size Dummies	N	N	Y	Y	Y	N	N	Y	Y	Y	N	N	Y	Y	Y
Country Dummies	N	N	N	Y	Y	N	N	N	Y	Y	N	N	N	Y	Y
Region Dummies	N	N	N	N	Y	N	N	N	N	Y	N	N	N	N	Y
Constant	-1.65	-0.87	-0.97	-0.90	-0.63	-0.31	-0.09	-0.14	-0.09	0.01	1.808***	3.019**	3.264*	1.551**	1.090***
	(-1.115)	(-1.500)	(-1.445)	(-1.532)	(-1.107)	(-0.665)	(-0.321)	(-0.403)	(-0.266)	(0.02)	(4.26)	(2.02)	(1.78)	(2.46)	(3.32)
Observations	1,061	1,061	1,061	1,061	849	1,113	1,113	1,113	1,113	893	1,113	1,113	1,113	1,113	893

Results uncover the effects of external finance on measures of firm growth, which appears to be stronger than what was obtained in the baseline estimation. After instrumenting measures of access to finance with an exogenous determinant, results reveal that if a firm owns an account, it enhances its growth through sales. This means that, as a firm participates in the formal financial market proxied by ownership of checking account/credit line/overdraft facility, it strongly translates into firm growth. Investments in fixed assets also has the correct sign which is statistically significant and economically meaningful i.e., all else equal, a firm that carries out capital investments, grows in terms of sales as seen from model 6 through 10 above. Another way to understand if firms are constrained is to track and evaluate their reliance on internal funds in order to sustain basic operations (working capital). If a firm heavily relies on this fund, it's safe to conclude that it is likely to lack external financing channels capable of funding/enhancing its growth potentials. Columns 11 through 15 supports this claim, whereby, all else equal, a firm that relies on internal funds for working capital is likely not to experience growth. In all the specifications above, one can observe consistency, even after controlling for various specificities, hence, external finance matters for firm growth.

Panel A: Effects of Access to Finance on Employment Growth

The panel presents 2SLS IV estimates. The left-hand is positive employment growth, the right-hand has measures of financial inclusion/access (investments in fixed capital, account ownership and reliance on internal funds) that have been instrumented using colonial transportation routes—that is, if a firm is located from the second to the fourth quartile away from a colonial railway or seaport, it is considered far and coded 1, when otherwise, it takes 0. Firm characteristics or controls such as Age, CEO experience, Foreign Ownership (a dummy), are incorporated in the modelling while making use of survey weights. Each access to finance variable is modelled five times, the first model only controls for firm characteristics, while second, third, fourth and fifth model incorporates industry, firm size, country, and region specificities respectively. Below the estimated coefficients are T-statistics (in parenthesis). The symbols ***, **, and* denote statistical significance at 1%, 5%, and 10% levels respectively.

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Account Ownership	1.369	1.025*	0.950	0.927	1.189***										
	(1.137)	(1.693)	(1.450)	(1.464)	(3.026)										
Investment In Fixed Assets						0.706	0.702*	0.640	0.811	1.269**					
						(1.330)	(1.662)	(1.384)	(1.280)	(2.393)					
Working Capital from Internal Funds											-0.583	-1.419	-1.316	-0.855	-0.503
											(-1.416)	(-1.246)	(-1.065)	(-1.318)	(-1.100)
Firm Characteristics	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Industry Dummies	N	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y	Y	Y	Y
Firm Size Dummies	N	N	Y	Y	Y	N	N	Y	Y	Y	N	N	Y	Y	Y
Country Dummies	N	N	N	Y	Y	N	N	N	Y	Y	N	N	N	Y	Y
Region Dummies	N	N	N	N	Y	N	N	N	N	Y	N	N	N	N	Y
Constant	(0.614)	(0.220)	(0.177)	(0.173)	(0.585)	0.150	0.233	0.248	0.302	(0.278)	0.976***	1.690*	1.596	1.055**	1.069***
	(-0.635)	(-0.511)	(-0.390)	(-0.389)	(-1.463)	(0.571)	(1.220)	(1.272)	(1.537)	(-0.624)	(2.785)	(1.767)	(1.524)	(2.355)	(3.667)
Observations	1,033	1,033	1,033	1,033	823	1,083	1,083	1,083	1,083	865	1,083	1,083	1,083	1,083	865

Table highlights the effects of external finance on firm growth. The explanation offered in the previous Table above is relevant here, but different in that it produces slightly weaker statistical significance.

Panel A: Effects of Access to Finance on Investment Inefficiency

The panel presents 2SLS IV estimates. The left-hand is lack of growth—underinvestment, which is a negative deviation from the predicted growth potential, the right-hand has measures of financial inclusion/access (investments in fixed capital, account ownership and reliance on internal funds) that have been instrumented using colonial transportation routes—that is, if a firm is located from the second to the fourth quartile away from a colonial railway or seaport, it is considered far and coded 1, when otherwise, it takes 0. Firm characteristics or controls such as Age, CEO experience, Foreign Ownership (a dummy), are incorporated in the modelling while making use of survey weights. Each access to finance variable is modelled five times, the first model only controls for firm characteristics, while second, third, fourth and fifth model incorporates industry, firm size, country, and region specificities respectively. Below the estimated coefficients are T-statistics (in parenthesis). The symbols ***, **, and* denote statistical significance at 1%, 5%, and 10% levels respectively.

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Account Ownership	(5.82)	-4.213***	-4.717**	-3.804**	-0.467										
	(-1.570)	(-2.831)	(-2.553)	(-2.500)	(-1.409)										
Investment In Fixed Assets						-3.536**	-3.319***	-3.784**	-3.971*	-0.462					
						(-2.102)	(-2.785)	(-2.455)	(-1.909)	(-1.520)					
Working Capital from Internal Funds											2.766***	6.141*	7.005	3.639**	1.967***
											-3.514	-1.811	-1.614	-2.411	-3.104
Firm Characteristics	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Industry Dummies	N	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y	Y	Y	Y
Firm Size Dummies	N	N	Y	Y	Y	N	N	Y	Y	Y	N	N	Y	Y	Y
Country Dummies	N	N	N	Y	Y	N	N	N	Y	Y	N	N	N	Y	Y
Region Dummies	N	N	N	N	Y	N	N	N	N	Y	N	N	N	N	Y
Constant	5.179*	3.587***	3.883***	3.693***	0.307	2.246***	1.931***	2.061***	2.017***	0.131	-1.764**	-4.48	-5.25	-1.312	1.037*
	-1.711	-3.403	-3.027	-3.601	-1.03	-2.668	-3.625	-3.152	-3.198	-0.662	(-2.556)	(-1.540)	(-1.404)	(-1.166)	-1.855
Observations	1,061	1,061	1,061	1,061	849	1,113	1,113	1,113	1,113	893	1,113	1,113	1,113	1,113	893

This table reports the effects of external finance on firm growth (or lack of growth) according to Chen, Hope, Li and Wang (2011, which is a deviation from the expected optimal level of investment. Conceptually, investment efficiency refers to firms undertaking all and only projects with positive net present value. Consistent with prior research (e.g., Biddle et al. 2009). This study measures investment efficiency as deviations from expected investment using a model that predicts investment as a function of growth opportunities. Thus, both underinvestment (negative deviations from expected investment) and overinvestment (positive deviations from expected investment). Here, I focus on the underinvestment portion as a measure of lack of growth. As reported above, account firms that own an account, and those that invest in fixed assets are less likely to underinvest, while those that rely on internal funds are more likely to underinvest.

Panel D: Effects of Access to Finance on Compounded Annual Sales Growth

The panel presents 2SLS IV estimates. The left-hand is compounded annual sales growth, the right-hand has measures of financial inclusion/access (investments in fixed capital, account ownership and reliance on internal funds) that have been instrumented using colonial transportation routes—that is, if a firm is located from the second to the fourth quartile away from a colonial railway or seaport, it is considered far and coded 1, when otherwise, it takes 0. Firm characteristics or controls such as Age, CEO experience, Foreign Ownership (a dummy), are incorporated in the modelling while making use of survey weights. Each access to finance variable is modelled five times, the first model only controls for firm characteristics, while second, third, fourth and fifth model incorporates industry, firm size, country, and region specificities respectively. Below the estimated coefficients are T-statistics (in parenthesis). The symbols ***, **, and* denote statistical significance at 1%, 5%, and 10% levels respectively.

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Account Ownership	50.530	51.44**	56.04**	46.84**	40.29***										
	(1.468)	(2.427)	(2.236)	(2.087)	(3.017)										
Investment In Fixed Assets						34.09*	43.31**	47.91**	52.63*	38.28***					
						(1.846)	(2.447)	(2.205)	(1.730)	(2.731)					
Working Capital from Internal Funds											-26.67**	-80.13*	-88.700	-48.24**	-39.01**
											(-2.442)	(-1.730)	(-1.542)	(-2.109)	(-2.560)
Firm Characteristics	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Industry Dummies	N	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y	Y	Y	Y
Firm Size Dummies	N	N	Y	Y	Y	N	N	Y	Y	Y	N	N	Y	Y	Y
Country Dummies	N	N	N	Y	Y	N	N	N	Y	Y	N	N	N	Y	Y
Region Dummies	N	N	N	N	Y	N	N	N	N	Y	N	N	N	N	Y
Constant	(32.940)	-30.47**	-33.18*	-31.27**	(22.930)	(8.835)	(11.800)	(13.090)	(11.990)	(8.631)	29.83***	71.84*	79.480	32.14*	21.07*
	(-1.180)	(-2.005)	(-1.891)	(-2.028)	(-1.570)	(-0.959)	(-1.471)	(-1.411)	(-1.295)	(-0.709)	(3.184)	(1.802)	(1.597)	(1.894)	(1.934)
Observations	1,061	1,061	1,061	1,061	849	1,113	1,113	1,113	1,113	893	1,113	1,113	1,113	1,113	893

Table shows that compounded annual sales growth, produce similar effects as in positive sales growth (see table 3.6. panel A), hence, highlighting the importance of external finance in firm growth.

Panel E: Effects of Access to Finance on Compounded Annual Employment Growth

The panel presents 2SLS IV estimates. The left-hand is compounded annual employment growth, the right-hand has measures of financial inclusion/access (investments in fixed capital, account ownership and reliance on internal funds) that have been instrumented using colonial transportation routes—that is, if a firm is located from the second to the fourth quartile away from a colonial railway or seaport, it is considered far and coded 1, when otherwise, it takes 0. Firm characteristics or controls such as Age, CEO experience, Foreign Ownership (a dummy), are incorporated in the modelling while making use of survey weights. Each access to finance variable is modelled five times, the first model only controls for firm characteristics, while second, third, fourth and fifth model incorporates industry, firm size, country, and region specificities respectively. Below the estimated coefficients are T-statistics (in parenthesis). The symbols ***, **, and* denote statistical significance at 1%, 5%, and 10% levels respectively.

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Account Ownership	26.84	24.29	23.75	14.3	26.32***										
	-0.9	-1.277	-1.142	-0.924	-2.681										
Investment In Fixed Assets						15.35	17.26	16.62	13.38	27.64**					
						-1.097	-1.365	-1.19	-0.928	-2.089					
Working Capital from Internal Funds											-12.9	-36.1	-35.5	-14.2	-2.9
											(-1.154)	(-1.102)	(-0.966)	(-0.930)	(-0.281)
Firm Characteristics	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Industry Dummies	N	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y	Y	Y	Y
Firm Size Dummies	N	N	Y	Y	Y	N	N	Y	Y	Y	N	N	Y	Y	Y
Country Dummies	N	N	N	Y	Y	N	N	N	Y	Y	N	N	N	Y	Y
Region Dummies	N	N	N	N	Y	N	N	N	N	Y	N	N	N	N	Y
Constant	-13.14	-10.5	-10.19	-8.329	-25.29**	1.184	-0.069	0.0887	-0.92	-18.48	19.30**	36.71	36.15	11.48	11.22
	(-0.561)	(-0.763)	(-0.694)	(-0.661)	(-2.225)	-0.171	(-0.0119)	-0.015	(-0.142)	(-1.406)	-1.977	-1.354	-1.176	-1.087	-1.322
Observations	1,035	1,035	1,035	1,035	825	1,085	1,085	1,085	1,085	867	1,085	1,085	1,085	1,085	867

Equally, similar effects seen on table 3.6. panel B are obtained using compounded annual employment growth rate as a dependent variable. Controlling for firm, size, industry, country and region effects, one can observe a statistically significant relation between firms' growth and account ownership/investment in fixed assets measures. Reliance on internal funds has the correct sign but lacks a statistical significance, suggesting that firms that depend on their internal funds for working capital are less likely to growth through sales within the CEMAC region.

3.4.3 Normalized financial development measure (instrument used for robustness checks)

Table 3.10 Normalized Measure of Financial Development

The table justifies financial development within the CEMAC region between 2009-2018. The coefficients on regional dummies are gotten from the regression estimation by considering those who self-selected themselves out of the credit market to constitute 1, and zero when otherwise. This captures credit constraint status and on the right-hand, there is a full set of regional dummies while considering Berberatia, a region in Central Africa Republic as the base. The coefficient obtained on these regional dummies are next normalized by executing 1 - Regional effect/max {Regional effect} and is thus equal to zero in the region with the maximum value of the coefficient on the regional dummy and represents a less financially developed region that ranges between 1 and 0.

Financial Development in CEMAC between 2009-18

Country	Regions	Coefficient	Normalized Measure
Central Africa Rep.	Bangui	0.544	0.22
Central Africa Rep.	Berberati		
Congo, Rep.	Brazzaville	0.667	0.05
Cameroon	Center	0.483	0.31
Cameroon	Coastal	0.475	0.32
Gabon	Libreville	0.339	0.52
Chad	N'Djamena	0.406	0.42
Gabon	Owendo	0.222	0.68
Congo, Rep.	Pointe-Noire	0.571	0.18
Gabon	Port-Gentil	0.7	0.00
Cameroon	West	0.674	0.04

Table 3.11 First Stage and Test for Instrument: Normalized Financial Development Measure

This table presents first stage estimation results, where the normalized financial development indicator is regressed on proxies of access to finance i.e., investments in fixed capital, account ownership, and reliance on internal funds. Firm characteristics controlled for, in this regression include age, years of experience of CEO, and foreign ownership status (dummy). Mindful of the heterogenous nature of firms operating in different industries within the CEMAC region, the analysis controls for firm size, industry, region and country dummies. The modelling makes use of survey weights. The F-test is highlighted below and demonstrates the strength and significance of the instruments. T-statistics are reported in parentheses below the estimated coefficients. The symbols *** and ** denotes statistical significance at 1% and 5% levels.

Variable	Account Ownership	Investments in Fixed Assets	Working Capital from Internal Funds
Instrument: Normalized Measure of Financial Development	**-16.15*** **	**-16.81*** **	**0.643** **
	(-4.090)	(-3.294)	(2.419)
Firm Characteristics	YES	YES	YES
Firm Size Dummies	YES	YES	YES
Industry Dummies	YES	YES	YES
Region Dummies	YES	YES	YES
Country Dummies	YES	YES	YES
Constant	7.829***	7.757***	(0.094)
	(4.606)	(3.552)	(-0.375)
Observations	847	891	891
First Stage: Test for Instrument	**16.73**	**10.85**	**5.85**
R-squared	0.149	0.095	0.135

Results above are obtained by estimating equation (3.4) that models first stage IV analysis. The left-hand in this regression has measures of access while the right-hand is an instrument constructed to reflect the current state of financial underdevelopment in each region (see table 3.7 above for full discussion). Result reveal that, controlling for firm, region, and country specificities, the instrument—*Normalized Measure of Underdevelopment* is statistically significant and economically meaningful, thus passing the test for a valid instrument in the first two models, while results obtained from the third model needs to be taken with caution. Specifically, the first model suggests that the state of a regions' financial underdevelopment predicts access to finance as measured by account ownership i.e., checking account/credit line/overdraft facility which has a strong F-stats after controlling for firm, industry, and country specificities. The negative coefficient on the instrument reflects the inverse relationship that resides in access to finance and financial underdevelopment i.e., when financial underdevelopment lessens the likelihood of obtaining finance increases. Similar logic and wording can be offered to the second model that measures access to finance as investments in fixed assets. The last model depicts severe financial constraints on firms i.e., reliance on its internal funds for routine/day-to-day activities–– working capital. All else equal, the model suggest that when financial underdevelopment worsens i.e., increase lack of financial institutions and markets to channel funds to projects efficiently, firm is condemned to rely on its internal funds for working capital. The predicted results obtained are used estimate the dependent variable described in equation (3.3).

3.4.4 Results: robustness checks

Table 3.12 Robustness Checks: Effects of Access to Finance on Firm Growth

Panel A: Effects of Access to Finance on Sales Growth

The panel presents 2SLS - IV estimates for robustness checks. On the left-hand is positive sales growth while the right-hand has measures of financial inclusion/access ((investments in fixed capital, account ownership and reliance on internal funds) that have been instrumented using a normalized measure of financial development à la Guizo, Sapienza and Zingales (2004) as illustrated on table 3.7. Firm characteristics such as Age, CEO experience, Foreign Ownership (a dummy), are incorporated in the modelling while making use of survey weights. As on the 3.6. that reports IV estimates, each access to finance variable is modelled five times, the first model only controls for firm characteristics, the second, the third, the fourth, and the fifth models incorporates industry, firm size, country and region specificities respectively. T-statistics appear in parenthesis below the estimated coefficients. The symbols ***, **, and* denote statistical significance at 1%, 5%, and 10% levels respectively.

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Account Ownership	1.284*	1.258*	1.33	1.852*	1.701***										
	(1.75)	(1.67)	(1.56)	(1.92)	(3.14)										
Investment In Fixed Assets						(43.88)	(48.57)	(5.75)	8.69	1.589***					
						(-0.0467)	(-0.0374)	(-0.288)	(0.29)	(2.85)					
Working Capital from Internal Funds											-0.717**	-0.803*	-0.798*	-1.699*	-1.867**
											(-2.038)	(-1.778)	(-1.668)	(-1.682)	(-2.262)
Firm Characteristics	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Industry Dummies	N	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y	Y	Y	Y
Firm Size Dummies	N	N	Y	Y	Y	N	N	Y	Y	Y	N	N	Y	Y	Y
Country Dummies	N	N	N	Y	Y	N	N	N	Y	Y	N	N	N	Y	Y
Region Dummies	N	N	N	N	Y	N	N	N	N	Y	N	N	N	N	Y
Constant	(0.44)	(0.31)	(0.36)	(0.91)	(0.63)	22.61	21.99	3.03	(1.94)	0.01	1.204***	1.262***	1.257***	1.491**	1.275***
	(-0.713)	(-0.549)	(-0.566)	(-1.225)	(-1.107)	(0.05)	(0.04)	(0.36)	(-0.232)	(0.02)	(4.12)	(3.31)	(3.08)	(2.29)	(2.70)
Observations	1,059	1,059	1,059	1,059	847	1,111	1,111	1,111	1,111	891	1,111	1,111	1,111	1,111	891

Table highlights the effects of external finance on firm growth within the CEMAC region. Controlling for firm characteristics, industry, firm size, country level and region level specifies, prior results obtained still hold, thus, demonstrating that external finance matters for firm growth when measured through sales. More specifically, all else equal, when firms have more access to finance either by account ownership or investments in fixed assets, such a firm grows, when otherwise, firms are limited and rely on internal funds for survival and growth which hurts growth potentials.

Panel B: Effects of Access to Finance on Employment Growth

The panel presents 2SLS - IV estimates for robustness checks. On the left-hand is positive employment growth while the right-hand has measures of financial inclusion/access ((investments in fixed capital, account ownership and reliance on internal funds) that have been instrumented using a normalized measure of financial development à la Guizo, Sapienza and Zingales (2004) as illustrated on table 3.7. Firm characteristics such as Age, CEO experience, Foreign Ownership (a dummy), are incorporated in the modelling while making use of survey weights. As on the 3.6. that reports IV estimates, each access to finance variable is modelled five times, the first model only controls for firm characteristics, the second, the third, the fourth, and the fifth models incorporates industry, firm size, country and region specificities respectively. T-statistics appear in parenthesis below the estimated coefficients. The symbols ***, **, and* denote statistical significance at 1%, 5%, and 10% levels respectively.

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Account Ownership	2.309**	2.410**	2.486**	2.560**	1.189***										
	(2.145)	(2.136)	(1.969)	(2.038)	(3.026)										
Investment In Fixed Assets						11.460	9.905	48.560	4.939	1.269**					
						(0.282)	(0.314)	(0.060)	(0.593)	(2.393)					
Working Capital from Internal Funds											-1.197**	-1.484*	-1.437*	-2.197	-1.180
											(-2.351)	(-1.942)	(-1.790)	(-1.385)	(-1.456)
Firm Characteristics	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Industry Dummies	N	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y	Y	Y	Y
Firm Size Dummies	N	N	Y	Y	Y	N	N	Y	Y	Y	N	N	Y	Y	Y
Country Dummies	N	N	N	Y	Y	N	N	N	Y	Y	N	N	N	Y	Y
Region Dummies	N	N	N	N	Y	N	N	N	N	Y	N	N	N	N	Y
Constant	(1.372)	(1.238)	(1.280)	(1.361)	(0.585)	(5.169)	(3.775)	(19.600)	(0.806)	(0.278)	1.476***	1.742***	1.696**	1.894*	1.244***
	(-1.543)	(-1.489)	(-1.410)	(-1.438)	(-1.463)	(-0.258)	(-0.276)	(-0.0585)	(-0.347)	(-0.625)	(3.406)	(2.741)	(2.509)	(1.858)	(3.232)
Observations	1,031	1,031	1,031	1,031	821	1,081	1,081	1,081	1,081	863	1,081	1,081	1,081	1,081	863

Results bring out

Panel C: Effects of Access to Finance on Investment Inefficiency

The panel presents 2SLS - IV estimates for robustness checks. On the left hand is underinvestment i.e., negative deviations from predicted investment while the right-hand has measures of financial inclusion/access ((investments in fixed capital, account ownership and reliance on internal funds) that have been instrumented using a normalized measure of financial development à la Guizo, Sapienza and Zingales (2004) as illustrated on table 3.7. Firm characteristics such as Age, CEO experience, Foreign Ownership (a dummy), are incorporated in the modelling while making use of survey weights. As on the 3.6. that reports IV estimates, each access to finance variable is modelled five times, the first model only controls for firm characteristics, the second, the third, the fourth, and the fifth models incorporates industry, firm size, country and region specificities respectively. T-statistics appear in parenthesis below the estimated coefficients. The symbols ***, **, and* denote statistical significance at 1%, 5%, and 10% levels respectively.

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Account Ownership	-2.575***	-2.462***	-2.760**	-4.161**	-0.47										
	(-2.613)	(-2.646)	(-2.391)	(-2.538)	(-1.409)										
Investment In Fixed Assets						80.40	92.96	12.03	-20.03	-0.46					
						-0.05	-0.04	-0.3	(-0.283)	(-1.520)					
Working Capital from Internal Funds											1.314***	1.536**	1.668**	3.918*	3.719**
											-2.94	-2.45	-2.37	-1.82	-2.42
Firm Characteristics	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Industry Dummies	N	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y	Y	Y	Y
Firm Size Dummies	N	N	Y	Y	Y	N	N	Y	Y	Y	N	N	Y	Y	Y
Country Dummies	N	N	N	Y	Y	N	N	N	Y	Y	N	N	N	Y	Y
Region Dummies	N	N	N	N	Y	N	N	N	N	Y	N	N	N	N	Y
Constant	2.556***	2.293***	2.467***	3.952***	0.307	-39.8	-40.4	-4.61	6.439	0.131	-0.59	-0.77	-0.9	-1.48	0.6
	-3.09	-3.36	-2.97	-3.07	-1.03	(-0.0464)	(-0.0371)	(-0.273)	-0.326	-0.66	(-1.562)	(-1.452)	(-1.496)	(-1.074)	-0.64
Observations	1,059	1,059	1,059	1,059	847	1,111	1,111	1,111	1,111	891	1,111	1,111	1,111	1,111	891

Panel D: Effects of Access to Finance on Compounded Annual Sales Growth

The panel presents 2SLS - IV estimates for robustness checks. The left-hand has compounded annual sales growth while the right-hand has measures of financial inclusion/access ((investments in fixed capital, account ownership and reliance on internal funds) that have been instrumented using a normalized measure of financial development à la Guizo, Sapienza and Zingales (2004) as illustrated on table 3.7. Firm characteristics such as Age, CEO experience, Foreign Ownership (a dummy), are incorporated in the modelling while making use of survey weights. As on the 3.6. that reports IV estimates, each access to finance variable is modelled five times, the first model only controls for firm characteristics, the second, the third, the fourth, and the fifth models incorporates industry, firm size, country, and region specificities respectively. T-statistics appear in parenthesis below the estimated coefficients. The symbols ***, **, and* denote statistical significance at 1%, 5%, and 10% levels respectively.

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Account Ownership	38.23*	43.88*	47.53*	61.62**	40.28***										
	(1.697)	(1.767)	(1.689)	(2.011)	(3.016)										
Investment In Fixed Assets						(1207.000)	(1597.000)	(196.000)	284.900	38.29***					
						(-0.0468)	(-0.0374)	(-0.293)	(0.287)	(2.731)					
Working Capital from Internal Funds											-19.73*	-26.39*	-27.18*	-55.73*	-55.89**
											(-1.834)	(-1.858)	(-1.786)	(-1.736)	(-2.283)
Firm Characteristics	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Industry Dummies	N	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y	Y	Y	Y
Firm Size Dummies	N	N	Y	Y	Y	N	N	Y	Y	Y	N	N	Y	Y	Y
Country Dummies	N	N	N	Y	Y	N	N	N	Y	Y	N	N	N	Y	Y
Region Dummies	N	N	N	N	Y	N	N	N	N	Y	N	N	N	N	Y
Constant	(23.020)	(24.900)	(27.030)	-41.96*	(22.920)	613.100	710.000	89.770	(75.950)	(8.633)	24.20***	28.52**	29.29**	36.69*	25.25*
	(-1.241)	(-1.334)	(-1.309)	(-1.795)	(-1.570)	(0.047)	(0.038)	(0.316)	(-0.275)	(-0.709)	(2.663)	(2.370)	(2.246)	(1.747)	(1.773)
Observations	1059	1059	1059	1059	847	1111	1111	1111	1111	891	1111	1111	1111	1111	891

Panel E: Effects of Access to Finance on Compounded Annual Employment Growth

The panel presents 2SLS - IV estimates for robustness checks. The left-hand has compounded employment while the right-hand has measures of financial inclusion/access ((investments in fixed capital, account ownership and reliance on internal funds) that have been instrumented using a normalized measure of financial development à la Guizo, Sapienza and Zingales (2004) as illustrated on table 3.7. Firm characteristics such as Age, CEO experience, Foreign Ownership (a dummy), are incorporated in the modelling while making use of survey weights. As on the 3.6. that reports IV estimates, each access to finance variable is modelled five times, the first model only controls for firm characteristics, the second, the third, the fourth, and the fifth models incorporates industry, firm size, country, and region specificities respectively. T-statistics appear in parenthesis below the estimated coefficients. The symbols ***, **, and* denote statistical significance at 1%, 5%, and 10% levels respectively.

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Account Ownership	24.300	24.540	24.080	38.950	26.32***										
	(0.959)	(0.981)	(0.857)	(1.532)	(2.681)										
Investment In Fixed Assets						218.700	163.200	(675.600)	88.880	27.65**					
						(0.171)	(0.210)	(-0.0441)	(0.513)	(2.089)					
Working Capital from Internal Funds											-13.700 (-1.065)	-16.210 (-1.013)	-14.500 (-0.829)	-34.900 (-1.173)	-10.200 (-0.694)
Firm Characteristics	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Industry Dummies	N	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y	Y	Y	Y
Firm Size Dummies	N	N	Y	Y	Y	N	N	Y	Y	Y	N	N	Y	Y	Y
Country Dummies	N	N	N	Y	Y	N	N	N	Y	Y	N	N	N	Y	Y
Region Dummies	N	N	N	N	Y	N	N	N	N	Y	N	N	N	N	Y
Constant	(11.090)	(10.680)	(10.430)	(26.210)	-25.29**	(99.590)	(63.510)	286.400	(20.690)	(18.480)	19.99*	20.590	18.900	24.370	13.090
	(-0.539)	(-0.587)	(-0.525)	(-1.434)	(-2.225)	(-0.157)	(-0.188)	(0.045)	(-0.440)	(-1.407)	(1.860)	(1.534)	(1.262)	(1.213)	(1.524)
Observations	1,033	1,033	1,033	1,033	823	1,083	1,083	1,083	1,083	865	1,083	1,083	1,083	1,083	865

3.5 More Insights On IV Design: Heterogenous Treatment Effects

Causal inferences in econometric analysis have recently preoccupied economists, especially with the contribution of Angrist, Imbens and Rubin (1996), where they provided interesting insights on the connection between econometrics and experimental designs. Basically, one can look at IV design in two ways: on one-hand where the treatment translates same causal effects on all firms i.e., homogenous treatment effects, and on another-hand where there is significant variation in the treatment effects across firms i.e., heterogenous effects. As dataset for the current analysis is drawn from WBES—a survey (sort of observational data), with potential heterogeneity that is likely to be at the source of bias such as pre-treatment factors affecting the outcome or heterogenous effects. This heterogeneity in treatment effects (HTE) has refreshed existing approaches aimed at handling causal inferences and the treatment effects as well as its interpretations (De Chaisemartin and D'Haultfoeuille, 2020; Wager and Athey, 2018; Yadlowsky, Fleming, Shah and Brunskill, 2021; Athey and Wager, 2019). The goal of these researchers has been to address previous approaches that estimated these effects of treatment on outcome across groups and over time because previously, most approaches produced treatment effect that was constant across groups and over time. It is therefore instructive to examine or evaluate the extent to which IV estimates are valid, in the presence of heterogenous treatment effect, and secondly, to understand under what assumptions the IV will identify a causal effect with heterogenous treatment effects. Why then does HTE matter? The reason is straightforward—once HTE are introduced, one has to make a difference between internal and external validity of a study. Internal validity implies the technique employed in the analysis identified a causal effect for the set of firms under study while external validity means that the findings can be applied to other firms in the CEMAC or Africa that were not included in the study. The question at hand is that under homogenous or constant effects, there is no friction between internal and external validity since all firms have exact treatment effects. However, under HTE the friction is present and could counter the importance of the IV results. Heterogeneity of treatment effect (HTE) is the non-random, explains variability in the direction of and magnitude of treatment effects for individuals within a population. The objective conducting an HTE analysis is to estimate treatment effects in subgroups and to predict whether an individual firm might benefit from a treatment——subgroup analysis is the most analytical approach that reflects HTE. Cunningham (2021) notes that there are about five assumptions that needs to be checked under HTE analysis i.e., exclusion restriction, first stage design, monotonicity, independence assumption, and stable unit treatment value assumption. If all

these assumptions are satisfied, one can safely conclude that the IV is valid and does not produce constant treatment effects.

As earlier discussed, and defended, the choice of the instrumental variable is motivated by the fact that physical distance between firms and financial intermediary still matter in Africa, specifically in the CEMAC zone. Whereby access to finance is conditioned by the density of banking services. My model is identified by the exclusion restriction—that colonial transportation routes have no direct effect on firm growth. These colonial infrastructures (rails/ports) may be correlated with country's specific condition that intend influences firm growth. To handle this, I control for various firm, country, and region specificities in order to ascertain that firm growth is not directly influenced by the instrument. Exclusion restriction implied in this IV estimation is that (1) conditional on the controls such as firms' characteristics, region, and country effects incorporated in the regression, colonial transportation routes have no effect on current firm growth other than through access to finance channel (2) no observables are systematically correlated with this measure of colonial transportation routes as well as firms' access to finance. I provide other useful discussion to show that construction and establishment of these rails/ports led to an improvement in economic conditions that have transformed some cities to important business centres, with most bank branches operating in these cities. I argue that such a phenomenon has persisted. Next, I show that this IV is associated with measures of access to finance specifically account ownership, investments in fixed assets, and working capital financed from internal funds. I argue that this instrument sits on sound economic intuition and go further in the first stage estimation to show the validity of this instrument, whereby, after controlling for firm characteristics, firm size, industry, region and country specificities, results revealed a statistically significant and economically meaningful association. The F-stats as shown on Table 3.5 indicate that the instrument is valid. For monotonicity assumption to hold, it suffices that at this first stage, one should obtain the correct signs, that defines the state of the relationship. For example, the negative coefficient on the instrument reflects the inverse relationship that resides in access to finance and improved transport network i.e., when the odds associated with physical distance between lender and borrower decreases, the likelihood of obtaining finance increases. Similar logic and wording can be offered to the second model that measures access to finance as the ease of investing in fixed assets. The last model depicts severe financial constraints on firms, where firms rely/depend on internal funds for routine/day-to-day activities i.e., working capital. All else equal, the model suggest that when physical

distance worsens i.e., increase in physical distance between firm and financial intermediary, firm is condemned to rely more and more on its internal funds for working capital. Thus, having the correct signs at this stage suggest that the monotonicity assumption is satisfied. Furthermore, stable unit treatment value assumption supposes that the potential outcomes for individual firm are not associated to the treatment status of other firms while the independence assumption states that the IV is independent of the potential outcomes and potential treatment assignments i.e., assuming that the instrument in question is itself random. This may mean that the effects or other channels that run from the instrument to the outcome or firm growth are addressed to ensure the validity of this assumption. As highlighted above, I control for these effects at firm, region, and country level which makes the instrument independent of firm growth or firm access since it is random.

3.6 Summary Of Results

How do firms grow, could firm growth be attributed to ease in accessing external finance? Or is it because of their performance that has enabled them to access finance? There are still many parts in the world where severe financial gaps and obstacles to getting external finance hinder firms in terms of growth (Rahaman, 2011; Allen, Carletti, Cull, Qian, Senbet and Valenzuela, 2014). Regions such as the CEMAC zone or Sub-Saharan Africa (SSA) in general, where despite their potential, growth remains sluggish with a business atmosphere that's marred by risks at almost every segment. The financial system[44] reveals that stock markets within Africa are poorly developed with heavily bank-led economies that are shallow, inefficient, and inaccessible. This chapter investigates these questions while contextualizing the study within a monetary union—CEMAC zone. At its broadest level, access to finance and firm growth are shown to have a positive association (Allen, Carletti, Cull, Qian, Senbet and Valenzuela, 2021; Burgess and Pande; 2005, Demirguc-Kunt and Levine, 2008; Rajan and Zingales, 1998).[45]

The question of whether access to finance is of help to firm growth or not is entirely endogenous. It could be that firms that grow have more access to finance (reverse causality), suggesting that countries with more developed capital markets are those that will better channel their resources to firms in need, or there are omitted variables that empirical models might not capture. To address these concerns, the study turns to history to construct an instrument—closeness of a firm to colonial railroads or ports as a proxy for access to finance. Initially implemented in a study by Banerjee, Duflo, Qian (2004, 2020), one can argue that this instrument, could help explain present day patterns of firms' access to finance in the CEMAC zone. Thus, history matters, and the merit of this instrument therefore rests on its ability to measure development and access to finance on firm growth in a one-way direction.

This relationship has been discussed in the literature even as far back as Bagehot (1873) Schumpeter (1911) and more recently King and Levine (1993) and Levine (2005) who identified that one of the core functions of a financial system is to screen, monitor and allocate funds to the most eligible users. Similarly, proponents of financial inclusion – loosely defined

[44] See IMF index on financial development that captures financial markets and financial institutions as discussed in Chapter 2.
[45] Evidence specific to Africa is documented in Murinde (2012) as well as a critical review by Andersen, Jones and Tarp (2012).

as access and use of financial products/services - suggest that the more financially inclusive a firm is, the more likely that firm can perform better (Demirguc-Kunt and Klapper, 2013) and may have a positive effect on job creation and growth. Other studies emphasize the aspect of digital/financial literacy in enhancing a broad-based financial inclusive system (Kass-Hanna and Lyons and Liu, 2021). *On the one hand, it may be that the lack of development of financial markets an environment deterring financial inclusion might hinder firms' access to finance.*

On the other hand, available finance may not end up being distributed among firms for optimal use because of information asymmetries. In a setup where perfect capital market conditions exist a firms' financial structure becomes independent of investment decisions. This is hardly the case due to frictions such as transaction cost and asymmetric issues (Claessens, Ueda and Yafeh, 2010). Information asymmetries can lead to debt-financing of only optimal investments that have a high collateral value (Myers and Majluf, 1984; Grundy and Verwijmeren, 2020). In the case of Africa, these issues largely explain the reluctance in accessing funds both at the domestic and international level (Montiel, 2006). Removing these information asymmetries can increase access to debt-financing (Asongu, Nwachukwu and Tchamyou, 2016; Qu, Wongchoti, Wu and Chen, 2018). *As a result, understanding whether access to external finance helps firm grow is an empirical question.*

This chapter tries to sustain explanations as some firms find themselves as beneficiaries of external finance. To redress the question whether external finance maters is indeed not linear, however, the contribution of this thesis to the literature is to propose instruments that can better explain this link. Two instruments have been put forth, one that depends on history or path-dependence, and another based on current state of financial development. In this way, I am able to obtain results that explain the effects if external finance in firm growth as proxied by positive sales growth and another measure that reflects lack of growth referred to as investment underdevelopment. Interestingly, results remain robust to various specifications, thus, highlighting the merits in external financing.

4 PART II. ACCESS TO FINANCE AND FIRM GROWTH IN ENTREPRENUERIAL FIRMS: EVIDENCE FROM SSA

4.1 Introduction

The establishment, survival and growth of an early-stage venture can partially be determined by its financial access or channels. Gompers and Lerner (2004) notes that accessing external finance remains critical for new ventures. Financial constraints can limit firms from realizing growth objectives such as investment, employment, and in worst cases increase firms' reliance on working capital for its day-to-day activities. Studies have documented the impact of these financial constraints on firm growth—through aggregate employment and investments as evidenced in Chodorow-Reich (2014) and Amiti and Weinstein (2018).[46] The previous part/chapter of this thesis underscored the need to relieve financial constraints for firms as it matters for their performance and growth. Given that firm growth is a policy priority in an economy, it is therefore imperative to identify various strategies that can unfreeze these constraints. In this chapter, I look at the same question from a different angle by exploring various sources or channels of financing available to entrepreneurial firms. Young firms generally lack financial history, obtaining debt-contract is unlikely due to information asymmetry especially moral hazard that may arise, this even gets worst in environments such as Sub-Saharan Africa (SSA)[47] where a sizeable share of the economy is in the informal sector, coupled with its comparatively shallow, inaccessible, and inefficient capital markets. At an early stage of firm development, alternative financing options within the private equity industry can assist in terms of financing which may potentially foster firm survival and growth. These private equity options may include angel investments, venture capital, leverage buyouts as well as new financial products such as equity crowdfunding or initial coin offering, which have a potential of better risk-adjusted returns both for investors and firms.

[46] Chodorow-Reich (2014) looks at the effects of financial constraints after the financial crisis to observe the effects it has on firm growth, while Amiti and Weinstein (2018) takes a look at how finance constraint shocks can explain roughly 30-40% of aggregate changes in investments.

[47] The IMF (2017) regional economic outlook reports that SSA informal sector accounts between 30-90% of non-agricultural employment and plays a major role in the economy by contributing 25-65% to GDP. https://www.imf.org/en/Publications/REO/SSA/Issues/2017/05/03/sreo0517
shall

In first major section, this chapter looks at firms' survival and growth paths, in the second, it discusses the crowdfunding and other alternative financing options that exist in SSA.

4.2 Related Literature

For starts-ups and fast-growing ventures, obtaining funds to foster its growth is one its challenges. It has been justified that access to external finance is an important driver of a new venture and growth (Rajan and Zingales, 1998; Aghion, Fally & Scarpetta, 2007). Young firms generally possess risk features that limits their ability to obtain capital through traditional sources such as bank borrowing or public securities. This is partly explained by the lack of convincing track record or opaque financial statements especially in SSA economies where informality is very high. At a certain stage of growth, firms might no longer compete without making new investments which might be costly and practically difficult to be financed from internal sources. Conventional financing methods are therefore difficult for these new ventures due to asymmetry of information (Beck, Demirguc-Kunt & Maksimovic, 2005). Private equity options can be instrumental in filling up the gap between self-financing and traditional sources. Candidate firms may be entrepreneurial start-ups, well-established firms that are small or troubled firm. In entrepreneurial start-ups, firms seek seed capital at this early stage, venture capital investors play this role, while at its advanced stage of development i.e., firm is somewhat mature but needs additional finance for growth opportunities, private equity can reduce these financing gaps.

In general, along firms' life-cycle or growth path, different categories of investors intervene with financing to assist the firm meets its demands. According to Brush, Edelman and Manolova (2012), angel financing is an informal lending done by rich individuals to unquoted private firms i.e., provision of seed capital. Besides providing finance, these categories of investors equally assist with necessary guidance needed by the firm at this initial stage of firm development. As the firm gets better over time, venture capitalists' step in, with finance—they invest in start-ups and their market is much more intermediated—pooling funds from investors and redirecting them to investments after screening. Venture capitalists also monitor and get involved in strategic planning and decision making. The private equity fund regroups investors 'who directly deploy capital into an already established private firm—that has not gone public. Beyond this stage, the firm might consider offering its shares to the public for greater growth opportunities and visibility. According to Klein, Chapman and Mondelli (2013), private equity

sector emerged around the KKR's buyout[48] of Houdaille industries in 1979, where it grew and spread from USA to UK in the 1990s and to Europe and Asia in the 2000s to be an important element of modern finance. In the private equity industry, investments are done through limited partnership who commit to provide the funds and the general partners manage the funds for an agreed time period, typically 5 years. The general partners agree when to return the capital to limited partners, typically in a time period of 10-12 years—this arrangement is therefore a closed end fund with a finite span (Kaplan and Schoar, 2005).

Private equity funds are financial intermediaries that make investments in portfolio companies––these companies are private or become private as part of the transaction so that there's no organized exchange for the company's equity. The goal is to exit the portfolio company after significantly increasing its equity value. Thus, these are active investors who increase firm value through financing and ensures effective monitoring, mentorship, and hiring of executives (Kaplan & Sensoy, 2015). Successful exits channels may include acquisition, Initial public offering for various reasons such as greater firm visibility, market timing. There's evidence on the importance and role of private equity fund in financing as compared to public markets from the mid 80s (Robinson & Sensoy, 2013; Higson & Stucke, 2012; Ang, Che, Goetzmann & Phalippou, 2018). As regards private equity and its ability to enhance performance, Kaplan (1989) show that after a firm undergoes leverage buyout, its operating performance increases. Kaplan and Strömberg (2009) provide evidence that private equity investments are associated with firm performance. Consistent with this view, Davis, Haltiwanger, Handley, Jarmin, Lerner, and Miranda (2014) present evidence from the US suggesting that buyouts are associated with increased productivity. According to Klein, Chapman and Mondelli (2013), private equity financing is known for its emphasis on performance, rules over managerial discretion, alignment between owners and managers. Such emphasis on governance is likely to enhance the performance of firms especially when managers act as owners. Private equity industry has witnessed a dramatic increase around the world, indicative that it is important alternative channel of finance to young firms, which stimulates entrepreneurship and firm growth. Mauboussin and Callahan (2020), highlights that for over two decades, the US equities investors redirected portfolio allocation from public to private equity where returns to investments remained high. Consistent with this view, Abraham, Cortina and Schmukler (2021) argue that firms in emerging market economies significantly increased their financing

[48] https://www.kkr.com/our-firm/firm-history

(equity & bonds) as from the 90s, thanks to their involvement in international markets. Despite the increasing importance and benefits of this industry, we still have deficient understanding about private equity investing as regards some parts of the world such as SSA. The African continent is host to some economies[49] with strong growth potentials and promises to be a lucrative destination for private equity investors given (a) the high cost of debt financing (b) the underdeveloped capital markets, which present an opportunity for private equity industry on the continent. On Africa, Silici and Locke (2013), present some merits about this alternative channel of financing and its importance on the economy and policy makers; private equity financing unfreezes financial constraints thereby enhancing access to credit, upgrades managerial skills as fund managers are actively involved in improving their portfolio. Shepard (2012) examines private equity-backed investments within African and notes that its indeed an important tool for spurring economic development and its gives opportunity for companies to nurture and expand operations. Research on equity industry on Africa is therefore important in order to guide policy as this channel has a likelihood of easing firms' financial constraints, increasing entrepreneurship, enhancing firm performance and innovation.[50] These are important vectors of development especially as SSA suffers from huge financing gaps.

Venture capitalists for example have a design that overcomes asymmetry of information via staged financing as they invest in start-ups and their market is much more intermediated—pooling funds from investors and redirecting them to investments after screening and monitoring, also, they're involved in strategic planning and decision making (Hellmann, 1998; Gompers et al., 1998; Kaplan and Stromberg, 2001). Thus, suggesting that this investment channel is likely to be beneficial at firms' early stage as it overcomes information challenges through contracting, screening, and effective monitoring more than traditional bank financing. Venture capital can therefore stimulate new firms by ensuring that well-conceived ideas receive seed capital, even when conceived without substantial assets (Keuchningg, 2004), this may raise firms' early survival chances as well as growth. The fact that VC provides complementary services that increases firm value such as mentorship, strategic policy formulation, it increases

[49] The Economist Corporate Network (2017) A growth engine: Trends and outcomes of private equity in Africa https://www.heliosinvestment.com/uploads/files/A-growth-engine-Trends-and-outcomes-of-private-equity-in-Africa.pdf

[50] https://www.brookings.edu/wp-content/uploads/2016/06/2013-BBR-Policy-Briefs-FINALVERSION-2.pdf; https://www.globalprivatecapital.org/africa/; https://www.whitecase.com/publications/insight/africa-focus-spring-2021/private-equity-africa-trends-and-opportunities-2021

the firms' survival and chances of growth (Kaplan and Stromberg, 2001; Bottazzi and Da Rin, 2002). Similarly, other studies highlight those recipients of venture capital are likely to experience higher growth and employment rates as compared to their average peers as documented in Engel and Keilbach (2007), Jain and Kini (1995). Ramadani (2012) underscore the central role angel investors play in the life of small business spanning from capital provision to skilled managerial approaches which helps firms to survive and perform better.

Overall, these investment channels play a crucial role in sustaining the economy especially for start-ups. Similarly, Hochberg, Ljungqvist, and Lu (2007), Gompers, Kovner, Lerner, and Scharfstein (2008), provide support suggesting that recipients of funding from experienced investors have a higher likelihood to survive especially as these investors only propose quality investments, that adds firm value. Equally, Liu and Wang (2014) argue that a decrease in equity value increases credit constraints and readjusts or reallocates resources from productive to unproductive firms with negative impact to aggregate productivity.

4.3 Data

The objective is to understand whether external finance assist firms to survive and grow by exploring financing options within private equity industry that inject capital into early-stage firms as well as some mature firms, given that these firms can't easily obtain bank financing. In the context of finance constraint literature, firm performance or firm growth can easily be modelled using financial statements; return on assets (ROA), return on investments (ROI), earnings per share (EPS) and return on equity (ROE). Such measures are straightforward when it comes to evaluation and interpretations but has a weakness of not being readily available, being historical, and being liable to manipulations and incompleteness, thus offering only lagged information (Santos & Brito, 2012). I therefore obtain data from CrunchBase database, which is a global investor network with more than thirty-seven thousand firms that submit monthly portfolio updates.[51] This makes CrunchBase ideal or an up-to-date reservoir of firm level data on private equity. The merit with CrunchBase rests on detailed provision of vital information regarding the count of deals that occurred at announcements such as seed, pre-seed, angel, grants, equity assistance, venture, convertible notes, post-IPO equity, post-IPO debt, initial coin offering, the amount raised, deal location, funding rounds, size & name of investors in given a country through time.

In this part, I focus on 25 Sub-Saharan African economies[52], identify sources of financing to firms and ask two important questions: (1) do recipients of external financing survive vis-à-vis non-recipients? (2) do recipients grow as a result of external financing? To answer the first question, this study identifies firms that obtained finance, builds a survival model that predicts firms' survival probability with respect to non-recipients. The second question is addressed by considering firms with IPO statuses and those involved in acquisition to be a signal of tremendous efforts made towards growth, and hence I use it as a proxy for growth.

[51] https://about.crunchbase.com/products/the-crunchbase-difference/
[52] please see Appendix B for a list of countries covered

4.4 Survival Analysis: Intuition And Model

To model the survival probability of firms in SSA that were recipients of external finance between 2000 and 2021, the study makes use of survival model to capture the dynamic nature associated with firm path or timeline i.e., from when firm is in difficulty or lacks finance and decides to raise money from the equity market, and later when firm goes inactive/fail. Survival method studies the occurrence and timing of an event and firms' path to failure begins generally from healthy-to-distress-to-failure. An event is therefore a qualitative change that can be situated in time as pointed by Allison (1995). These changes span over several years and not instantaneously, thus, this dynamic path approach that aims to explain firm progression towards inaction begins with an identification of a symptom. Such symptoms change over time as corporate distress worsens. The survival model in the field of finance has recently established the basis of firms' failure as this technique uses diverse identification strategies to provide survival probability of a firm over time. Audretsch and Mahmood (1995) employed this technique and found the probability of a new businesses to survive does not only depend only on technology but on firm specific features such as ownership and size. Hence, academic research uses firm survival as a measure of performance especially for newly established firms (Carr, Haggard, Hmieleski & Zahra, 2010).

The analysis posits that firms' survival at time, *t*, is a function of firm characteristics, and a set of region and country specificities. The dependent variable is time, and independent variable is a firm that received external finance. Firm characteristic is size which is a measure of firm growth and reflects sales/number of employees a firm has in a given year. Studies hold the view that firm size might influence firms' survival overtime such as Audretsch (1991), Gorg and Strobl (2003), Cefis and Marsili (2012).

The Model: A basic survival model has three features as highlighted below.

- There is response variable which is waiting time until an event occurs i.e., a firm as a recipient of external finance is expected to survive or shut its activities
- Some firms are censored i.e., those that did not obtain equity financing
- Predictors whose effect on the waiting time needs to be controlled.

The survival function (St), defines the probability that a firm has not experienced the event of interest at time*, t.* differently put, the probability of survival after time*, t.*

Let 'T' be a random variable that is non-negative, taken from the population which represent the waiting time before an event occurs (hereafter referred to as *event of interest*). The event of interest therefore occurs when firms' operations stop, and firm goes to inaction. If 'T' is henceforth assumed to be a continuous random variable with a probability density function as f(t) and a cumulative distribution function as *Pr(T<t)=Ft* with a probability that the event has occurred with a particular time, t. Making use of the compliment of cumulative distribution function, the survival function will thus appear as seen in equation 4.1. The equation provides the probability that a firm, which happens to be an external finance recipient is alive just before the interval or duration, t. That is, the probability that the event of interest is yet to occur. S(t) ranges between 1 and 0.

$$\boldsymbol{S(t) = 1 - F(t) = Pr(T > t) = \int_t^{\infty} f(u)du} \qquad \textbf{(4.1)}$$

In this way, firms' survival function is indeed a complement of the cumulative distribution function i.e., [1-F(t) = S(t)] or as well, an integral of the probability density function [S(t) = $\int_t^{\infty} f(u)du$]. As 'T' is continuous, so too is S(t), and a strictly non-increasing function of *t*. Thus, at *t* = 0 (year 2000 in this analysis), probability of the recipient-firm to survive is 100% and as *t* goes towards ∞, probability of firms to survive approaches 0. Conversely, as probability of survival decreases or goes down, hazard rates go up. Table 4.1 below presents the distribution of firms that received/did not receive external finance (funding rounds) in the SSA between 2000 and 2021. Next, Table 4.2 calculates these probabilities and finally, I estimate the impact of external finance on survival/fail by fitting a multiple fixed effect model as presented on Table 4.3.

Table 4.1 Distribution of firms in 25 SSA economies between 2000 and 2021

Firms' year of Incorporation	Total of Firms	Funded Firms		Unfunded Firms	
		Recipients	Failed on or before 2021	Non-Recipients	Failed on or before 2021
2000	231	24	1	207	11
2001	221	26	2	195	11
2002	208	15	/	193	10
2003	246	31	/	215	3
2004	249	29	/	220	4
2005	284	35	2	249	17
2006	287	38	1	249	14
2007	307	41	2	266	17
2008	330	47	4	283	27
2009	354	60	4	294	25
2010	487	89	9	398	37
2011	467	90	10	377	49
2012	634	143	19	491	68
2013	662	166	22	496	65
2014	702	213	28	489	73
2015	779	242	25	537	59
2016	879	260	30	619	76
2017	938	251	28	687	79
2018	846	258	32	588	61
2019	659	203	11	456	29
2020	585	175	4	410	9
2021	361	86	2	275	3
	10716	2522	236	8194	747

From the CrunchBase database, two sets are obtained i.e., from ''all companies'' and from ''funding round'' for 25 SSA economies between 2000 and 2021. The funding round side has 4596 observations and informs on the various funding rounds undergone by the firm, the 'all companies' side has 10716 obs. I bring the two sets together as highlighted above. A total of 10716 firms are observed, where 2522 received finance and 8194 did not receive finance. Of the 2522 recipients of finance, 236 failed on or before 2021. Non-finance recipients also failed (747). Greater details on funding at country level appear on Appendix D.

Table 4.2 Firm Survival Function

Panel A: Year of Incorporation =2000

Table presents survival probability of firms—funded and unfunded, that were established in year 2000. Time of event reflects the number of years a firm was operational before an event of interest, where 5 corresponds to the first five years after incorporation i.e., 2000 to 2005, 10 corresponds to the interval between 2005 and 2010, same intuition applies to 15 and 20 while above 20 corresponds to year 2021. The next column reports the number of failures and reflects how many firms failed after their year of incorporation for both recipients and non-recipients of external finance on or before year 2021. Corresponding probabilities are estimated depending on if a firm is active or not as earlier discussed in equation (4.1), which is a non-increasing function (an integral of probability density function), and is probability that a firm, which happens to be an external finance recipient is alive just before the interval or duration, t. That is, the probability that the event of interest is yet to occur. S(t) ranges between 1 and 0.

Funded Firms						**Unfunded Firms**					
Time of Event	No of Failures	Recipients	Estimated Probability death	Survival survival	Survival Function	Time of Event	No of Failures	Non-Recipients	Estimated Probability death	Survival survival	Survival Function
5	0	24	0	1	100%	5	0	207	0	1	100%
10	0	24	0	1	100%	10	1	207	0.005	0.995	99%
15	0	24	0	1	100%	15	2	207	0.010	0.990	98%
20	0	24	0	1	100%	20	0	207	0.000	1.000	98%
>20	1	24	0.042	0.958	**96%**	>20	8	207	0.039	0.961	**95%**

Panel B: Year of Incorporation =2005

Funded Firms						**Unfunded Firms**					
Time of Event	No of Failures	Recipients	Estimated Probability death	Survival survival	Survival Function	Time of Event	No of Failures	Non-Recipients	Estimated Probability death	Survival survival	Survival Function
5	0	35	0	1	100%	5	0	249	0	1	100%
10	0	35	0	1	100%	10	1	249	0.004	0.996	99%
15	1	35	0.029	0.971	97%	15	0	249	0.000	1.000	99%
>20	1	35	0.029	0.971	**94%**	>20	16	249	0.064	0.936	**93%**

Panel C: Year of Incorporation =2010

Funded Firms						**Unfunded Firms**					
Time of Event	No of Failures	Recipients	Estimated Probability death	Survival survival	Survival Function	Time of Event	No of Failures	Non-Recipients	Estimated Probability death	Survival survival	Survival Function
5	0	89	0	1	100%	5	5	398	0.013	0.987	99%
10	0	89	0	1	100%	10	1	398	0.003	0.997	98%
>20	9	89	0.101	0.899	**90%**	>20	31	398	0.078	0.922	**91%**

Panel D: Year of Incorporation =2015

Funded Firms						**Unfunded Firms**					
Time of Event	No of Failures	Recipients	Estimated Probability death	Survival survival	Survival Function	Time of Event	No of Failures	Non-Recipients	Estimated Probability death	Survival survival	Survival Function
5	1	242	0.004	0.996	99%	5	8	537	0.019	0.981	98%
>20	24	242	0.099	0.901	**90%**	>20	51	537	0.091	0.909	**89%**

Panels A through D of Table 4.2 computes survival probability of firms observed between 2000 and 2021 in 25 SSA economies. To understand these calculations, consider firms incorporated in 2000, that did not receive funding. A total of 207 firms were studied between 2000 and 2021, and 11 of these firms failed on or before the 21st year of observation. Looking at firm path or progression, the first 5 years i.e., until 2005, there was no failed firm for those created in year 2000. As from 2006 to 2010, a single firm failed, and between 2010 to 2015, there were 2 more failed firms, and no firm failed between 2016 and 2020. In 2021 more firms (8) failed summing up to 11 with a corresponding non-increasing survival function reported in the last column. As earlier discussed, "T" is continuous, so too is S(t), and a strictly non-increasing function of *t*. Thus, at $t = 0$ (year 2000), probability of the recipient-firm to survive is 100% and this remains true for the first 5 years after incorporation. The single failure recorded between 2006 and 2010 mean that [1-(1/207) *100%] corresponding to a survival function of 99%, and for the interval between 2011 and 2015 where 2 firms failed, it means [1-(2/207) *99%] corresponding to survival function of 98%. Between 2016 and 2020, there was no failure, meaning all firms survived, however, it does not change the survival function. It is important to note that this analysis assumes that firms with blank year of closure is 2021, nevertheless, it does not affect the analysis given that if the computation of this survival function was to stop in year 2020, results will largely remain unchanged. Results highlight the contribution of external finance in sustaining firms' survival within SSA.

Table 4.3 Effects of External Finance on Firm Survival/Failure

This table reports the effects of external finance on firms' survival/failure in SSA between 2000 and 2021. A model is fitted in which the left-hand is time, expressed as the duration a firm is in existence (survived) and when firm ceases to operate (failed), calculated as the difference between firms' year of incorporation and year it failed/survived, while restricting/assuming active firms ended their activities in 2021. The right-hand represents access to external finance i.e., the rounds a firm obtained capital. The analysis controls for firm size, and standard errors appear below the estimated coefficient (in parentheses) and are adjusted for the potential clustering of the residual at industry, country, and year levels. The symbols ***, * mean that the coefficient is statistically different from zero, respectively, at the 1-, and 10- percent level

Variable	Survival	Fail
Received External Finance (rounds)	0.0199*	-0.0154*
	(0.012)	(0.008)
Size	Y	Y
Constant	10.99***	0.0855***
	(0.026)	(0.016)
Observations	950	950
R-squared	0.996	0.344

All else equal, results indicate that recipients of external finance are more likely to grow and less likely to fail.

Why does survival analysis matter for firms? Conceptually, there is a view that implicitly considers firms' survival as an important goal assigned to business executives, while failure is seen as an unfortunate outcome—survival's inverse. Firms' survival could mean enhancements in its size, or growth paths. Klepper (2002) notes that it's a broad indicator of performance, while Hannan and Freeman (1989) point that survival signals organizational success. Until this point, I have shown that external finance has potential marginal benefits for firms, as it leads to their survival as shown by the various panels on Table 4.2 that computes survival probabilities, though with a slight difference between recipients and non-recipients. Furthermore, the multiple fixed effect regression simplifies the results obtained in the survival analysis, whereby, findings inform that firms that did obtain external finance are likely to survive than non-recipient counterparts.

Having established that firms are more likely to survive when financed by private investors, the next objective is to evaluate and understand if the survived firms experience growth. Firm growth is important not only to the firm but to society at it potentially translate higher employment levels. This makes firms to be seen as important vectors of development and growth in an economy. In the subsequent section, I briefly justify my measures of growth and next proceed to estimate the effects of external finance for these entrepreneurial firms on firm growth.

4.5 Analysis On Firm Growth Through An IPO And Acquisition

As earlier noted, lack of data on firm financials has motivated the choice of the following proxies picked for firm growth. Thus, this study makes use of firms' life cycle—especially from maturity onwards when an entrepreneurial firm ascends an important status such as IPO or involved in acquisitions. An IPO refers to the first time a firm offers its shares to the public–– the status is an important stage in the life a firm as it may signal recent tremendous growth and development strides that the firm has been undertaken. This status gives the firm more visibility and can be linked to the market-timing theory (Kim & Weisback, 2008; Baker & Wurgler, 2002) where IPOs are timed to tap the benefits of market conditions for overpriced shares. Pesterac (2020), notes that IPOs are a proven method of financing growth, attracting more capital, enhanced management approaches. Another motivation might be to increase firms' bargaining power with banks (Pagano, Fabio & Zingales, 1998) or to obtain a proper coverage from experts and analysts (Bradley, Jordan & Ritter, 2003).

I consider such a status as a signal or reflection of growth and expect equity financing to be associated with IPO, as a measure of firm growth.

The second proxy for firm growth assumes if firm is currently involved in acquisition i.e., corporate transaction where one firm buys a significant part/share of another firm to exercise control with a mutual understanding between the target and acquirer. Value maximizing theory posits that acquisitions increases the market value of the acquirer and target as their synergy might lead to efficient resource allocation (Shleifer & Vishny, 1988). Besstremyannaya, Dasher and Golovan (2019), emphasize that acquisition can be viewed as a complementary technique to investments in research and developments with a potential of improving the products of their targets. Bandick and Gorg (2010) provide evidence suggesting that acquisition increases the lifespan of the acquired firms that do involve in exports. Similarly, Xiao (2015) investigates the effects of an acquisition by multinational enterprises on new technology-based firms and finds that after acquisition, firm grows in terms of employment.

Thus, an acquisition status signals that in the past, a firm has made significant progress towards growth, has more cash to spend on acquiring another firm, and therefore signals growth.

4.5.1 Methodology

To estimate the effects of external finance, I consider only firms' first funding round, so as to minimize potential biases from the analysis and capture the real effects of external finance on firm growth. To do achieve this, I merge two datasheets from CrunchBase obtained from the 'funding rounds' and 'all companies' sections representing 1943 firms created between 2000 and 2021 in SSA. These 1943 firms are split into two—388 for non-recipients, and 1555 recipients as described on the table below.

Table 4.4 Categories of Equity Finance

Panel A: Firms' First External Funding between 2000 and 2021

Table presents firms that obtained funding in their first round, that fall under the equity category. The figures are summed for the entire 25 SSA economies, between 2000 and 2021. Data is obtained from CrunchBase database. Greater details are reported in Appendix D.

Category	Freq.	Percentage
Angel	67	4.31
Corporate Round	15	0.96
Equity Crowdfunding	32	2.06
Initial Coin Offering	5	0.32
Post-IPO Equity	8	0.51
Pre-Seed	230	14.79
Private Equity	150	9.65
Seed	670	43.09
Series A	87	5.59
Series B	11	0.71
Series C	1	0.06
Undisclosed	14	0.90
Venture	265	17.04
Total	**1,555**	

Panel B: Firms' Funding/Growth Stages

Equity Type	Freq.	%
Growth Stage 1: Angel +Pre-Seed + Seed	967	62
Growth Stage 2: Venture Capital	265	17
Growth Stage 3: Private Equity	150	10
Others: Corporate Round + Equity Crowdfunding + Initial Coin Offering + Post -IPO Equity + Series A, B & C + Undisclosed	173	11
Total	**1,555**	**100**

Figures reported in panels A and B of Table 4.4. highlight the relative importance of each investor in the financing life cycle of a firm. Angel investors play a dominant role in assisting firms at an early age/stage of its existence with the provision of seed capital and mentorship. Figures reflect a remarkable contribution from this category of investor at such a crucial stage. Venture capitalist generally inject capital into firms that are highly entrepreneurial—startups, and figures suggests a sizeable contribution from these set of investors, followed by private equity, indicative that firms are surviving and at least, registering improved performances in the business operations. Whether or not, the presence of these alternative financing vehicle is likely to assist firms to survive or grow, will be the focus of the next section.

Empirical Model

The objective is to shed light on the possible effects equity finance can have on firm growth. To achieve this, I estimate the model below.

$$\boldsymbol{Firm\ Growth_{i,t} = Financing + X_{i,t} + x_i + \varepsilon} \quad \textbf{(4.2)}$$

In equation 4.2, the left-hand is firm growth, which is an individual firm *i*, in a given time *t*, this indicator variable is coded the value 1, if a firm currently has a status marked IPO or involved in acquisition, and when different, it takes the value 0. As earlier highlighted, these proxies of growth are motivated by the fact that the database at hand—Crunchbase does not provide firm financials where one can observe financial growth, as a result I rely on other indicators such as IPO or acquisition. The right-hand is an indicator variable, which depict firms that are equity finance recipients (1) or non-recipients (0). Firm individual characteristics

such as age and size is represented by $X_{i,t}$.[53] Controls such as country, industry, and region level effects is denoted x_i.

Table 4.5 Summary Statistics

Below, is five-point summary statistics of the variables employed in the survival analysis. Data is obtained from CrunchBase database for 25 Sub-Saharan economies between 2000 and 2021

Variable	Obs	Mean	Std.	Min	Max
Time	1,943	4.636	3.265	1	21
Age	1,943	7.396	4.509	0	21
Size: Employees (Ln)	1,757	1.018	0.601	0.476	2.22
Stage I: Angel Investors	1,943	0.498	0.500	0	1
Stage II: Venture Capitalists	1,943	0.136	0.343	0	1
Stage III: Private Equity	1,943	0.077	0.267	0	1
Other Growth Stages	1,943	0.089	0.285	0	1
Growth through Acquisition	1,943	0.045	0.207	0	1
Growth Through IPO	1,943	0.981	0.137	0	1

4.5.2 Results: Effects of External Finance on Firm Growth

The goal of this analysis is to estimate the effects of external finance on firm growth. To do so, I focused on first funding round that firms obtained under the equity category as presented on Table 4.4, that reports recipients of equity finance (1555 firms) and non-recipients (388 firms). Firm growth as proxied by an ascension to the status of an IPO and involvement in acquisition while controlling various specificities as summarized in equation 4.2. Estimates of these effects appear on Table 4.6 panels A, B, and C. findings reveal that, everything being equal—recipients of external financing seem to be strongly and positively associated with firm growth measure, indicating that this channel of financing can relax financial constraints. External finance seems to be positively associated, and statistically significant with the two measures of firm growth. Stronger relation is observed when firm growth is proxied by IPO than in acquisition. Separating the recipients into three stages i.e., that is angel investors, venture capitalists and private equity, the coefficient on finance retained its statistical significance when firm growth is considered as an IPO status. When firm growth is considered as involvement in acquisition, the coefficients on finance lacked statistical significance as reported in panel C.

[53] Young and small-sized firms may tend to perceive access to finance as a constraint, given that their early stages, not much information is available to financier about their growth prospects or likelihood of repayment, as they grow in size, these effects lessen.

Globally, firms external finance seemed to have fostered firm growth between 2000 and 2021 in SSA.

Table 4.6 Estimation Results: Effects of Equity Finance on Firm Growth

Panel A: Growth Through Acquisition

The dependent variable is a dummy and assigned 1 if firm is currently involved in acquisition, when different, it takes the value 0. The variable of interest reflects firms that obtained external financing in their first funding round and are coded 1, when otherwise, 0. Firm characteristics such as age and size (log of average number of employees) are incorporated in various specifications. The analysis controls for industry, region, and country fixed effects. The first model does not control for fixed effects, the second, third and fourth includes industry, region, and country effects respectively. The fifth model drops advanced funding categories such as initial coin offering and the undisclosed category. Robust standard errors are in parentheses; ***, **, and* denote statistical significance at 1%, 5%, and 10% levels respectively.

Variable	(1)	(2)	(3)	(4)	(5)
Received Finance	0.0270***	0.0204**	0.0180*	0.0178*	
	(0.00944)	(0.00946)	(0.00942)	(0.00942)	
Received Finance					0.0186*
					(0.00961)
Age		0.00283**	0.00268**	0.00263**	0.00154
		(0.00133)	(0.00133)	(0.00132)	(0.00129)
Size: Employee (Ln)		0.0294***	0.0299***	0.0300***	0.0282***
		(0.00896)	(0.00896)	(0.00895)	(0.00947)
Industry F.E	N	Y	Y	Y	Y
Region F.E	N	N	Y	Y	Y
Country F.E	N	N	N	Y	Y
Observations	1,943	1,704	1,704	1,704	1,552
R-squared	0.003	0.019	0.022	0.024	0.019

The analysis estimates the effects of external finance on firms' evolvement such as being involved in acquisition. This status highlights tremendous efforts that has been made in recent times by the firm. I consider this status as an indicator of firm growth and estimates the effects of finance on it. Overall, findings reveal a strong, positive, and somewhat robust association between access to finance and firm growth. This may mean that as firms obtain external finance, it increases their likelihood of survival, which later enhances firm growth.

Panel B: Growth Through An IPO

The dependent variable is an IPO status which proxies for firm growth and is a dummy that takes the value 1 if firm survived, currently has an IPO status, and is equally active. When different, it is assigned the value 0. The variable of interest reflects firms that obtained external financing in their first funding round and are coded 1, when otherwise, 0. Firm characteristics such as age and size (log of average number of employees) are incorporated in various specifications. The analysis controls for industry, region, and country fixed effects. The first model does not control for fixed effects, the second, third and fourth includes industry, region, and country effects respectively. The fifth model drops advanced funding categories such as initial coin offering and the undisclosed category. Robust standard errors are in parentheses; ***, **, and* denote statistical significance at 1%, 5%, and 10% levels respectively.

Variable(s)	(1)	(2)	(3)	(4)	(5)
Received Finance	0.0954***	0.0934***	0.0939***	0.0938***	
	(0.01490)	(0.01570)	(0.01580)	(0.01580)	
Received Finance					0.0938***
					(0.01570)
Age		-0.00101*	-0.000985*	-0.000999*	-0.00112*
		(0.00059)	(0.00058)	(0.00058)	(0.00064)
Size: Employee (Ln)		0.0172***	0.0171***	0.0171***	0.0189***
		(0.00520)	(0.00519)	(0.00520)	(0.00574)
Industry F.E	N	Y	Y	Y	Y
Region F.E	N	N	Y	Y	Y
Country F.E	N	N	N	Y	Y
Observations	1,943	1,704	1,704	1,704	1,552
R-squared	0.078	0.081	0.081	0.082	0.08

This analysis estimates the effects of external finance on firms' evolvement such as being involved in acquisition. This status highlights tremendous efforts that has been made in recent times by the firm. I consider this status as an indicator of firm growth and estimates the effects of finance on it. Everything being equal, overall findings reveal a strong, positive, and somewhat robust association between access to finance and firm growth. This may mean that as firms obtain external finance, the likelihood to survive goes up, which later on translates to firm growth.

Panel C: Funding State and Firm Growth

There are two dependent variables: (1) An IPO status which proxies for firm growth and is a dummy that takes the value 1 if firm survived, currently has an IPO status, and is equally active. When different, it is assigned the value 0. (2) A dummy variable which is assigned 1 if firm is currently involved in acquisition, when different, it takes the value 0. The variable of interest reflects firms that obtained external financing in their first funding round and are coded 1, when otherwise, 0. Firm characteristics such as age and size (log of average number of employees) are incorporated in various specifications. The analysis controls for industry, region, and country fixed effects. The first models consider all firms that are within the equity category, the second, the third, and the fourth models consider firm funding stages i.e., angel investor, venture capitalist, and private equity respectively. Robust standard errors are in parentheses; ***, **, and* denote statistical significance at 1%, 5%, and 10% levels respectively.

	Initial Public Offering				Acquisition			
Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(1)**	**(2)**	**(3)**	**(4)**
Received Finance	0.0938***				0.0179*			
	(0.0158)				(0.0094)			
Stage I: Angel Investors		0.0463***				0.0092		
		(0.0081)				(0.0101)		
Stage II: Venture Cap.			0.0192***				(0.0107)	
			(0.0038)				(0.0167)	
Stage III: Private Equity				0.0159***				0.0192
				(0.0045)				(0.0268)
Age	-0.001000*	0.00166**	(0.0004)	(0.0003)	0.00314**	0.00303**	0.00242*	0.00263**
	(0.0006)	(0.0007)	(0.0006)	(0.0006)	(0.0014)	(0.0015)	(0.0014)	(0.0013)
Size: Employee (Ln)	0.0171***	0.0191***	0.0164***	0.0167***	0.0304***	0.0303***	0.0296***	0.0300***
	(0.0052)	(0.0055)	(0.0053)	(0.0053)	(0.0089)	(0.0089)	(0.0090)	(0.0090)
Industry F.E	Y	Y	Y	Y	Y	Y	Y	Y
Region F.E	Y	Y	Y	Y	Y	Y	Y	Y
Country F.E	Y	Y	Y	Y	Y	Y	Y	Y
Observations	1,704	1,704	1,704	1,704	1,704	1,704	1,704	1,704
R-squared	0.082	0.032	0.008	0.007	0.023	0.023	0.023	0.024

Table highlights the effects of external finance following firms' three stages of funding. Everything being equal, results reveal that external finance is strongly and positively associated with firm growth as proxied by an IPO status. These results hold for the three stages of development and may simply indicate recipient firms grew. As regards growth through firms' involvement in acquisition, results highlight a positive relation that is statistically significant at a global level. However, when separated into various stages of development, the statistical significance disappears.

4.5.3 Summary of results

This part was primarily aimed at understanding the effects of external finance on firms' probability to survive and secondarily, to estimate the likelihood of growth for survived firms. Indeed, firms that did obtain external finance had higher chances of survival than non-recipients. Furthermore, finding highlighted that external finance was strongly associated with measures of firm growth (IPO/Acquisition), thus, emphasizing the crucial function of external finance, for entrepreneurial firms in the Sub-Saharan African economies.

PART III. ALTERNATIVE EXTERNAL SOURCES OF FUNDING IN AFRICA

4.6 Introduction

As previously discussed, the capital markets are comparatively less developed in Africa, thus likely to hurt entrepreneurial activities. However, the financial landscape in Africa in terms of financing options is extensive. Firms in Africa do not rely solely on bank financing and private equity, there are alternative sources that help firms circumvent obstacles to external funding opportunities. In this part, I provide a discussion on the traditional as well as an upcoming option of external finance, so as to have a complete picture of the effects of finance on firm growth in Africa. However, these informal methods of access to finance are difficult to measure with respect to its economic impact on firms given the difficulty in obtaining data that merits academic investigation. I therefore briefly provide a discussion on these alternative sources of funding in Africa. I begin with the informal lending, next literature survey on crowdfunding and the state of crowdfunding in Africa, lastly, I pick an important crowdfunding platform that has been instrumental in financing 27 Sub Saharan African economies since 2014 and show that this model is suitable in areas with high informality.

According to Nichter and Goldmark (2009), the informal sector are unregistered businesses that are legitimate and operate out of formal institutional framework. These informal businesses occupy a large share of SSA economies with varying strategies for external financing, especially as this region is plagued with scarce capital for candidate firms as well as established firms. The credit market is very different from other markets as it relies largely on a promise––and the quality of this promise is always difficult to ascertain as it sits on a probability. Thus, a credit transaction suffers major setbacks such as–adverse selection, moral hazard and enforcement issues. This can have far-reaching implications for lending such as freezing funds in the hands of the lender which hurts investments or entrepreneurial opportunities. These problems manifest differently from one environment to the other, hence designing its solution will equally vary. In advanced markets, the issues can be rectified with well-established credit information systems as well as a good system of property rights enabled by the efficiency of its legal system. Developing economies are characterized by informality, lack of proper property right system, weak or no credit information systems. Thus, addressing these issues remain a challenge to financial intermediaries as well as development experts. Informal lending

channels such as money lender, Rotating Credit and Savings Association[54] play an important role in developing economies such as SSA, especially as they deal mostly with those they know so well. Formal institutions such as microfinance play a dominant role in terms of intermediation in developing countries as it fosters entrepreneurship, promotes self-reliance, enhances indigenous cultures through financing of locally made products. Nowadays, advancements in technology have completely modified or enhanced lending and entrepreneurial activities in developing economies.

The emergence of another method of financing channel such as crowdfunding, can partly relieve the financing constraints for start-ups and entrepreneurial firms in SSA thanks to improved technology such as mobile phones, internet. In SSA for example, crowdfunding platforms have field partners that screen and monitor investments thus, making this mode of financing unique as it traverses national boundaries to answer to the needs of whoever is eligible for funding. Given that dominant crowdfunding platform that plays critical role in intermediation are not on SSA soil, and mindful that this role relieves financing constraints for entrepreneurial activities thereby creating jobs and employment, it therefore suffices for policy to intervene and see how to accompany the private sector establish such financing models in SSA that reduces distance between lender and borrower.

4.6.1 Background

Bradford (2012), notes that crowdfunding is inspired by a mix of microfinance and crowdsourcing i.e., the former lends out money to a category of borrowers deemed to be very poor who might be aspiring entrepreneurs with very small ventures while the latter captures small contributions from a large pool of people to realize a common objective. Crowdfunding— the practice of funding a project or venture by raising money from a large pool of investors who each contribute a relatively small amount with the help of technological advancements (Chang, 2020) has recently emerged to answer to the ever-growing demand of entrepreneurial ventures as an alternative source of financing. Agrawal, Catalini and Goldfarb (2011) describe crowdfunding as a model that enables users to finance various types of ventures, often in small amounts using online social media platforms that facilitate direct

[54] Members of such an association self-select themselves in and since peer monitoring is efficient, repayment is likely. The benefits of peer monitoring have been shown to have importance in enforcing repayment (Stiglitz, 1990).

interactions between investors as well as individuals raising funds. Bruton, Khavul and Chavez (2011) argue that crowdfunding enables international microlenders to support projects and ventures by giving small loans to millions of borrowers. Thus, crowdfunding relies on financial and technological infrastructure to use the crowd as investors for personal, cultural, or economic projects.

This external financing model fits the realities of SSA economies, largely due to their informality of micro businesses.[55] The merit of this mode of finance resides in the fact that its operations go beyond national or regional frontier provided the necessary infrastructural technology and field partners are in place.[56] Though the model tackles only a weak segment of the economy —micro-agents who wish to obtain loans for petty-petty businesses, it does have positive marginal effects as it drives broad-based financial inclusion, which has a potential to contribute to firm growth. This weak segment mainly constitutes households or individuals who are vulnerable to economic shocks, and at times left only at the mercy of aid. Nowadays, the narrative around aid to the developing countries has attracted criticism. Many international bodies prefer to build the needed capacities— for example, building needed human capital and allowing them to handle their affairs. The World Bank (2014/15) Global Monitoring report on poverty and shared prosperity advocates for greater autonomy in helping Africa come out of poverty. Benerjee and Duflo (2011) argues that aid alone can't stamp out poverty from Africa. Indeed, the UN 2030 Agenda for Sustainable Development (UN-2030-ASD) and the G20 High-Level Principles for Digital Financial Inclusion (G20-HLP-DFI) highlight the importance of harnessing the potential of FinTech to reduce financial exclusion and income inequality. Therefore, it is important to seek innovative approaches in terms of directing finance properly to investments. Crowdfunding promises to deliver broad-based financially inclusive society especially for Africa, where the lending gap is wide. Stein, Goland and Schiff (2010) estimates Africa's lending gap was approximately $140-$170 billion as estimated by McKinsey and International Finance Corporation. IMF currently projects the financing gap at $345 by 2023.[57]

[55] The IMF (2017) regional economic outlook reports that SSA informal sector accounts between 30-90% of non-agricultural employment and plays a major role in the economy by contributing 25-65% to GDP. https://www.imf.org/en/Publications/REO/SSA/Issues/2017/05/03/sreo0517

[56] Crowdfunding generally takes place online with properly registered financial intermediaries (broker-dealer, field partners) who identify, screen and monitor projects before seeking funding.

[57] https://finance.yahoo.com/news/imf-chief-sees-345-bln-154758807.html

Thus, the intension of this review is to complete the picture on the effects of external finance on firm growth in Africa. Understanding how microeconomic agents obtain financing especially in this digital transformation era can enrich the growing claim that sources of finance can partially alleviate the financing gap especially for the poor, such as SSA economies through enhancement of microbusinesses that play an important role in economy.

4.7 Related Literature

Financial Stability Board[58] (FSB) defines fintech as a "technologically enabled financial innovation that could result in new business models, applications, processes, or products with an associated material effect on financial markets and institutions, and the provision of financial services". Essentially, banks' dual function suffices to handle current operations that entails accepting deposits and granting loans to the public. Theory informs that the management of risks remains central in the functions that banks perform on its balance sheet —such as credit/default risk (Freixas and Rochet, 2008). In another work, Gorton and Pennacchi (1993) predicted a potential split of these functions into institutions that finance loans by issuing debts/equity (credit institutions) and those that accept deposits by investing in traded securities such as mutual funds. Fintech disruptions have revived this claim as the industry has witnessed a dramatic increase, offering a variety of services and has in some areas complemented banking activities (Bharadwaj and Suri, 2020) while in others, it has substituted banking activities (Erel and Liebersohn, 2020). According to Thakor (2020), if these fintech makes significant inroads, then, its either banks will create their own platforms, or they'll be condemned to partner with these marketplace lenders in order to stay relevant. The net benefit of these changes to the society is that it drives greater financial inclusion, increases the lending pie and impacts investment and economic outcomes (Ozili, 2020; G20 High-Level Principles for Digital Financial Inclusion, 2016; Yermack, 2018; Cumming, Farag, Johan and McGowan, 2021).

The origination of crowdfunding is an important innovation in the finance industry. For example, Huang, Chiu, Mo and Marjerison (2018), presents evidence from china, suggesting that crowdfunding played a major role in facilitating access to finance and better risk sharing. A comprehensive review on the origins of crowdfund in Africa is conducted by Adjakou

[58] https://www.fsb.org/work-of-the-fsb/financial-innovation-and-structural-change/fintech/

(2021), where the study finds that French African economies are generally weak in crowdfunding as compared to English African economies. Similarly on Africa, Chao, Serwaah, Baah-Peprah and Shneor (2020), underscore the benefits of crowdfunding on the continent.

Stiglitz and Weiss (1981) on credit rationing demonstrated how information asymmetry can lead to distortions in financial markets such that loanable projects/firms remain unserved. In such a world, financing gaps are bound to emerge because of market failures. Crowdfunding model as a source of finance can potentially reduce this mismatch in the credit market as it extends its services to a segment of the economy that suffers asymmetry of information and financial exclusion. The importance of this model in assisting ventures has been just highlighted in the literature (Gompers and Lerner, 2004; Robb & Robinson, 2014; Blaseg, Cumming, and Koetter, 2021).

Crowdfunding adopts varying models of compensation ranging from loan-based, equity-based, reward-based and donation based (N'Guessan, Alegre and Canela, 2017; Agrawal, Catalini and Goldfarb, 2011). Loan-based or peer-to-peer or crowdlending model suggest that investors are repaid at a particular time the principal and interest while equity-based model compensates the investors with shares or participation in the company. They former mostly occurs in already existing or well-established firms while latter occurs with start-ups. The overall benefit is cheaper cost of credit, less regulated and deeper financial markets for start-ups— which reduces potential entrepreneurs expected operating costs, permitting ventures that were formerly unprofitable at the margin to enter (Cumming et al. 2021). Donation-based and reward-based takes on a more social approach the former tells of an investor who directs funds to charitable projects without expecting anything and the latter takes on an investor who expects recognition or acknowledgments as compensation.

The attractive feature with this model resides in its ability to extend beyond territorial boundaries and answer to financing needs, an approach that is difficult for banks to execute so far as it concerns individual economic agents. Equity-based and loan-based models are guided by risk and return as seen in bank contracts, but with less regulation. It's against this backdrop, that Blaseg, Cumming and Koetter (2021) assert that equity-based model is suited for growth-oriented entrepreneurs but notes the potential costs incurred in communicating with a large pool of investors and costs tied to equity dilution that could potentially act as a disincentive to the future equity investors. In sum, Fintech has propelled individuals towards entrepreneurship

and enhanced business operations (Yermack, 2018; Sabrina and Christoph, 2020; Cumming and Ahmed, 2021). As such, crowdfunding is an important instrument for introducing and spreading new technology, which potentially improves firm productivity (Blaseg et al., 2021; Cumming, Vanacker and Zahra, 2019).[59] Similarly, Yasar (2021) surveys the development of this new financing option and notes that equity crowdfunding seems to be a promising channel for entrepreneurial firms.

4.7.1 The landscape of crowdfunding in Saharan Africa

The idea of crowdfunding as an alternative financing channel is quite recent on the African soil and has emerged to partly fill the lending gap that entrepreneurs in these economies face due to the comparatively poor financial systems in Africa. Studies have shown the merits of this new financing vehicle in increasing financial access, thereby driving greater financial inclusion. Despite the positive net effects of crowdfunding, Africa still lags in terms of platforms operating on its soil. In a study by N'Guessan, Alegre and Canela (2017), they found that African platforms represented 0.06% of global platforms as compared to 7.6% from emerging markets. However, there is rising importance as some African countries have taken the initiative to facilitate the establishment and functionality of these platforms. The same study notes that by the end of 2015, close to 22 crowdfunding platforms were headquartered in SSA whereby; South Africa had 10, Uganda had 04, Nigeria had 03, Kenya had 02, Ghana had 02, and Cote d'Ivoire had 01. Furthermore, the Cambridge alternative finance report (2018) highlights that the online alternative finance market grew by 118% in 2016 with the highest contribution coming from donation-based crowdfunding championed by Nigeria, South Africa and Kenya. Again, discussing Africa's current or state of development can hardly be convincing without taking stock of its history—a past which seems to persist. It is not surprising that such an innovative financial product seems to be prevalent only in common law environment. Upon achieving political independence, the new states inherited legal institutions that design the structure of incentives and property rights. Common law tradition seems to be friendly, and therefore fosters crowdfunding. Adjakou (2021), conducts a comprehensive investigation on the origins of crowdfund in Africa and notes that French African economies are generally weak in crowdfunding as compared to English African economies.

[59] Agrawal, Catalini and Goldfarb (2011), N'Guessan, Alegre and Canela (2017) and Chang (2020) discuss the general economics of this recent technology, while enumerating its merits on the general welfare of the society.

To have the current landscape of crowdfunding platforms operating on the SSA economies I obtained data from African Crowdfund Association (ACFA)[60] which is a self-regulatory organization, that ensures and fosters transparency, and advocates for good governance in this industry in the African continent. Regulation remains crucial in moderating the activities of online platforms; I therefore only consider platforms that are regulated by this umbrella association—ACFA. This umbrella organization has pan-African ideals aimed at formalizing development finance, so as to harmonize crowdfunding regulations and equally broaden financial access for firms. Thus, data obtained represent quality platforms that are in compliance or conformity with regulations and can be trusted.

[60] https://africancrowd.org

Table 4.7 State of Crowdfunding in SSA

Table presents Crowdfunding platforms that are registered with the African Crowdfunding Association and equally headquartered in Sub Saharan Africa.

T.No	No	Type	Crowdfunding Platform	Headquarter	Country of Operations	Website
1	1	Donantion-Based	M-Changa	Kenya	Kenya, South Africa	https://www.changa.co.ke
2	2	Donantion-Based	Donate-NG	Nigeria	Nigeria	https://donate-ng.com
3	3	Donantion-Based	Quickraiz	Nigeria	Nigeria	http://quickraiz.com
4	4	Donantion-Based	Seek4fund	Nigeria	Nigeria	https://www.seek4fund.com
5	5	Donantion-Based	Spring Stars Global Empowerment Foundation	Nigeria	Nigeria	https://ssgefoundation.org
6	6	Donantion-Based	Backabuddy	South Africa	South Africa	https://www.backabuddy.co.za
7	7	Donantion-Based	Feenix	South Africa	South Africa	https://feenix.org
8	8	Donantion-Based	Tawakul The Crowd	South Africa	South Africa	https://tawakul.org
9	1	Equity-Based	Kiro'o Rebuntu	Cameroon	Cameroon	https://kiroorebuntu.com
10	2	Equity-Based	Uprise.Africa	South Africa	South Africa	https://uprise.africa
11	3	Equity-Based	Wengi Equity Crowdfunding	Tanzania	Tanzania	https://wengi.co.tz
12	1	Loan-Based	AgriBusiness Corner	South Africa	South Africa	https://agribusinesscorner.co.za
13	2	Loan-Based	Agri Seed Capital	South Africa	South Africa	
14	3	Loan-Based	Farmcrowdy	Nigeria	Nigeria	https://www.farmcrowdy.com/#/
15	4	Loan-Based	Thrive Agric	Nigeria	Nigeria	https://www.thriveagric.com
16	5	Loan-Based	Go Global	South Africa	Togo	
17	6	Loan-Based	Lloyd Corporate Capital	Zimbabwe	Zimbabwe	https://www.lloydccapital.com
18	7	Loan-Based	Ortus Africa Capital	Uganda	Uganda	https://www.ortusafricacapital.com
19	8	Loan-Based	Pezesha	Kenya	Kenya, Ghana	https://pezesha.com
20	9	Loan-Based	Fundkiss Technologies Limited	Mauritius	Mauritius	https://fundkiss.mu
21	10	Loan-Based	AB Crowdfunding	Congo, Dep. Rep	Congo, Dep. Rep	
22	11	Loan-Based	Finance Club Ltd	Mauritius	Mauritius	https://finclub.mu/public/home
23	12	Loan-Based	RealSmart	Mauritius	South Africa, Global	https://realsmart.io
24	13	Loan-Based	Crowdprop	South Africa	South Africa	https://crowdprop.co.za
26	1	Reward-Based	Jumpstarter	South Africa, Nigeria	South Africa, Nigeria	https://jumpstarter.co.za
27	2	Reward-Based	Wedeydo	Nigeria	Nigeria	https://wedeydo.com
25	1	Reward+Loan Based	Africa Crowdfunding	Cameroon	Cameroon, Chad, EquatoGuinea	https://africa-crowdfunding.com
28	2	Reward+Loan Based	Thundafund Africa	South Africa, Kenya	South Africa, Kenya, The Gambia	https://www.thundafund.com

Source: African Crowd Funding Association (ACFA), accessed via https://africancrowd.org on 13/08/2022. Of the 28 platforms, 13 are loan-based, 8 are donation-based, 3 are equity-based, 2 are reward-based and 2 are hybrid of reward and loan-based models. Furthermore, 10 of the platforms are headquartered in South Africa, 8 in Nigeria, 3 in Kenya, 3in Mauritius, 2 in Cameroon, 1 in Tanzania, 1 in Zimbabwe, 1 in Uganda, and 1 in Democratic Republic of Congo.

The empirical investigation conducted on crowdfunding platforms on Africa by N'Guessan, Alegre and Canela (2017) revealed that of the 17 international platforms extended their services to Africa such as *Catapult, Eureeca, Helloasso, Kickstarter, Kiva*, just to name a few. Of these 17 platforms, Kiva exerted significant impact in financing projects across Africa, which merits academic investigation. I therefore briefly present the contribution of Kiva as an alternative financing channel that drives financial inclusion further.

Kiva is a well-known U.S crowdfunding platform in San Francisco since 2005. Its establishment was motivated by the contribution of the Nobel Peace Prize winner, Muhammad Yunus in 2003. With a philosophy of 'loans that change lives' the platform allows people to lend small amounts of cash through the internet both in the USA and to developing countries. Since Kiva commenced operations, they've crowd-funded more than 1.6M loans of close to $1.3B with a close to 95% repayment rate. The choice of this platform is informed by the fact that it has the biggest representation in Africa and is a loan-based model that has processed and funded investments since its creation in Africa (N'Guessan, Alegre and Canela, 2017). Kiva has funded more than 170.000 loan applications in Africa through its field partners. Burtch et al. (2014) remarked that Kiva provides a good opportunity that facilitates the interaction of multiculturalism, peer-to-peer lending on a wide scale with people residing in 190 countries. Kiva asks questions related to why request a loan, sector of activity, gender, amount amongst others. Average loan duration is a year and with some loans exceeding ten years. Repayment is either regular (weekly, monthly or irregular/bullet. For example: In 2017, a male agriculturalist in Cameroons' Northwest Region got his loan application fully funded by 25 lenders amounting to $725 request. The reason advanced by this farmer was "To buy piglets, chicks and feed, build a fence, and buy fertilizer and seedlings". A female entrepreneur in Congo's capital-Brazzaville operating in the construction industry applied for a loan of $4075 to expand her Cement industry. Her request was fully approved by 120 investors. Interestingly, one can observe entrepreneur's behavior by gender, by sector of activity, as well as by region as they encounter Fintech lenders. To justify the growing importance in SSA economies, I present the number of projects that received financing in the following clustered bar as well as on Table 4.4.

Figure 4.1 State of Crowdfunding in SSA using Data from Kiva platform

This clustered bar reflects the state of crowdfunding in 27 SSA economies. Data is obtained from kiva platform for four periods i.e., 2014, 2015, 2016 and 2017. Not all the 27 countries were covered during these years, I therefore combine 2014 and 2015 and refer to the projects that occurred in these periods are year 2014 while those that occurred in 2016 and 2017 are marked as year 2017.

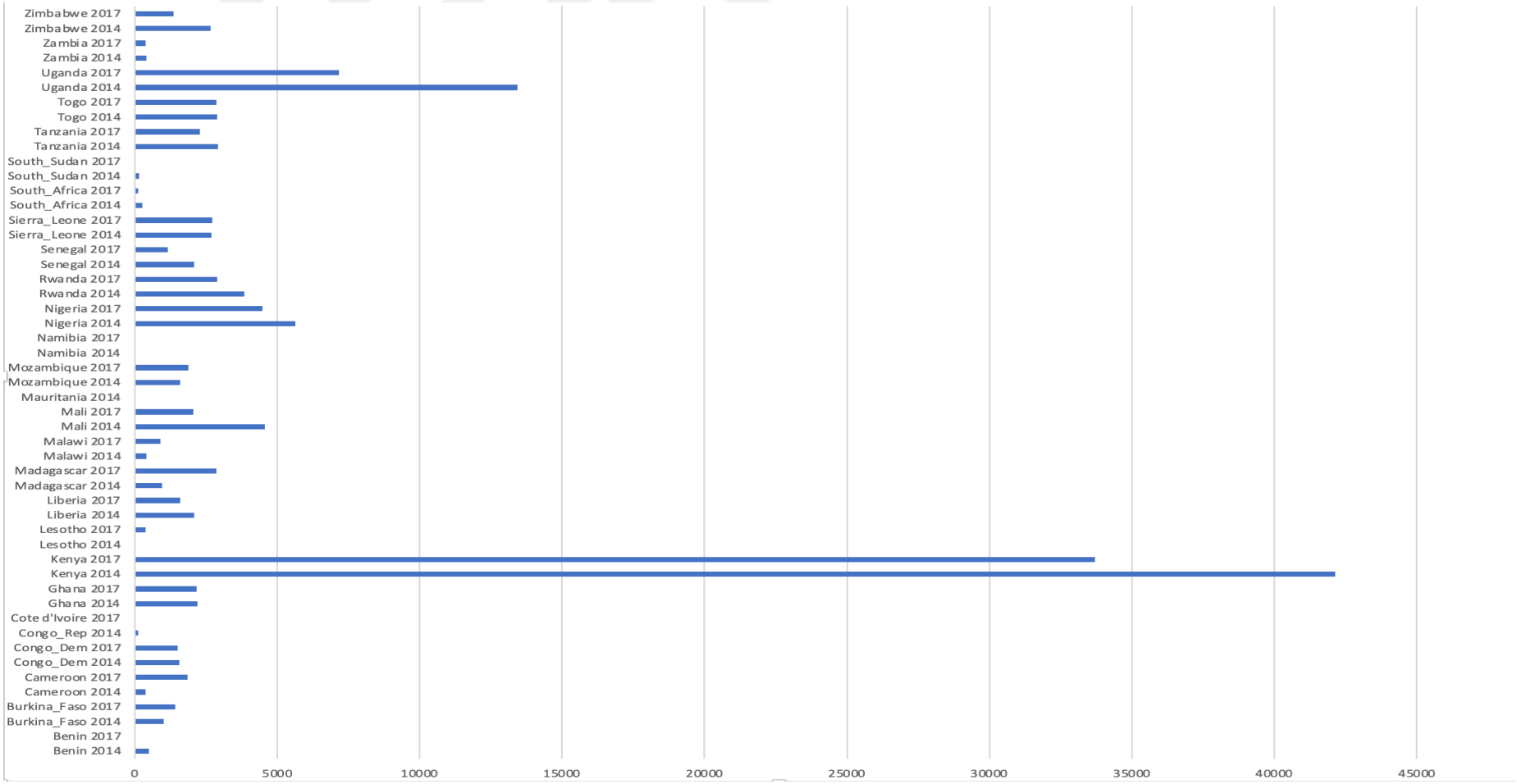


Table 4.8 State of Crowdfunding in SSA using Data from Kiva platform

Table presents the state of crowdfunding in 27 SSA economies. Data is obtained from kiva platform for four periods i.e., 2014, 2015, 2016 and 2017. Not all the 27 countries were covered during these years, I therefore combine 2014 and 2015 and refer to the projects that occurred in these periods are year 2014 while those that occurred in 2016 and 2017 are marked as year 2017.

Ccountry_Year	Crowdfunding Projects	%	Ccountry_Year	Crowdfunding Projects	%	Ccountry_Year	Crowdfunding Projects	%
Benin 2014	496	0.29	Madagascar 2014	967	0.57	Sierra_Leone 2014	2,698	1.58
Benin 2017	1	0	Madagascar 2017	2,854	1.67	Sierra_Leone 2017	2,717	1.59
Burkina_Faso 2014	1,026	0.6	Malawi 2014	424	0.25	South_Africa 2014	262	0.15
Burkina_Faso 2017	1,434	0.84	Malawi 2017	896	0.53	South_Africa 2017	116	0.07
Cameroon 2014	372	0.22	Mali 2014	4,582	2.69	South_Sudan 2014	159	0.09
Cameroon 2017	1,858	1.09	Mali 2017	2,057	1.21	South_Sudan 2017	1	0
Congo_Dem 2014	1,564	0.92	Mauritania 2014	1	0	Tanzania 2014	2,937	1.72
Congo_Dem 2017	1,509	0.89	Mozambique 2014	1,594	0.94	Tanzania 2017	2,282	1.34
Congo_Rep 2014	128	0.08	Mozambique 2017	1,889	1.11	Togo 2014	2,896	1.7
Cote d'Ivoire 2017	1	0	Namibia 2014	4	0	Togo 2017	2,853	1.67
Ghana 2014	2,196	1.29	Namibia 2017	4	0	Uganda 2014	13,421	7.87
Ghana 2017	2,178	1.28	Nigeria 2014	5,642	3.31	Uganda 2017	7,180	4.21
Kenya 2014	42,119	24.71	Nigeria 2017	4,494	2.64	Zambia 2014	401	0.24
Kenya 2017	33,706	19.78	Rwanda 2014	3,844	2.26	Zambia 2017	383	0.22
Lesotho 2014	25	0.01	Rwanda 2017	2,891	1.7	Zimbabwe 2014	2,678	1.57
Lesotho 2017	397	0.23	Senegal 2014	2,097	1.23	Zimbabwe 2017	1,356	0.8
Liberia 2014	2,090	1.23	Senegal 2017	1,172	0.69			
Liberia 2017	1,592	0.93						

Source: Adapted from Kiva platform. Overall, one can notice the dominance in common law countries.

4.8 Summary of Part III

Given that financial constraint significantly limits firm growth and employment, given that young firms are unlikely to obtain debt-contracts, given equally that access to finance and financial inclusion is comparatively weak in Sub Saharan African economies, this chapter explored alternative financing sources for entrepreneurial firms operating in SSA. These alternative channels are primarily examined from the private equity industry, followed by a close look at the emergence of new financial products in SSA, such as crowdfunding that have gained prominence these past years.

The first part of this chapter investigates the effects of external finance for entrepreneurial firms on two fronts: Firstly, to understand if at all firms survive after obtaining external finance, secondly to understand if this survival translates firm growth. Making use of survival model, findings revealed that indeed, external finance obtained from the private equity industry helps firms in SSA to survive. In the second question, external finance recipients were strongly and positively associated with firm growth, as proxied by IPO or involvement in acquisition. Results hold after controlling for various characteristics.

In the second part of the chapter, I discuss other alternative financing options available in SSA that spans from the informal sector to formal. Later, I discuss the growing importance of new financial products in SSA especially in an era of improved technology, such as crowdfunding. I briefly review the literature linked to this financing option and proceed to present the landscape of crowdfunding in some selected SSA economies. This external financing model fits the realities of SSA economies, largely due to their informality of micro businesses.[61] The merit of this mode of finance resides in the fact that its operations go beyond national or regional frontier provided the necessary infrastructural technology and field partners are in place.[62] Though the model tackles only a weak segment of the economy —micro-agents who wish to obtain loans for petty-petty businesses, it does have positive marginal effects as it drives broad-based financial inclusion, which has a potential to contribute to firm growth. An

[61] The IMF (2017) regional economic outlook reports that SSA informal sector accounts between 30-90% of non-agricultural employment and plays a major role in the economy by contributing 25-65% to GDP. https://www.imf.org/en/Publications/REO/SSA/Issues/2017/05/03/sreo0517

[62] Crowdfunding generally takes place online with properly registered financial intermediaries (broker-dealer, field partners) who identify, screen, and monitor projects before seeking funding.

important role to have been explored could have been that of impact investors, however, African economies based on their economic realities are still not too involved with high-tech companies, that are largely concerned with impact investing, coupled with the high informality that resides in SSA as well as challenges linked to regulatory efficiency of public authorities. Furthermore, lack of data retards academic investigation of the activities of impact investors.

5 CONCLUSION

This thesis primarily aims at understanding how external finance may be important for firms in a geography where financial constraint is a serious obstacle on firm growth such as Sub-Saharan Africa (SSA). The question is addressed in two parts—part one investigates access to finance for firms within the CEMAC sub-region. This is motivated by the fact that there is enough version within a group to understand the effects of access to finance on firms, focusing on a union such as CEMAC many heterogeneities are removed, thus rendering various aspects of these countries more homogenous as compared to the variations that reside in SSA economies as whole. Part two considers 25 SSA economies. The first part asks whether access to finance enables firms to grow, the second part asks same question but looks at firms in different life cycles and estimates the effects of external finance on firm survival/growth. The third part discusses recent financing techniques in SSA, given the difficulty in obtaining debt-contracts.

Findings provides additional evidence that finance is indeed important for firm growth i.e., start-ups or well-established firms do require external finance for their growth opportunities, thus emphasizing the need of well-developed financial institutions/systems. Addressing financial constraints for firms is central especially as they play an important role in the economy and are seen as engines of development. This therefore mean that unfreezing credit constraints for them have multiplier effects spanning to the firms and the economy at large. Their ease of access to finance would help them to grow which in turn spur economic development/growth. In the first part of this thesis, I use colonial transportation routes—railways and seaports constructed in the colonial days as an instrument and another instrument based on financial development to understand whether access to finance assist firms to grow. My findings support the view that finance is crucial for firm growth. In the second part, making use of firms' survival probability model, I observe that indeed external finance provided by the private equity industry assist firms to survive and subsequently grow. In the last part, I discuss the benefits of new financial product —crowdfunding in driving broad-based financial access thereby assisting the financially excluded with SSA.

The contribution of this work is its identification strategy which addresses potential endogeneity using a novel instrument within access to finance and firm growth literature. Second, the proposed instrument connects two fields - geographical proximities, transportation networks and firms. Third, sheds lights on the landscape of private equity industry in SSA and finally, discusses the growing importance of alternative financing sources such as crowdfunding.

As Sub-Saharan African economies currently face challenges in access to finance as evidenced by the huge lending gap, it is therefore important for this region to re-define financial reforms that can accompany policy. This thesis has implications for decisionmakers as it provides empirical support on the importance of external financial opportunities for firms, which potentially spurs development/growth.

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APPENDIXES

Appendix A: Financial Development in CEMAC Compared to other Regions

Appendix A.1. Detailed Comparison on the State of Financial Development in CEMAC with other Regions

Panel A: Comparison Within CEMAC States between 2000 and 2017

Detailed CEMAC analysis is presented, where FD stands for financial development, FI for financial institutions, FM for financial markets, FID for financial institutions depth, FIA for financial institutions access, FIE for financial institution efficiency, FMD for financial market depth, FMA for financial market access, FME for financial market efficiency. Data is from IMF and averaged over three years.

Year	Economy	FD	FI	FM	FID	FIA	FIE	FMD	FMA	FME
Cameroon	2000-02	0.076	0.149	0.001	0.042	0.006	0.505	0.003	0	0
Cameroon	2003-05	0.072	0.140	0.001	0.047	0.009	0.455	0.004	0	0
Cameroon	2006-08	0.080	0.157	0.002	0.047	0.017	0.509	0.004	0	0
Cameroon	2009-11	0.080	0.156	0.002	0.052	0.026	0.484	0.005	0	0
Cameroon	2012-14	0.087	0.167	0.004	0.055	0.035	0.507	0.012	0	0
Cameroon	2015-17	0.088	0.170	0.004	0.058	0.041	0.502	0.010	0	0
CAF	2000-02	0.055	0.109	0.000	0.022	0.004	0.385	0.000	0	0
CAF	2003-05	0.063	0.124	0.000	0.021	0.004	0.444	0.000	0	0
CAF	2006-08	0.051	0.100	0.000	0.023	0.005	0.347	0.000	0	0
CAF	2009-11	0.064	0.126	0.000	0.028	0.013	0.426	0.000	0	0
CAF	2012-14	0.045	0.088	0.000	0.036	0.015	0.259	0.000	0	0
CAF	2015-17	0.039	0.078	0.000	0.031	0.013	0.231	0.000	0	0
Chad	2000-02	0.073	0.111	0.034	0.016	0.006	0.398	0.090	0	0
Chad	2003-05	0.069	0.121	0.015	0.013	0.005	0.447	0.041	0	0
Chad	2006-08	0.065	0.120	0.008	0.009	0.005	0.444	0.021	0	0
Chad	2009-11	0.078	0.148	0.006	0.014	0.009	0.542	0.017	0	0
Chad	2012-14	0.083	0.149	0.015	0.018	0.011	0.533	0.040	0	0
Chad	2015-17	0.073	0.116	0.029	0.024	0.016	0.388	0.076	0	0
Congo, Rep.	2000-02	0.046	0.063	0.027	0.018	0.009	0.200	0.072	0	0
Congo, Rep.	2003-05	0.048	0.071	0.025	0.037	0.010	0.199	0.066	0	0
Congo, Rep.	2006-08	0.036	0.060	0.010	0.028	0.017	0.161	0.027	0	0
Congo, Rep.	2009-11	0.100	0.186	0.010	0.034	0.032	0.622	0.027	0	0
Congo, Rep.	2012-14	0.112	0.208	0.014	0.054	0.055	0.633	0.037	0	0
Congo, Rep.	2015-17	0.138	0.233	0.038	0.092	0.082	0.626	0.102	0	0
E. Guinea	2000-02	0.080	0.147	0.010	0.008	0.030	0.512	0.026	0	0
E. Guinea	2003-05	0.082	0.151	0.010	0.005	0.032	0.529	0.025	0	0
E. Guinea	2006-08	0.079	0.150	0.005	0.007	0.039	0.512	0.012	0	0
E. Guinea	2009-11	0.078	0.152	0.001	0.013	0.052	0.487	0.004	0	0
E. Guinea	2012-14	0.087	0.171	0.000	0.015	0.070	0.527	0.000	0	0
E. Guinea	2015-17	0.097	0.191	0.000	0.031	0.096	0.537	0.000	0	0
Gabon	2000-02	0.088	0.171	0.001	0.059	0.065	0.467	0.003	0	0
Gabon	2003-05	0.083	0.161	0.001	0.057	0.064	0.431	0.003	0	0
Gabon	2006-08	0.090	0.173	0.004	0.051	0.072	0.472	0.010	0	0
Gabon	2009-11	0.086	0.165	0.005	0.055	0.092	0.403	0.013	0	0
Gabon	2012-14	0.105	0.199	0.008	0.064	0.157	0.413	0.022	0	0
Gabon	2015-17	0.114	0.211	0.013	0.061	0.160	0.460	0.034	0	0

Panel B: Global between 2000 and 2017

Figures are computed following 3 year averages. FD stands for financial development, FI for financial institutions, FM for financial markets, FID for financial institutions depth, FIA for financial institutions access, FIE for financial institution efficiency, FMD for financial market depth, FMA for financial market access, FME for financial market efficiency. Data is obtained from IMF

Economy	Year	FD	FI	FM	FID	FIA	FIE	FMD	FMA	FME
Africa	2000-02	0.116	0.187	0.040	0.092	0.060	0.484	0.053	0.047	0.017
Africa	2003-05	0.120	0.196	0.041	0.102	0.064	0.493	0.054	0.046	0.019
Africa	2006-08	0.130	0.210	0.046	0.107	0.080	0.515	0.060	0.043	0.029
Africa	2009-11	0.141	0.228	0.050	0.116	0.110	0.520	0.062	0.043	0.040
Africa	2012-14	0.147	0.240	0.050	0.124	0.130	0.523	0.064	0.042	0.041
Africa	2015-17	0.153	0.244	0.058	0.127	0.138	0.518	0.079	0.047	0.042
All countries	2000-02	0.268	0.337	0.191	0.211	0.259	0.543	0.175	0.191	0.204
All countries	2003-05	0.280	0.355	0.196	0.227	0.274	0.565	0.191	0.203	0.190
All countries	2006-08	0.307	0.384	0.219	0.241	0.313	0.591	0.218	0.210	0.224
All countries	2009-11	0.311	0.399	0.213	0.249	0.347	0.577	0.220	0.203	0.208
All countries	2012-14	0.311	0.412	0.201	0.257	0.365	0.585	0.214	0.203	0.178
All countries	2015-17	0.318	0.419	0.207	0.268	0.368	0.590	0.227	0.207	0.176
AM	2000-02	0.601	0.659	0.524	0.557	0.625	0.627	0.500	0.502	0.560
AM	2003-05	0.614	0.691	0.519	0.584	0.655	0.658	0.525	0.520	0.497
AM	2006-08	0.657	0.721	0.573	0.610	0.698	0.662	0.589	0.514	0.596
AM	2009-11	0.650	0.718	0.564	0.619	0.704	0.625	0.586	0.517	0.566
AM	2012-14	0.633	0.711	0.536	0.632	0.671	0.631	0.582	0.517	0.485
AM	2015-17	0.635	0.703	0.547	0.644	0.636	0.642	0.593	0.524	0.499
EM	2000-02	0.248	0.310	0.179	0.171	0.232	0.548	0.142	0.195	0.201
EM	2003-05	0.266	0.332	0.193	0.189	0.248	0.577	0.166	0.214	0.198
EM	2006-08	0.301	0.370	0.222	0.202	0.304	0.614	0.199	0.232	0.232
EM	2009-11	0.307	0.397	0.209	0.218	0.359	0.599	0.198	0.213	0.211
EM	2012-14	0.312	0.419	0.194	0.225	0.398	0.612	0.187	0.214	0.178
EM	2015-17	0.323	0.436	0.200	0.241	0.414	0.622	0.205	0.218	0.169
SSA	2000-02	0.108	0.177	0.037	0.099	0.033	0.473	0.055	0.031	0.019
SSA	2003-05	0.111	0.181	0.038	0.107	0.034	0.478	0.057	0.029	0.023
SSA	2006-08	0.121	0.194	0.044	0.113	0.046	0.500	0.063	0.027	0.037
SSA	2009-11	0.132	0.209	0.050	0.121	0.070	0.504	0.064	0.028	0.054
SSA	2012-14	0.138	0.222	0.050	0.129	0.086	0.516	0.064	0.026	0.055
SSA	2015-17	0.144	0.226	0.057	0.136	0.097	0.501	0.080	0.029	0.057
SSA-CEMAC	2000-02	0.118	0.189	0.043	0.117	0.036	0.489	0.061	0.039	0.023
SSA-CEMAC	2003-05	0.122	0.195	0.045	0.126	0.037	0.494	0.065	0.036	0.029
SSA-CEMAC	2006-08	0.135	0.211	0.054	0.134	0.050	0.523	0.076	0.034	0.047
SSA-CEMAC	2009-11	0.144	0.223	0.062	0.143	0.078	0.507	0.077	0.036	0.068
SSA-CEMAC	2012-14	0.151	0.237	0.060	0.152	0.093	0.525	0.075	0.032	0.069
SSA-CEMAC	2015-17	0.157	0.241	0.068	0.158	0.105	0.512	0.090	0.036	0.071
CEMAC	2000-02	0.070	0.125	0.012	0.027	0.020	0.411	0.032	0	0
CEMAC	2003-05	0.069	0.128	0.009	0.030	0.021	0.418	0.023	0	0
CEMAC	2006-08	0.067	0.127	0.005	0.028	0.026	0.407	0.013	0	0
CEMAC	2009-11	0.081	0.156	0.004	0.032	0.037	0.494	0.011	0	0
CEMAC	2012-14	0.087	0.164	0.007	0.040	0.057	0.479	0.018	0	0
CEMAC	2015-17	0.092	0.166	0.014	0.050	0.068	0.457	0.037	0	0

Appendix B Sub-Saharan African Economies

List of SSA considered in the comparison regarding financial development as compiled by IMF.

Number	Selected SSA Economies
1	Benin
2	Burkina Faso
3	Cameroon
4	Central African Republic
5	Chad
6	Congo, Dem. Rep.
7	Congo, Rep.
8	Cote d'Ivoire
9	Equatorial Guinea
10	Gabon
11	Ghana
12	Kenya
13	Lesotho
14	Liberia
15	Madagascar
16	Malawi
17	Mali
18	Mauritania
19	Mozambique
20	Namibia
21	Nigeria
22	Rwanda
23	Senegal
24	Sierra Leone
25	South Africa
26	South Sudan
27	Tanzania
28	Togo
29	Uganda
30	Zambia

Appendix C Definition of variables employed in the analysis with their sources

Definition of Variables

Variable Name	Description & Source	Source
Account Ownership (dummy)	A measure of firms' inclusion status. It is a dummy variable coded one (1) If a firm happens to have a checking account, overdraft facility and credit line, when otherwise, it takes the value zero (0)	WBES
Compounded Annual Sales and Employment Growth Rate	Compounded annual sales growth rate is computed as (((d2 / n3) ^ (1/3))-1) *100; where d2 is the total annual sales for the just ended fiscal year while n3 represent sales figures three years ago. Compounded annual employment growth rate is computed as (((l1 / l2) ^ (1/3))-1) *100; where l1 is the number of permanent employees for the just ended fiscal year while l2 is the number of permanent employees, three years ago	WBES
CEO Experience	Years of experience of top management during the World Bank Enterprise Surveys	WBES
Colonial Pathways: Railway or Seaport	An instrument for access to finance and considers the distance from Colonial Railway or seaport to firms' current city/town/village. A firm is considered far if it happens to lie within the second and fourth quartile and therefore code 1, when otherwise, it is 0	QGIS & WBES
Competition with unregistered firms	An indicator variable =1 if firm competes with an unregistered firm and otherwise=0	WBES
Finance an a constraint to business operations	A dummy variable =1, If firm indicates that lack of finance constitutes a Major+ Sever Obstacle to its operations	WBES
Firms' Age	Firm age is considered as difference since incorporation and the current survey year	WBES
Investments in Fixed Capital	A measure of external finance, where a dummy variable equal to 1 if the firm reports fixed assets purchase during the last fiscal year was financed from bank loans, other financial institutions excluding banks, credit from suppliers which was more than 50% of the purchase, when otherwise, it is zero.	WBES
Manufacturing	dummy variable if firm is a manufacturing industry=1 and otherwise=0	WBES
Normalized Measure of Financial Development	Variable used to predict financial development according to Guiso, Sapienza and Zingales (2004). Disincentivized firms, who could not apply for a loan based on various reasons are considered to represent underdeveloped financial regions. The coefficients obtained on regions are further normalized following 1-reject/max(reject) procedure per region. The least financially developed region is therefore considered zero.	WBES
Other Services	dummy variable if firm is a Other service industry=1 and otherwise=0	WBES
Other_Businesses	dummy variable =1 if firm is Other business and otherwise=0	WBES
Table	dummy variable =1 if firm is Other business and otherwise=0	WBES

Other_Businesses		
Partnership Businesses	dummy variable =1 if firm is a partnership business, when otherwise=0	WBES
Partnership Businesses	dummy variable =1 if firm is a partnership business, when otherwise=0	WBES
Per Capita GDP	GDP/Capita for each country during the year of Survey in current USD (scaled by 1000)	World Development Indicators
Positive Employment Growth (dummy)	A measure of firm growth where an indicator variable equal to 1 if, within the past three years, the firm has experienced a positive sales increase and 0 otherwise. Source: WBES.	WBES
Positive Sales Growth (dummy)	A measure of firm growth, where an indicator variable equal to 1 if, within the past three years, the firm has experienced a positive increase in employment and 0 otherwise.	WBES
Reliance on Internal Funds for Working Capital (dummy	Variable measures firms reliance on external finance i.e., at least 50% of external finance for its working capital operations and coded one(1), when not, it is zero(0). Respondents that replied with "Don't know" are assumed as missing values.	WBES
Retail	dummy variable if firm is a Retails industry=1 and otherwise=0	WBES
Service	dummy variable if firm is a Service industry=1 and otherwise=0	WBES
Shareholding Businesses	dummy variiable =1 if firm is shareholding business and otherwise=0	WBES
Shareholding Businesses	dummy variable =1 if firm is shareholding business and otherwise=0	WBES
Size_Large	dummy variable, = 1 if firm employs >=100	WBES
Size_Medium	dummy variable, = 1 if firm employs >=20 & <100 and otherwise= 0	WBES
Size_Small	dummy variable, = 1 if firm employs <20 workers and otherwise=0	WBES
Sole_Proprietor	dummy variable =1 if firm is sole proprietor	WBES
Sole_Proprietor	dummy variable =1 if firm is sole proprietor	WBES
Under Investment (dummy)	A measure of deviations from the expected optimal level of investment based on the measure of Chen, Hope, Li and Wang (2011). The model used predicts investment as a function of growth opportunities. Thus, both underinvestment (negative deviations from expected investment) and overinvestment (positive deviations from expected investment). Here we focus on the underinvestment portion	WBES

Appendix D Recipients of External Finance by Country

Table illustrates the state of financing within 25 Sub Saharan African economies, between 2000 and 2021.

No	Country	Funding Rounds	%	First Funding Round (Equity)	%
1	Benin	26	1.03	4	0.26
2	Burkina Faso	6	0.24	4	0.26
3	Cameroon	30	1.19	16	1.03
4	Ghana	168	6.66	103	6.62
5	Kenya	417	16.53	239	15.37
6	Lesotho	3	0.12	2	0.13
7	Liberia	5	0.20	3	0.19
8	Madagascar	12	0.48	9	0.58
9	Malawi	10	0.40	7	0.45
10	Mali	27	1.07	10	0.64
11	Mauritania	1	0.04	1	0.06
12	Mozambique	7	0.28	4	0.26
13	Namibia	8	0.32	7	0.45
14	Nigeria	684	27.12	412	26.50
15	Rwanda	51	2.02	22	1.41
16	Senegal	41	1.63	25	1.61
17	Sierra Leone	5	0.20	4	0.26
18	South Africa	683	27.08	496	31.90
19	Tanzania	73	2.89	39	2.51
20	Togo	7	0.28	6	0.39
21	Uganda	120	4.76	67	4.31
22	Zambia	49	1.94	23	1.48
23	Zimbabwe	27	1.07	18	1.16
24	Congo, Dem. Rep.	16	0.63	11	0.71
25	Cote d'Ivoire	46	1.82	23	1.48
Total		**2522**		**1555**	

Source: Adapted from CrunchBase database specifically from “funding round” and “all companies” sections.

CV

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