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The effect of banking sector competition on firm creation in Sub-Saharan Africa

A Research Report presented for the degree of Master of Economic Science in the School of Economics and Finance

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Abstract

This study determines the effect of banking sector competition on firm creation in Sub-Saharan Africa (SSA). The study uses country-level data from multiple World Bank databases covering the period 2006-2021. While the analysis initially included all 48 SSA countries, only 40 countries were part of the final sample due to missing data in 8 countries. For a comprehensive view of the banking sector competition in the region, we use two non-structural measures of competition (Boone Indicator and the Lerner Index) and one structural measure (The concentration ratio calculated based on the top five banks, CR5). The Fixed Effects (FE) model and the two-step system Generalized Method of Moment (system-GMM) estimators are used to estimate the results of the analysis. Employing two estimators enhances robustness of the findings and ensures their consistency across different estimation techniques. Our findings support the market power hypothesis for SSA countries, indicating a positive relationship between banking sector competition and firm creation. This supports the view that increased competition in the banking sector will lead to an increase in the rate of firm creation. Based on the results, economic growth and higher levels of education lead to opportunities for firm creation. Our findings also show that new firm registration rates are lower in upper-income countries compared to lower-income countries in the region. The findings from this paper can inform policy decisions around banking sector competition regulation, and support initiatives that leverage firm creation as a tool to address unemployment and poverty in the region.

JEL Classification Numbers: G18, G21

Keywords: Competition, firm creation, Boone Indicator, Lerner Index, Concentration Ratio

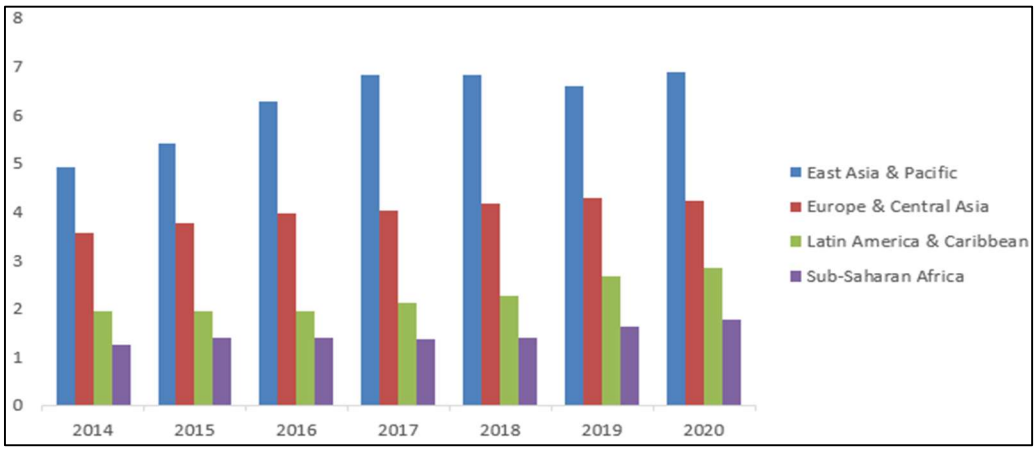
1. Introduction

Firm creation is one of the economic stimulants for growing the economy of a country. Countries in Sub-Saharan Africa (SSA) have experienced high unemployment rates, leading to a cycle of poverty, and limiting overall economic growth in the region (Zaman et al., 2023). One of the United Nations Development Programme's (UNDP) sustainable development goals is to eradicate poverty by 2030. A study by Mogess, Eshete, and Alemaw (2023) on economic growth and poverty reduction in SSA countries found that a minimum economic growth rate of 9% is required to reduce poverty from 41.58% in 2018 to zero by 2030. With an average population growth rate of at least 2.3%, a minimum economic growth rate of 11.3% is required, assuming constant income inequality and a poverty line of $1.90 per day. Low economic activities, ethnic and religious conflicts, high population growth rates, and limited opportunities to long-term employment were identified as factors linked to rising poverty levels in SSA (Adeyemi, Ijaiya & Raheem, 2009; Ngubane, Mndebele & Kaseeram, 2023). The economic development of African countries, supported by abundant natural resources, seemed like a pathway to driving down unemployment rates in the sub-region but employment levels remain low (Akinyele, Oloba & Mah, 2023). A report by the International Labour Organization (ILO) (2024) stated that political instability and conflict in the SSA region contributed to rising unemployment rates. Additionally, it stated that approximately 8.9 million people resided in areas near conflicts in 2022, which significantly hindered their ability to secure employment. Firm creation can be used as a tool to address issues of unemployment, poverty, and economic growth. New firms create jobs, improve innovation, and promote economic growth (Ghosh, 2022).

Low levels of firm creation in the SSA region coincide with periods of high poverty and unemployment rates. According to the data from the entrepreneurship dataset of the World Bank, firm creation in SSA is low compared to other regions as illustrated in figure 1. For the period 2014-2020, the average of new business entry density, defined as the number of newly registered limited liability corporations per year normalized for 1000 working-age people, the density rate for the SSA region is below 2. SSA had the lowest density of new firms throughout the sample period, whereas East Asia & Pacific recorded the highest density of new business entries, followed by Europe & Central Asia, and Latin America & Caribbean, respectively. From their study of analyzing poverty of different countries, Khan et al. (2020) found that countries in Eastern and Southeastern Asia have made progress of

living above the poverty line, unlike 42% of the population in SSA. Based on this finding and the analysis from figure 1, the argument that firm creation (or entrepreneurship) can reduce poverty by providing employment and ultimately improve economic growth, can be made. Moreover, in his multi-country analysis, Ghosh (2022) found that entrepreneurial activity was most prevalent in high-income and middle-income countries, reinforcing the notion that firm creation can help reduce poverty levels.

Figure 1: New firm entry density normalized for 1000 working-age people (ages 15-64) per region for the period 2014-2020.



Source: Own calculations from the World Bank's entrepreneurship database

There is a growing literature on firm creation and the analysis of what leads to failures of establishing new firms, entry regulations, and policy recommendations (Klapper, Laeven & Rajan, 2006; Odeyemi et al., 2024). According to Klapper, Laeven & Rajan. (2006), "regulations that improve access to finance can aid entrepreneurship". Financial service organizations such as banks can play a crucial role in supporting the establishment of new firms. Although there are increasing options for external funding, such as venture capital and business angels, new firms still rely on bank products like bank loans and credit lines as source of funding (González, 2020). This is especially so in developing economies, like those in SSA, where capital markets are in their embryonic stages.

Since bank financing is crucial for firm creation, it remains unclear if bank competition facilitates or obstructs access to finance for new firms.

Studies focusing on the African continent which supports bank competition facilitating

access to finance include Banya and Biekpe (2017), who concluded that bank competition improves the quality of financial products and services, lowers the cost of borrowing for entrepreneurs, and stimulates access to banking products and services by firms, thereby advancing financial inclusion. Kalebe and Gwatidzo (2025) concluded a positive relationship between bank competition and firms' access to finance in common monetary areas of Southern Africa. Studies conducted outside of Africa include Backman (2015), who found that bank competition will increase the probability of accessing finance for borrowers and entrepreneurs. Ghosh (2022) found a positive impact between firm creation and opening the local market to foreign banks participation. Moreover, this positive impact is strengthened in countries with well-developed financial markets. Additionally, Prieger (2023) suggests that lack of bank competition will keep the costs of accessing financial services high.

On the other hand, studies focusing on the African continent arguing that bank competition obstructs access to finance include Ayalew and Xianzhi (2019), who found that bank competition has an overall negative effect on removing access to credit constraints, even though bank competition positively affects firms' need for external funding, applying for bank credit and bank-loan approval decision. On a broader geographical analysis, Coccorese (2017) found that the competitive advantages of efficiency and ideal market structure may not translate to the banking market if some level of market power is not permitted. Specifically, the banking sector relies on data obtained from borrowers to evaluate the risk involved in offering credit products. Therefore, increased market power for banks (less competition) allows them to evaluate borrowers more effectively and improve their credit risk assessment.

This study seeks to investigate the effect of banking sector competition on firm creation in the SSA region. Focusing on African countries is important for several reasons. Firstly, Africa's banking sector was historically highly concentrated, but due to the adoption of competition reforms across the continent, the trend is slowly decreasing (Fosu, 2013). Given these changes, it is important to study the relationships within the banking sector, to understand how changes in competition will affect financial inclusion (by extension, access to funds to start new firms), financial stability, and innovation – all important for economic growth. Secondly, a better understanding of this relationship for the SSA region can help interested organizations, such as international development agencies and policymakers, to

develop targeted strategies aimed at addressing unemployment and poverty levels through firm creation. Thirdly, while there are a number of studies focusing on bank competition and access to finance in Africa, I could not find studies extending the analysis to explicitly study the effect of bank competition on new firm registration rates. Moreover, it is important to conduct Africa-centric studies to explore its diverse economy and propose solutions tailored for African realities. Africa has the highest number of countries among all continents, implying institutional, economic and different stages of development. By studying how bank competition, administered differently in most SSA countries, affects new firm creation, our study can be insightful in developing a framework that aggregates systems across the continent, and builds scalable insights from what we learned from the SSA region.

This study complements existing literature using multi-country analysis to study the effect of banking sector competition on firm creation (proxied by new firm registration rate), except, this study focuses only on African countries. Other studies ((Ghosh,2022) – uses 137 countries; (González, 2020) – uses 84 countries; ((Agostino and Trivieri, 2016) – uses 106 countries), analyse African countries with countries from other geographical regions. While their results offer a global perspective, they fall short in capturing Africa-specific dynamics such as rapid digitization and technology adaptation, growing demographic, untapped markets, and pronounced macroeconomic volatility. This argument can be extended to single-country analysis ((Hean and Jabas, 2024) – U.S. Midwest; (di Patti and Dell'Ariccia, 2004) – Italy); (Backman, 2015) – Sweden).

While this study contributes new findings to the literature, its core assumption of linking bank competition to firm creation is through access to finance – and the study of the effect of bank competition on access to finance in Africa is not new. Therefore, our study shares core arguments with studies investigating the effect of bank competition on access to finance: (Kalebe and Gwatidzo, 2025), (Moyo and Sibindi, 2021), and (Ayalew and Xianzhi, 2019). The difference is the explicit analysis of new firm registration rate as the variable of interest.

This study aims to answer the following questions:

(a) Does bank competition stimulate firm creation?

(b) How can we leverage statistically significant indicators from the World Governance Indicators (WGI) [1] to promote firm creation?

[1] WGI inputs: Voice and Accountability (VA); Political Stability and Absence of Violence/Terrorism (PA); Government Effectiveness (GE); Regulatory Quality (RQ); Rule of Law (RL); Control of Corruption (CC)

The paper is structured as follows: section 2 presents the theoretical and empirical literature on bank competition and firm creation. Section 3 describes the data and methodology used in this study. Section 4 presents the estimation results and discusses the effect bank competition has on our study. Section 5 concludes the paper. The appendix list is included in section 6 and section 7 is the reference list.

2. Literature Review

2.1 Theoretical frameworks

2.1.1 The market power and information hypothesis

The existing literature on the impact of competition in the banking sector on access to finance and, consequently, firm creation presents ambiguous findings. These findings are summarized in two hypotheses: The market power hypothesis and the information hypothesis. The market power hypothesis emphasizes the importance of bank competition in increasing the supply of credit to borrowers. According to this hypothesis, competition in the banking sector is similar to competition in other sectors. i.e., a more competitive banking market will support firm creation because high levels of competition lead to increased credit supply and reduced borrowing costs (di Patti and Dell'Ariccia, 2004; Agostino and Trivieri, 2016). Studies conducted using this view found that competition increases the number of banks, improving coverage to unbanked areas, and increased usage of banking products by customers in those regions (Cetorelli, 2001). The level of education for a population and exposure of credit products is important and positively contribute to firm creation (Agostino and Trivieri, 2016).

On the other hand, the information hypothesis emphases the role played by information in credit markets, suggesting that bank competition lacking sufficient borrower information can be detrimental to supply of credit (di Patti and Dell'Ariccia, 2004). This view suggests that an increase in bank competition will result in a reduction in credit supply due to challenges posed by asymmetric information. Moreover, banks have less incentives to bear the initial cost of offering credit to opaque borrowers at lower rates, consequently, raising interest rates (Petersen and Rajan, 1995). At high rates, new firm owners are unlikely to access finance. In a less competitive banking environment, banks are willing to build relationships with

borrowers and gather soft information, leading to efficient pricing of borrowing costs and offering loan products that are more likely to perform well (Coccorese, 2017).

If we assume both hypotheses can coexist, the hypothesis that will dominate will depend on the effect asymmetric information has on the sector we are investigating. In the case of bank competition, information that banks collect from borrowers forms a crucial part of the decision to grant finance and the rate of pricing borrowing cost (Coccorese, 2017).

2.1.2 Other theoretical hypotheses: Competition-Inefficiency and Quiet-Life Hypothesis

The competition-inefficient hypothesis argues that an increase in bank competition leads to unstable and shorter relationships with borrowers, leading to decline in efficiency (Moyo, 2018). This implies that bank clients can switch to other banks, eroding the lending relationship and increasing opaque customers. This will negatively affect banks' lending to customers aligning to the information hypothesis. i.e., banks are less willing to lend to customers, implying a decline in firm creation.

On the other hand, the Quiet-Life Hypothesis argues that increased bank competition (reduced market concentration) leads to more pressure to compete, making the bank more efficient. Efficient banks will foster relationships with clients and conduct proper screening of borrowers. This will positively affect access to finance and by extension, firm creation, aligning with the market power hypothesis.

2.2. Empirical Framework – the relationship between bank competition and firm creation

Much like section 2.1, empirical findings investigating the effect of bank competition and firm creation are also ambiguous. The study by Agostino and Trivieri (2016) is a multi-country analysis and uses data drawn from several World Bank databases – Doing Business (DB), World Development Indicators (WDI), and Global Financial Development Database (GFDD) in the period 2004 – 2011. The study investigates the relationship between bank market power and firm creation using data from 106 countries (including 17 SSA countries) and found that credit market competition may benefit firm creation. The study by Ghosh (2022) is another multi-country analysis (137 countries) which found that banking sector

openness, in the form of foreign banks market entry, significantly increases new business formations. The study by Hean and Jabas (2024) supports the finding that reduced banking competition may hinder new business formations and negatively affect entrepreneurship. Their paper investigates bank competition and business formation in the United States Midwest, focusing their analysis on the United States Midwest. The study was conducted over the period from 2005 – 2019 and it differs from the study by Agostino and Trivieri (2016) in that it focuses on a single country analysis and there was a concerted effort to conduct the study in homogenous states.

On the other hand, other studies found that less banking sector competition leads to a rise in firm creation. Also using a multi-country analysis of 84 countries (9 SSA countries) over 2002 to 2017 period, González (2020) found that less banking competition facilitated new business creation. The study made use of three proxies for bank competition: the Boone Indicator, the net interest margin, and bank market concentration. Both Petersen and Rajan (1995) and González (2020) highlight the importance of lending relationships between banks and new businesses, for reducing the cost of borrowing and overcoming the challenges of moral hazard and adverse selection.

With opposing literature on the effect of banking sector competition on firm creation, this study explores the case for SSA countries.

Table 1: Summary of the literature of previous studies on the effect of banking sector competition on firm creation

Author(s)	Objective(s)	Measures of Competition	Methodology	Findings	Period
(Backman, 2015)	Bank Competition and new firm creation in Sweden	• Herfindahl-Hirshman Index (HHI)	• Two-stage Least Squares (2SLS) Instrumental Variables	A positive relationship between bank competition and firm creation	2010
(Agostino and Trivieri, 2016)	bank market power and firm creation (Multi-Country analysis)	• BI • Lerner Index • CR3 and CR5	• Fixed Effects • Random Effects	More bank competition benefits firm creation	2004-2011
(González, 2020)	Bank development, competition, and entrepreneurship (multi-Country analysis)	• BI • Margin • CR3 and CR5	• FE • two-step system-GMM	Less bank market concentration positively affects entrepreneurship	2002-2017
(Ghosh, 2022)	Banking sector openness and entrepreneurship (multi-Country analysis)	• Lerner Index	• Fixed Effects • 2SLS • two-step system-GMM • Difference-in-difference	Greater banking sector competition significantly increases new business formations	2002-2014
(Hean and Jabas, 2024)	Bank Competition and business formation in the U.S. Midwest	• HHI	• FE	Less banking competition negatively affects entrepreneurship	2005-2019

BI – Boone Indicator, CR3 – Top 3 bank concentration, CR5 – Top 5 bank concentration

3. Data and Methodology

3.1. Data

The data used in this study is sourced from the World Bank databases. and World Development Indicators (WDI) database provided data on new business density rate, which serves as the dependent variable in this study. Governance data and data on the ease of new business formations are sourced from the Doing Business. The GFDD provides data for proxies of measuring competition, and macroeconomic variables. The study starts with 48 countries in SSA as the scope for analysis and 8 countries are dropped due missing data. The period of analysis is from 2006 to 2021.

Table 2 provides descriptive statistics and descriptions for variables included in our model. Amongst the measures of competition, the Lerner Index has the least data available for this sample period, implying that models using the Lerner Index as a measure of bank competition will have fewer observations. The mean for CR5 is high at 85.206, because of 21 countries having CR5 of 100 over multiple years. Appendix A provides country names and the years where this was observed. CR5 of 100 represents an extreme case where all the market share is concentrated amongst the top 5 companies. The average GDP growth rate is 3.838%, which is higher than the average population growth rate of 2.442% per annum, indicating that, on average, economic growth is outgrowing population growth – a positive sign for the region. However, the actual values for GDP growth show significant deviations from the mean. For example, the minimum value for GDP growth recorded by South Sudan in 2012, shows a steep decline of 46.082% from the GDP growth of the previous year. This could be explained by the war in South Sudan at the time. On the other end, Zimbabwe in 2010 recorded the highest value of economic growth of 21.452% for our sample period (See Appendix B). This could be explained by a rise in economic activity post the 2008 Global Financial Crisis (GFC).

The average inflation rate for the region has a mean value of 9.917%. Zimbabwe had the highest and lowest values reported for inflation. Appendix C provides a view for average inflation in the region for average inflation including Zimbabwe versus without Zimbabwe. For the years 2006 to 2008 and 2018 to 2021, the inflation rate for Zimbabwe differed significantly with the inflation for the rest of the region. Both timelines are around the GFC and the covid-19 crisis which may explain this observation.

Table 2: Descriptive Statistics

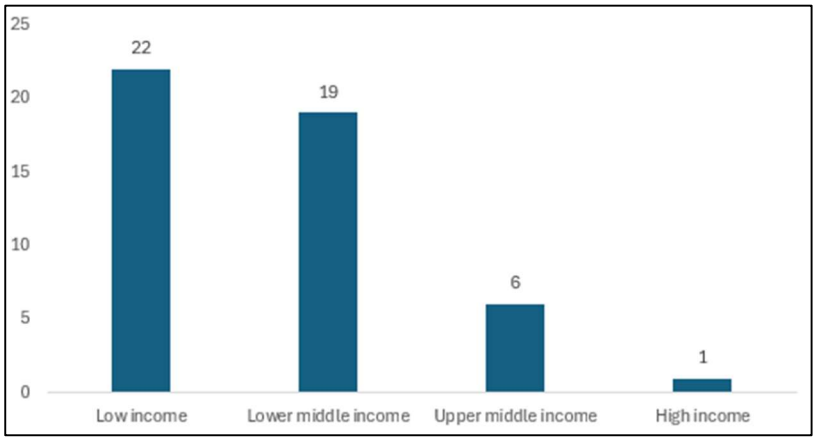
Variable	Description	Obs	Mean	Std. Dev.	Min	Max
NewFirmRegistration	Number of newly registered limited liability companies per 1,000 working age people (those aged 15-64)	548	1.672	3.011	.007	23.005
LernerIndex	A measure of market power in the banking market. It compares output pricing and marginal costs (markup).	451	.299	.099	.007	.595
Boone	Boone indicator. A measure of degree of competition based on profit efficiency in the banking market. It is calculated as the elasticity of profits to marginal costs.	600	-.08	.199	-2.541	.321
CR5	Assets of the five largest commercial banks as a share of total commercial banking assets.	488	85.206	14.078	44.33	100
GDPGROWTH	GDP growth (annual %)	749	3.838	5.091	-46.082	21.452
POPGROWTH	Population growth (annual %)	768	2.442	1.055	-5.416	5.59
Inflation	Headline CPI (%)	746	9.917	32.127	-72.729	557.21
UpperINC	Dummy variable. 1 if country is High-Income OR Upper-middle-Income, 0 otherwise	768	.854	.353	0	1
LowerINC	Dummy variable. 1 if country is Low-Income OR Lower-middle-Income, 0 otherwise	768	.146	.353	0	1
StartBus	Starting a business (score). A higher score implies it is difficult to start a business in that specific country	650	64.995	19.494	2.206	95.131
Education	Gross enrolment ratio for secondary school. The ratio between the number of students enrolled in secondary education regardless of age and the population of the age group that officially corresponds to secondary education.	443	47.66	23.3	5.46	112.311
FSD	the ratio of total domestic credit to private sector to GDP	664	21.491	22.625	.5	142.42
Crisis	Indicator showing years affected by 2008 Global Financial Crisis	768	.188	.391	0	1
VA	Governance indicator: Voice and Accountability	763	-.591	.763	-2.23	.97
PA	Governance indicator: Political Stability and Absence of Violence /Terrorism	763	-.58	.901	-2.5	1.2
GE	Governance indicator: Government Effectiveness	763	-.826	.656	-2.44	1.15
RQ	Governance indicator: Regulatory Quality	763	-.737	.642	-2.5	1.2
RL	Governance indicator: Rule of Law	763	-.73	.652	-2.5	1.02
CC	Governance indicator: Control of Corruption	764	-.656	.661	-1.94	1.6
WGI ind	Governance indicator: Composite indicator calculated using the PCA.	763	-.02	1.007	-2.5	2.5

Source(s): Variable definitions are taken from sources where the data was downloaded.

The average values for the WGI reported in Table 2 are all negative, ranging from -0.826 to -0.580. Since the indicators are scored on a scale from -2.5 (representing weak governance) to +2.5 (representing strong governance), this suggests that most countries are categorized as having weak governance. Although the study only uses WGI values between the scale of -2.5 to +2.5, there are instances in the data where the values are more negative than -2.5 for Political Stability and Absence of Violence /Terrorism (PA), Regulatory Quality (RL), and Rule of Law (RL) and these observations were rounded to -2.5. Appendix D provides the year, country, and WGI value for these observations. From the four countries listed, Somalia had the highest count of observations across the sample period. The WGI values outside the specified scale may be due to the aggregation method of using multiple sources by the World Bank with new sources added and calculated at different weights (Kaufmann, Kraay, & Mastruzzi, 2004). The approach taken to round off to -2.5 is justified as this still achieves the representation of worse governance for the stated WGI.

We combined countries from the four income groups into two broader groups: Lower income (which includes Low income and Lower-middle-income) and Upper income (which includes Upper-middle-income and High-income). This approach was driven by two factors: the presence of missing data, and a positively skewed distribution from low-income to high-income countries. For example, 8 countries were excluded from the sample due to missing data, one of which was from the upper-middle-income. Of the remaining countries, the sample consists of 40 countries, with 34 countries classified as Lower income and 6 countries classified as Upper income.

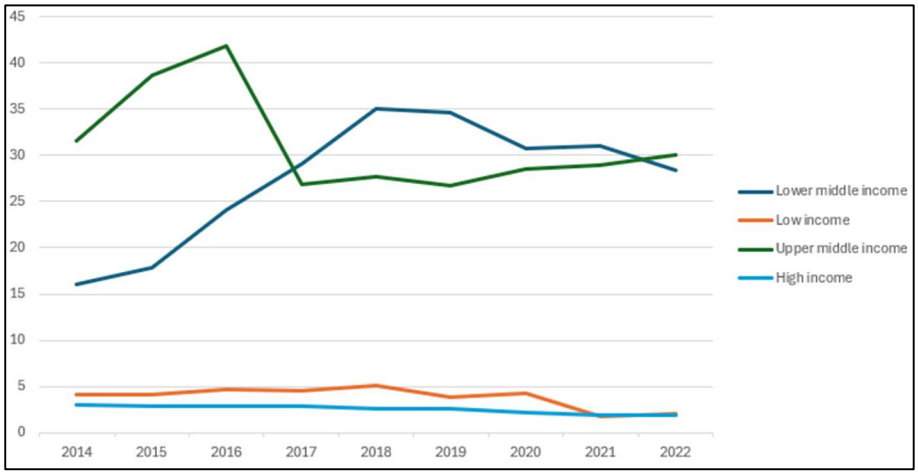
Figure 2: Distribution of SSA Countries by Income Groups (as classified by the World Bank)



Source: Own calculations from the World Bank's entrepreneurship database

Figure 2 provides the distribution of SSA countries across income groups for the data sample 2014-21. Seychelles is the only country in the high-income category. South Africa, Nigeria, and Rwanda are each example of countries classified under upper middle income, lower middle income, and low income, respectively. Figure 3 below shows the sum of new firm entry density across the 4 income groups for the SSA region. The 22 countries in the low-income group have an average new firm density rate of 3.8 for the sample period, similar trend to that of Seychelles, averaging 2.5 new firm density for the sample period. The income groups will form part of our model to assess if bank competition affects new firm registration across economic contexts; advanced economies and developing economies.

Figure 3: New firm density in the SSA region normalized for 1000 working-age people (ages 15-64), by Income Groups, for the period 2014-22.



Source: Own calculations from the World Bank's entrepreneurship database

Table 3 provides the correlation matrix for the variables studied in this paper. These correlations are useful for exploring the relationships between the variables and for understanding how to specify regressions in later sections. Most variables are statistically correlated with the dependent variable, but notably, two out of the three bank competition measures (Boone and CR5) are not statistically correlated. New firm registration shows a weak negative correlation with the Lerner Index. The strongest statistically correlated relationship for the dependent variable is a positive correlation with education, at 0.726, suggesting higher education attainment is associated with an increase increases in new firm registrations. On the other hand, new firm registration has a negative correlation with population growth, showing that as the level of population declines, new firm registrations tend to increase.

Table 3: Matrix of correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
(1) NewFirmRegistration	1.000																		
(2) LernerIndex	-0.170*	1.000																	
(3) Boone	-0.006	0.195*	1.000																
(4) CR5	0.087	-0.198*	0.160*	1.000															
(5) GDPGROWTH	-0.101*	0.207*	-0.016	-0.091*	1.000														
(6) POPGROWTH	-0.505*	0.188*	0.096*	0.033	0.125*	1.000													
(7) Inflation	-0.023	0.090*	-0.034	-0.025	-0.169*	-0.152*	1.000												
(8) LowerINC	-0.556*	0.155*	-0.037	-0.186*	0.111*	0.203*	0.068*	1.000											
(9) UpperINC	0.556*	-0.155*	0.037	0.186*	-0.111*	-0.203*	-0.068*	-1.000*	1.000										
(10) StartBus	0.303*	-0.124*	-0.131*	-0.239*	0.001	-0.171*	-0.036	-0.149*	0.149*	1.000									
(11) Education	0.726*	-0.193*	-0.054	-0.102*	-0.165*	-0.681*	-0.081*	-0.676*	0.676*	0.434*	1.000								
(12) FSD	0.687*	-0.100*	0.036	0.085*	-0.109*	-0.427*	-0.093*	-0.551*	0.551*	0.314*	0.703*	1.000							
(13) crisis	-0.061	-0.039	-0.044	0.066	0.074*	0.052	-0.040	0.000	0.000	-0.172*	-0.114*	-0.037	1.000						
(14) VA	0.509*	-0.178*	-0.007	-0.099*	0.059	-0.254*	-0.139*	-0.300*	0.300*	0.436*	0.551*	0.557*	-0.018	1.000					
(15) PA	0.457*	-0.179*	0.110*	0.119*	0.006	-0.228*	-0.171*	-0.490*	0.490*	0.259*	0.544*	0.394*	0.031	0.648*	1.000				
(16) GE	0.596*	0.002	0.020	-0.087*	0.066*	-0.299*	-0.165*	-0.541*	0.541*	0.416*	0.636*	0.629*	0.023	0.728*	0.699*	1.000			
(17) RQ	0.594*	-0.142*	0.010	-0.112*	0.061*	-0.235*	-0.177*	-0.449*	0.449*	0.476*	0.515*	0.597*	0.020	0.783*	0.639*	0.903*	1.000		
(18) CC	0.571*	-0.153*	-0.011	0.073	0.058	-0.411*	-0.145*	-0.410*	0.410*	0.397*	0.630*	0.516*	0.026	0.733*	0.714*	0.860*	0.782*	1.000	
(19) WGI_ind	0.601*	-0.133*	0.021	-0.028	0.056	-0.316*	-0.176*	-0.490*	0.490*	0.457*	0.642*	0.608*	0.014	0.860*	0.814*	0.945*	0.925*	0.916*	1.000

**** p<0.01, ** p<0.05, * p<0.1*

Source: Own calculations

3.2. *Empirical model*

The basic model takes a regression of new firm registration on bank competition. The control variables handled by the model include macroeconomic variables, indicators of governance effectiveness, and the level of financial sector development. The model is given by:

$$new\ firm\ registratrion_{i,t} = \beta_0 + \beta_1 Bank\ Competition_{i,t} + \beta_2 Control\ Variables_{i,t} + \tau_i + \varepsilon_{i,t} \quad (1)$$

New firm registration is the dependent variable, and I regress on bank competition to assess the relationship between the variables. Our data ranges from 2006 – 2021; in equation 1 above, i represents SSA countries and t represents the year. β_1 is the focus of this paper; it tells us if there is a relationship between firm competition and firm creation, and if the relationship is negative or positive. τ_i represents country specific error term. The error term ($\varepsilon_{i,t}$) is clustered at country level to cater for serial correlation. The control variables will include variables which are country specific and can potentially have a relationship with our dependent variable. Control variables are given by: Real GDP growth (GDPGROWTH), population growth (POPGROWTH), Education, Inflation, Financial Sector Development (FSD), Financial Crises, Income levels (UpperINC & LowerINC), Doing Business indicator[2] (StartBus), and the WGI.

3.3. *Determinants of variables*

3.3.1 *Entrepreneurship*

Similar to the study by (González, 2020), this analysis will use the new business entry density (new firm registration) as a proxy for new firm creation. This metric includes data for new corporations – private firms with limited liability. New business entry density is preferred over the number of new firms registered per country due to the perspective of being unable to differentiate the type of entrepreneurship between formal and informal categories i.e. considering the number of firms registered is more likely to overstate the number of firms from the perspective of accessing capital from the banking sector. Another limitation of this metric is that the reported figures do not consider restoration of firms, suspension of firms, and temporary measures. The paper assumes that the effect of bank competition on firm

[2] Doing business indicator inputs: Starting a business is selected as a proxy for this study

creation will be correctly captured from only considering formal entrepreneurship.

From the specified period, new firm registration has an average value of 1.8895 and the lowest value of 0.0067 from Liberia, and highest value of 23.0054 from Cabo Verde.

3.3.2 *Bank Competition*

Bank competition will be measured using the Boone Indicator, the Leaner Index and the concentration ratio. We use different measures to gain a comprehensive view of the banking sector competition in the region. These measures represent the two major categories of measuring competition: the traditional structural measures approach and the non-structural measures approach – also known as new empirical industrial organization (NEIO). The traditional structural measures of bank competition are based on the Structure-Conduct-Performance (SCP) paradigm, which posits a stable causal relationship between the structure of the banking industry, firm conduct, and performance (Elitcha, 2021). i.e., banks' profits tend to be higher in more concentrated markets (less competition) because concentration encourages collusive behavior among banks, reducing efficiency (Agostino and Trivieri, 2016). The structural approach is based on the observed market share to calculate bank market power while the non-structural approach calculates market power by directly observing costs and pricing functions of banks in the market. Elitcha (2021) highlights an example of concentration measures (structural) that do not consider the degree of market contestability, arguing that non-structural measures are more robust and accurate than structural measures.

The Boone Indicator

The Boone Indicator (BI) is a non-structural measure, and it considers that competition benefits efficient firms and penalizes inefficient firms; thus, it is calculated by assessing the responsiveness of profits to changes in marginal cost. Stronger profits and market shares imply high absolute values of BI (Banya and Biekpe, 2017). Compared to other non-structural measures, BI requires little data to compute. As shown by equation 2 below, to calculate BI we only need information on profits and costs.

$$ln\pi_i = \alpha - \beta \ln(MC_i) + \varepsilon \quad (2)$$

Where π_i stands for profit for bank i; α is the bank fixed term effect; β measures the

elasticity between profits and marginal cost for bank i (MC_i) – and shows that the relationship is negative; and ε is the error term.

The Lerner Index

The Lerner Index is also a non-structural measure, and it measures market power by calculating the markup of price over the marginal costs (Lerner,1934). The Lerner index takes values between 0 and 1, where index of 0 implies perfect competition and 1 implies monopoly (López-Penabad, Iglesias-Casal & Neto, 2021). It is calculated as follows:

$$Lerner\ Index = \frac{P_i - MC_i}{P_i} \tag{3}$$

Where P_i is the price of total assets proxied by the ration of total revenue to total assets and MC_i is the marginal cost of total assest (López-Penabad, Iglesias-Casal & Neto, 2021).

The concentration ratio

The concentration ratio represents the structural measure, and it is calculated by taking the market share of the top five banks (CR5) as a share of total banking assets (Agostino and Trivieri, 2016). We include this measure to cover both categories of measuring competition. The calculation of this ratio is given by equation 4:

$$CR5 = \frac{\sum_{i=1}^{5} total\ assets_i}{total\ banking\ industry\ assets} \tag{4}$$

3.3.3 *Control Variables*

The control variables used in the model are as follows.

GDPGROWTH – indicates the relationship between newly registered firms at different stages of the business cycle. Other studies concluded that the results regarding the effect of real GDP on firm creation are ambiguous. Ghosh (2022) highlights that the investment decision of banks may be affected by GDP growth i.e., in an expanding economy banks may decide to invest in entrepreneurship. On the other hand, the cost of production and opportunity costs of potential entrepreneurs are all low during a recession, implying an opportunity to establish new firms.

POPGROWTH – included to account for changes in country demographics on firm creation.

Education – proxied by the gross enrollment ratio for secondary school. It is the ratio between the number of students enrolled in secondary school regardless of age and the population of the age group that officially corresponds to secondary education. This variable helps to measure the link between human capital investment and new business registration.

Inflation – proxied by the annual growth rate of the CPI Index, and it is included in the model to control for macroeconomic stability.

FSD – proxied by the ratio of total domestic credit to private sector to GDP. This variable represents the effect access to finance has on new business registration.

Income levels – using the income group classifications by the World Bank, high-income and upper-middle-income countries are categorized by the UpperINC dummy variable, and lower-middle-income and low-income countries are categorized by the LowerINC dummy variable. The result of this variable will help assess the effect of bank competition on firm creation for countries with varying income levels. Existing literature suggests high income countries create more firms. The decision to divide countries into upper- and lower-income groups was driven by the fact that Seychelles is the only high-income country in SSA.

Starting business is a proxy for a country's business environment. It is part of the Doing Business indicators and while there are other indicators, we choose this one as it is directly related to new business formation. A higher score indicates that it is more difficult to start a business (Elitcha, 2021).

The results are presented based on the evaluation of seven models. The first six models evaluate all six WGIs individually, while the seventh model makes uses Principal Component Analysis (PCA) to create a composite governance indicator, *WGI_ind*. The expectation for all governance indicators is that they will be positive as improvement in governance structures and policies should lead to an increase in the rate of firm creation.

Crisis – dummy variable for capturing the years affected by Global Financial Crisis of 2008. Crisis is defined by years starting from 2009 to 2011.

4. Empirical results

4.1 Baseline model estimation using Fixed Effects (FE) Method.

Tables 4-6 presents results for panel data FE estimation with Driscoll-Kraay standard errors. This method is effective for addressing issues of serial correlation and heteroskedasticity, both of which were observed in this study. Furthermore, it can handle missing data series, which is relevant to this study, and it is applicable for both balanced and unbalanced data. Appendix E and F provide results of testing for serial correlation and heteroskedasticity, respectively, on the FE model with traditional standard errors. The Wooldridge test for autocorrelation in panel data has a p-value < 0.05, and we reject the null hypothesis and conclude serial correlation. Likewise, the Modified Wald test for groupwise heteroskedasticity in fixed effect regression model has a p-value < 0.05, and we conclude that we reject the null hypothesis of constant variance (homoskedasticity) and conclude heteroskedasticity. The coefficients for all variables remain the same when running the FE model reporting traditional standard errors and when reporting Driscoll-Kraay standard errors, the main difference being in the statistical significance of the variables.

The value of β_1 in equation (1) represents the main finding for this study, describing the relationship between bank competition and new firm registration. A positive (negative) relationship between banking sector competition and new firm creation supports the market power hypothesis (information hypothesis). Because bank competition is proxied using three bank measures, we discuss how the bank measures affect bank competition.

An increase in CR5 means that the market is concentrated amongst fewer banks and implies low levels of bank competition. Increasing Lerner Index implies that the difference between output price and marginal cost is increasing, consistent with price-setting characteristics, and therefore suggests a reduction in bank competition. The Boone Indicator measures the effect of efficiency on profits, and it is given by the elasticity of profits to marginal costs. According to this measure, less efficient banks' profit is earned by the more efficient banks. Therefore, an increase in the value of the Boone Indicator implies reduced bank competition in the market.

Since all the bank measures have an inverse relationship with bank competition, the estimated value of β_1 should be negative for a positive relationship between bank competition and new firm registration (market power hypothesis), and β_1 should be positive

for a negative relationship between bank competition and new firm registration (information hypothesis).

The FE estimation results for each measure of competition, Boone, Lerner, CR5, are presented in Tables 4 through 6, respectively. As previously mentioned, each table provides seven models, each model regressing individual governance indicators as well as the calculated composite indicator. This specification allows for an assessment of the robustness of each governance indicator. i.e., We can evaluate the effect of each governance indicator on the coefficient of bank competition, β_1.

The estimation results indicate that all measures of bank competition have negative coefficients that are statistically significant. The coefficients of the Boone Indicator are statistically significant at the 1% level (see Table 4) and are robust to the definition of governance indicators. This implies that a decrease in the Boone Indicator (increase in competition) leads to an increase in the rate of firm registration, aligning with the market power hypothesis. For the Lerner Index, the coefficients are statistically significant at the 5% level (10% level for model 5). A decrease in the Lerner Index (increase in competition) also increases the rate of new firm registration, supporting the market power hypothesis. All coefficients are statistically significant at the 5% level when CR5 is used as a proxy for bank competition (see Table 6). A decrease in the CR5 (increase in competition) leads to an increase in the rate of new firms registered, reinforcing the market power hypothesis.

The results presented for all three measures of competition provide strong support for the market power hypothesis. Other studies supporting the market power hypothesis when investigating the effect of bank competition on firm creation include: (Hean and Jabas, 2024); (Ghosh, 2022); (Elitcha, 2021); (Agostino and Trivieri, 2016).

Not all governance indicators were statistically significant in Table 4. Models (1), (5) and (6) were not statistically significant but this did not affect the results for the coefficient of the Boone Indicator. This implies that the change in governance indicators does not have a big enough effect to change the relationship between bank competition and new firm registration. Statistically significant estimates for governance indicators are all positive, implying a positive relationship with new firm registration. For instance, the specification that includes *PA* in Table 4 is statistically significant at the 1% level, suggesting that as political stability improves, the rate of new firm registration will increase.

Table 4: Fixed effects model results (Based on Boone Indicator)

Dependent Variable: NewFirmRegistration	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Boone	-1.421***	-1.301***	-1.459***	-1.51***	-1.479***	-1.35***	-1.309***
	(.402)	(.414)	(.387)	(.355)	(.47)	(.437)	(.416)
GDPGROWTH	.039*	.036*	.027*	.035	.041*	.038	.036
	(.023)	(.021)	(.014)	(.022)	(.024)	(.023)	(.021)
POPGROWTH	-.315**	-.312**	-.245**	-.304**	-.324**	-.315**	-.308**
	(.13)	(.124)	(.105)	(.131)	(.14)	(.127)	(.126)
Education	.031***	.033***	.038***	.032***	.032***	.031***	.032***
	(.008)	(.007)	(.008)	(.008)	(.007)	(.007)	(.007)
Inflation	-.011	-.008	-.01	-.007	-.014	-.01	-.008
	(.008)	(.008)	(.007)	(.008)	(.01)	(.009)	(.009)
StartBus	.001	.002	.001	.003	.001	.001	.002
	(.007)	(.007)	(.008)	(.008)	(.007)	(.007)	(.007)
UpperINC	0	0	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)	(0)	(0)
crisis	-.604**	-.614**	-.647**	-.631**	-.58**	-.6**	-.611**
	(.24)	(.241)	(.259)	(.245)	(.216)	(.222)	(.239)
FSD	-.04*	-.04	-.048*	-.05**	-.04*	-.041*	-.042*
	(.023)	(.024)	(.026)	(.023)	(.021)	(.023)	(.024)
VA	-.154						
	(.161)						
PA		.207***					
		(.07)					
GE			1.832**				
			(.865)				
RQ				.721**			
				(.347)			
RL					-.875		
					(.571)		
CC						.051	
						(.436)	
WGI_ind							.286*
							(.156)
Intercept	2.002***	1.991**	2.804**	2.437***	1.677***	2.088***	1.939**
	(.728)	(.754)	(1.117)	(.716)	(.573)	(.593)	(.806)
Observations	234	234	234	234	234	234	234
within R-squared	0.096	0.099	0.130	0.102	0.106	0.096	0.098
F-stat	86.779	76.524	74.072	166.321	53.122	63.579	96.943
# Countries	33	33	33	33	33	33	33

Regression with Driscoll-Kraay standard errors. Standard errors are in parentheses

**** p<.01, ** p<.05, * p<.1. In case of missing data for NewFirmRegistration, we assume that data observed 8 years in the future is observed in the current year (8 years leads were taken). All bank measures were lagged by 8 years in case of missing data. Income levels are constant and do not change over the sample period and are dropped by the Fixed Effect Model. Income levels (UpperINC – Upper Income $ LowerINC – Lower Income); crisis – dummy variable for years affected by Global financial Crisis; FSD - Financial Sector Development; VA- Voice and Accountability; PA - Political Stability and Absence of Violence / Terrorism; GE - Government Effectiveness; RQ - Regulatory Quality; RL - Rule of Law; CC - Control of Corruption; WGI ind - Composite indicator calculated using the PCA*

For the Lerner Index in Table 5, the estimates for the bank measure do not change statistically for different governance indicators, except for model (5), where the estimate is statistically significant at the 10% level from 5% level in other models. Similar to Table 4, not all

governance indicators are statistically significant, however, for those that are significant, they are all positive. *CC* is positive and statistically significant at the 5% level, implying that implementing anti-corruption improves the rate of firm registration.

Table 5: Fixed effects model results (Based on the Lerner Index)

Dependent Variable: NewFirmRegistration	(1)	(2)	(3)	(4)	(5)	(6)	(7)
LernerIndex	-1.197**	-1.185**	-1.223**	-1.201**	-1.151*	-1.341**	-1.26**
	(.55)	(.554)	(.557)	(.537)	(.583)	(.514)	(.559)
GDPGROWTH	-.002	-.002	-.003	-.002	-.001	0	-.002
	(.005)	(.005)	(.005)	(.004)	(.004)	(.005)	(.005)
POPGROWTH	-.253	-.23	-.243	-.241	-.258	-.28	-.234
	(.259)	(.27)	(.26)	(.252)	(.256)	(.259)	(.266)
Education	.042***	.043***	.043***	.042***	.042***	.044***	.042***
	(.014)	(.014)	(.014)	(.014)	(.014)	(.013)	(.014)
Inflation	.006	.007	.006	.006	.005	.007	.007
	(.006)	(.006)	(.006)	(.006)	(.006)	(.006)	(.006)
StartBus	-.009	-.008	-.009	-.009	-.009	-.01	-.008
	(.007)	(.007)	(.007)	(.008)	(.007)	(.007)	(.007)
UpperINC	0	0	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)	(0)	(0)
crisis	-.337***	-.347***	-.346***	-.348***	-.339***	-.364***	-.349***
	(.041)	(.046)	(.046)	(.055)	(.048)	(.04)	(.048)
FSD	-.018	-.017	-.02	-.019	-.018	-.019	-.019
	(.014)	(.015)	(.014)	(.014)	(.014)	(.014)	(.014)
VA	.067						
	(.161)						
PA		.136*					
		(.074)					
GE			.352*				
			(.176)				
RQ				.131			
				(.34)			
RL					-.086		
					(.42)		
CC						.657**	
						(.247)	
WGI_ind							.113
							(.086)
Intercept	2.182***	2.001**	2.293***	2.19**	2.139**	2.467***	1.945**
	(.765)	(.802)	(.697)	(.8)	(.775)	(.777)	(.779)
Observations	174	174	174	174	174	174	174
within R-squared	0.251	0.255	0.256	0.252	0.251	0.280	0.257
F-stat	38.568	70.238	85.607	57.422	37.155	157.604	681.821
# Countries	23	23	23	23	23	23	23

Regression with Driscoll-Kraay standard errors. Standard errors are in parentheses

**** p<.01, ** p<.05, * p<.1. In case of missing data for NewFirmRegistration, we assume that data observed 8 years in the future is observed in the current year (8 years leads were taken). All bank measures were lagged by 8 years in case of missing data. Income levels are constant and do not change over the sample period and are dropped by the Fixed Effect Model. Income levels (UpperINC – Upper Income $ LowerINC – Lower Income); crisis – dummy variable for years affected by Global financial Crisis; FSD - Financial Sector Development; VA- Voice and Accountability; PA - Political Stability and Absence of Violence /Terrorism; GE - Government Effectiveness; RQ - Regulatory Quality; RL - Rule of Law; CC - Control of Corruption; WGI ind - Composite indicator calculated using the PCA*

Table 6: Fixed effects model results (Based on the concentration ratio, CR5)

Dependent Variable: NewFirmRegistration	(1)	(2)	(3)	(4)	(5)	(6)	(7)
CR5	-.037**	-.037**	-.035**	-.036**	-.039**	-.037**	-.037**
	(.016)	(.016)	(.013)	(.016)	(.017)	(.016)	(.016)
GDPGROWTH	.035	.034	.028	.031	.039	.035	.034
	(.022)	(.021)	(.017)	(.021)	(.025)	(.021)	(.021)
POPGROWTH	-.254	-.22	-.191	-.185	-.272	-.247	-.242
	(.356)	(.373)	(.368)	(.416)	(.321)	(.362)	(.37)
Education	.018	.019	.029*	.02	.016	.017	.018
	(.016)	(.016)	(.015)	(.016)	(.016)	(.016)	(.016)
Inflation	.007	.008*	.009*	.011*	.002	.007	.008
	(.006)	(.005)	(.004)	(.005)	(.008)	(.006)	(.006)
StartBus	-.006	-.004	-.002	-.003	-.01	-.006	-.005
	(.009)	(.009)	(.01)	(.01)	(.008)	(.009)	(.01)
UpperINC	0	0	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)	(0)	(0)
crisis	-.58***	-.583***	-.572***	-.612***	-.561***	-.571***	-.577***
	(.14)	(.143)	(.146)	(.148)	(.129)	(.133)	(.14)
FSD	-.058**	-.056*	-.067**	-.066**	-.056**	-.057**	-.058**
	(.027)	(.028)	(.032)	(.028)	(.024)	(.027)	(.028)
VA	-.128						
	(.153)						
PA		.203**					
		(.08)					
GE			2.243**				
			(1.027)				
RQ				.639			
				(.485)			
RL					-1.537*		
					(.79)		
CC						-.092	
						(.549)	
WGI_ind							.068
							(.088)
Intercept	7.194***	6.848***	7.467***	7.142***	7.178***	7.168***	6.97***
	(2.22)	(2.292)	(2.341)	(2.238)	(2.18)	(2.201)	(2.365)
Observations	180	180	180	180	180	180	180
Pseudo R^2	0.095	0.097	0.128	0.098	0.119	0.095	0.095
F-stat	13.747	49.283	12.49	63.545	13.131	10.887	134.346
# Countries	28	28	28	28	28	28	28

Regression with Driscoll-Kraay standard errors. Standard errors are in parentheses

**** p<.01, ** p<.05, * p<.1. In case of missing data for NewFirmRegistration, we assume that data observed 8 years in the future is observed in the current year (8 years leads were taken). All bank measures were lagged by 8 years in case of missing data. Income levels are constant and do not change over the sample period and are dropped by the Fixed Effect Model. Income levels (UpperINC – Upper Income $ LowerINC – Lower Income); crisis – dummy variable for years affected by Global financial Crisis; FSD - Financial Sector Development; VA- Voice and Accountability; PA - Political Stability and Absence of Violence /Terrorism; GE - Government Effectiveness; RQ - Regulatory Quality; RL - Rule of Law; CC - Control of Corruption; WGI ind - Composite indicator calculated using the PCA*

Table 6 also shows that any governance indicator used in the model does not affect the effect of bank competition on new firm creation. Likewise, statistically significant governance indicators are positive – in line with findings from the previous tables.

The coefficient of *GDPGROWTH* is positive and statistically significant at the 10% level, indicating that as the economy grows, the registration of new firms is expected to increase. An interesting finding is the negative and statistically significant coefficient for *POPGROWTH* (statistically significant at the 5% level), suggesting that an increase in population growth leads to a decrease in new firms registered (see Table 4). A plausible explanation for this is that if population growth is not accompanied by a growing economy, more individuals may struggle to access the limited resources required to start new firms. The coefficients for *Education,* which is a proxy for human capital, are positive and statistically significant at the 1% level. The sign of the coefficients is expected because availability of human capital and skills increases the likelihood of starting a business. Although small, the coefficients for *Inflation* are positive and statistically significant at the 10% level. This implies that some level of macroeconomic instability can create opportunities for new businesses to enter the market. The coefficient for the *Crisis* variable is negative and statistically significant at the 1% level, confirming that the effects of the 2008 financial crisis led to a decline in the rate of new firm registrations. *FSD,* which measures access to finance by looking at the ratio of total domestic credit to private sector to GDP, has negative and significant coefficients but at the 5% level. The negative sign was not expected, and a plausible explanation is that the financial market may not be efficient in distributing capital to individuals with the necessary skills to start new businesses. The coefficient is zero and the standard error is zero for the *UpperINC* variable for all models in Tables 4-6. This is because the classification of countries as either upper-income or lower-income, remains constant throughout the sample period; there is no movement of countries between income groups over time. The FE model cannot estimate its effect.

Other variables do not seem to have any significant effect on the new firm registration rate.

4.2 Dynamic panel data estimation using system-GMM.

This study follows Ghosh (2022) in employing the Arellano and Bond (1991) and Arellano and Bover (1995) dynamic System Generalized Method of Moment (system-GMM) to investigate the relationship between bank competition and new firm creation. This estimator is preferred as it accounts for endogeneity, unobserved heterogeneity bias (Arellano and Bover 1995), and handles for correlation between regressors – more specifically, regressors and lagged dependent variables which is the case for the model approximated in this section (See equation 5 below indicating new firm registration is dynamic). The measures of competition (Boone Indicator, Lerner Index, CR5) in our model may not be strictly exogenous variables. For instance, a reverse causality problem may arise; increased competition can increase registration of new firms through increased access to finance, and as more firms are created, competition can increase further. Additionally, past values of our dependent variable may influence current values. The bias caused by endogeneity can cause inconsistent estimates and lead to incorrect inferences and misleading conclusions (Huynh, 2023).

Other dynamic panel data estimators such as FE have been criticized for suffering from Nickell bias, where the presence of lagged dependent variable as a regressor leads to biased estimates especially when T is small (T<25) and N is large (N>25) (Ullah, Akhtar, & Zaefarian, 2018). System-GMM can be used for dynamic panel data specification with a larger number of cross-section (N=40 countries) and a short period (T=16, from 2006 to 2021). System-GMM addresses the issue of lagged dependent variable(s) being part of regressors by making use of lagged values of the dependent and independent variables as instruments (Ullah, Akhtar, & Zaefarian, 2018). Although the FE framework can also fit instrumental variables, the results are not as effective for short panels. Lagged values of regressors are poor instruments for Difference-GMM estimation, and therefore System-GMM is preferred. Moreover, two-step System-GMM is used ahead of one-step because the internal transformation resulting from a one-step approach may result in data loss for samples with missing data – which is the case for this study. For validity of the instruments used in System-GMM models, we report the Hansen J statistics in robust estimation to test for overidentification. If the probability is greater than 0.05, the instruments used are valid and there is no evidence of overidentification. To test for the autocorrelation in the error term, the probability of AR(2) ($pr > z$) is higher than 0.05 for the case of no autocorrelation.

The results presented by Tables 7–9 are based on the dynamic panel data model below where Equation (1) is modified to include the lagged value of the dependent variable as part of explanatory variables, as specified below:

$$new\ firm\ registratrion_{i,t} = \beta_0 + \theta new\ firm\ registratrion_{i,t-1} + \beta_1 Bank\ Competition_{i,t} + \beta_2 Control\ Variables_{i,t} + \tau_i + \varepsilon_{i,t} \quad (5)$$

Following the same reporting structure used for FE model results, Tables 7-9 presents 7 models estimating each of the governance indicators plus the composite indicator.

The lagged dependent variable: L.NewFirmRegistration (across Tables7-9)

The coefficient of the lagged dependent variable, *L.NewFirmRegistration*, is statistically significant and positive, suggesting that the rate of firm registration from previous periods has a positive effect on the current rate of firm registration. For instance, a 1% increase in the previous rate of new firm registration leads to the current rate of new firm registration rising by 1.775% as indicated by Table 9 model (4) and rising by 0.831% as indicated by Table 8 model (3). Across the three measures of competition, CR5 (Table 9) reported the largest statistically significant positive effects of *L.NewFirmRegistration* on *NewFirmRegistration.*

The measures of competition : Boone Indicator, Lerner Index, and CR5

All measures of competition are negative and statistically significant, consistent with the results obtained from the FE model. CR5 is only statistically significant for model 6 in Table 9, a drop compared to all models being statistically significant in the FE model. Based on this result, we may conclude that CR5 was not strictly exogenous. The same argument applies for the Boone Indicator which had all models statistically significant (see Table 4) and dropped to five statistically significant models in Table 7. Lerner Index is strictly exogenous as all the models are statistically significant across both estimators. The positive relationship between bank competition and new firm registration is confirmed by an even more robust estimator, making a strong case of market power hypothesis for the sample studied in this paper.

Below are System-GMM results for the three measures of competition followed by a summary discussing all the control variables.

Table 7: 2 System-GMM results (Based on the Boone Indicator)

Dependent Variable: NewFirmRegistration	(1)	(2)	(3)	(4)	(5)	(6)	(7)
L.NewFirmRegistration	.63**	1.399**	.725***	.912***	.914***	.52*	.686***
	(.281)	(.519)	(.199)	(.107)	(.213)	(.303)	(.236)
Boone	-14.378**	-1.52	-16.229***	-13.723***	-12.635**	-15.057***	-9.553
	(6.363)	(8.462)	(5.037)	(3.441)	(4.836)	(5.347)	(6.972)
GDPGROWTH	.289**	.333	.251***	.309***	.323***	.307**	.206
	(.123)	(.207)	(.066)	(.061)	(.073)	(.129)	(.126)
POPGROWTH	-.215	.64	-.373	.413	-.208	-1.035	-.472
	(1.185)	(1.746)	(.751)	(.276)	(.886)	(1.334)	(1.071)
Education	-.007	.029	.022	.032**	.011	.028	.035
	(.042)	(.125)	(.033)	(.015)	(.041)	(.048)	(.029)
Inflation	-.028	-.001	.061	-.103	.033	-.082	-.067
	(.117)	(.405)	(.105)	(.109)	(.144)	(.125)	(.084)
StartBus	.05	-.119	.038	-.026	.006	.057	.002
	(.106)	(.227)	(.065)	(.025)	(.081)	(.106)	(.074)
UpperINC	-18.51*	-1.611	-32.032***	-12.425	-23.77***	-27.757***	-29.786***
	(10.785)	(6.921)	(11.559)	(7.455)	(5.979)	(9.513)	(9.096)
crisis	-.402	.362	-.319	-.626*	-.381	-1.165	-.781
	(.775)	(2.056)	(.644)	(.343)	(.759)	(.902)	(.551)
FSD	-.016	.099***	-.002	.022*	.013	.003	-.024
	(.045)	(.027)	(.022)	(.013)	(.017)	(.025)	(.026)
VA	7.666**						
	(3.25)						
PA		-2.737					
		(3.044)					
GE			5.093***				
			(1.571)				
RQ				3.329***			
				(1.204)			
RL					3.425***		
					(.557)		
CC						4.137***	
						(.796)	
WGI_ind							4.584***
							(1.037)
Observations	207	207	207	207	207	207	207
# Countries	33	32	32	32	32	32	32
Instruments	15	15	15	15	15	15	15
Hansen	0.440	0.324	0.240	0.463	0.248	0.393	0.430
AR(2)	0.632	0.206	0.083	0.075	0.104	0.839	0.440
F-stat	318.93	1913.211	247.95	395.001	257.865	133.912	218.53

Robust standard errors are in parentheses

**** p<.01, ** p<.05, * p<.1. In case of missing data for NewFirmRegistration, we assume that data observed 8 years in the future is observed in the current year (8 years leads were taken). All bank measures were lagged by 8 years in case of missing data. Income levels are constant and do not change over the sample period and are dropped by the Fixed Effect Model. Income levels (UpperINC – Upper Income $ LowerINC – Lower Income); crisis – dummy variable for years affected by Global financial Crisis; FSD - Financial Sector Development; VA- Voice and Accountability; PA - Political Stability and Absence of Violence /Terrorism; GE - Government Effectiveness; RQ - Regulatory Quality; RL - Rule of Law; CC - Control of Corruption; WGI ind - Composite indicator calculated using the PCA*

Table 8: 2 System-GMM results (Based on the Lerner Index)

Dependent Variable: NewFirmRegistration	(1)	(2)	(3)	(4)	(5)	(6)	(7)
L.NewFirmRegistration	.537**	.482***	.831***	.544***	.484	.459***	.454***
	(.212)	(.109)	(.15)	(.118)	(.417)	(.104)	(.145)
LernerIndex	-13.671***	-12.643***	-9.151***	-12.379***	-13.491***	-13.06***	-14.572***
	(1.681)	(1.166)	(3.106)	(1.988)	(3.354)	(1.488)	(3.257)
GDPGROWTH	.222*	.16	.468**	.19	.088	.135	.092
	(.115)	(.128)	(.219)	(.146)	(.419)	(.127)	(.173)
POPGROWTH	-.596	-1.039***	-.753***	-.937***	-.887	-1.146***	-.903**
	(.922)	(.351)	(.255)	(.308)	(.788)	(.378)	(.368)
Education	-.042**	-.034*	-.03	-.036**	-.047**	-.041**	-.05*
	(.016)	(.016)	(.022)	(.016)	(.017)	(.016)	(.025)
Inflation	-.261**	-.15*	-.182**	-.167**	-.164	-.172**	-.191**
	(.1)	(.087)	(.078)	(.074)	(.113)	(.079)	(.084)
StartBus	.096	.125***	.134***	.118***	.126***	.138***	.138***
	(.059)	(.023)	(.027)	(.026)	(.044)	(.026)	(.036)
UpperINC	4.45	-.743	-24.543**	-.16	3.103	-1.354	6.905
	(5.313)	(2.866)	(10.404)	(4.041)	(24.658)	(5.969)	(12.898)
crisis	-1.57***	-1.216***	-.709	-1.169***	-1.348***	-1.375***	-1.397***
	(.253)	(.194)	(.444)	(.249)	(.35)	(.187)	(.336)
FSD	0	-.016	-.001	-.01	-.01	-.012	-.01
	(.026)	(.013)	(.01)	(.011)	(.012)	(.011)	(.011)
VA	-3.573						
	(3.111)						
PA		.564					
		(.567)					
GE			5.996**				
			(2.745)				
RQ				.494			
				(.884)			
RL					-.329		
					(5.494)		
CC						.671	
						(.986)	
WGI_ind							-.906
							(2.184)
Observations	152	152	152	152	152	152	152
# Countries	22	22	22	22	22	22	22
Instruments	15	15	15	15	15	15	15
Hansen	0.745	0.730	0.912	0.736	0.745	0.730	0.733
AR(2)	0.486	0.338	0.316	0.211	0.486	0.338	0.336
F-stat	1166.86	2948.154	1419.715	1932.709	2479.086	1351.243	2075.36

Robust standard errors are in parentheses

**** p<.01, ** p<.05, * p<.1. In case of missing data for NewFirmRegistration, we assume that data observed 8 years in the future is observed in the current year (8 years leads were taken). All bank measures were lagged by 8 years in case of missing data. Income levels are constant and do not change over the sample period and are dropped by the Fixed Effect Model. Income levels (UpperINC – Upper Income $ LowerINC – Lower Income); crisis – dummy variable for years affected by Global financial Crisis; FSD - Financial Sector Development; VA- Voice and Accountability; PA - Political Stability and Absence of Violence /Terrorism; GE - Government Effectiveness; RQ - Regulatory Quality; RL - Rule of Law; CC - Control of Corruption; WGI ind - Composite indicator calculated using the PCA*

Table 9: 2 System-GMM results (Based on the concentration ratio, CR5)

Dependent Variable: NewFirmRegistration	(1)	(2)	(3)	(4)	(5)	(6)	(7)
L.NewFirmRegistration	1.575***	1.569***	1.675***	1.775***	1.49***	1.599***	1.628***
	(.192)	(.17)	(.186)	(.223)	(.204)	(.186)	(.188)
CR5	-.066	-.079	-.101	-.116	-.061	-.134*	-.089
	(.074)	(.069)	(.068)	(.086)	(.066)	(.078)	(.074)
GDPGROWTH	.766***	.811***	.819***	.878***	.677***	.947***	.817***
	(.148)	(.156)	(.131)	(.178)	(.169)	(.176)	(.154)
POPGROWTH	2.666*	3.097***	3.509***	4.058***	2.302*	3.641***	3.266**
	(1.3)	(1.108)	(1.159)	(1.339)	(1.185)	(1.223)	(1.255)
Education	.001	0	-.025	-.032	0	-.056	-.015
	(.067)	(.061)	(.048)	(.061)	(.05)	(.055)	(.056)
Inflation	-.097	-.08	-.077	-.07	-.082	-.09	-.087
	(.104)	(.113)	(.106)	(.131)	(.097)	(.105)	(.107)
StartBus	-.107*	-.103	-.093	-.103	-.1**	-.038	-.1*
	(.059)	(.068)	(.057)	(.071)	(.047)	(.07)	(.057)
UpperINC	-25.538***	-25.009***	-28.218***	-27.153***	-22.484***	-24.521***	-26.919***
	(7.902)	(6.928)	(7.832)	(8.903)	(6.626)	(7.998)	(7.764)
crisis	.08	.138	.235	.359	.113	-.282	.129
	(.57)	(.585)	(.623)	(.666)	(.551)	(.625)	(.62)
FSD	.156**	.144**	.186***	.206**	.154**	.174***	.166***
	(.062)	(.058)	(.062)	(.086)	(.057)	(.061)	(.06)
VA	-.859						
	(1.863)						
PA		.524					
		(.726)					
GE			.38				
			(1.167)				
RQ				1.141			
				(1.462)			
RL					-1.121		
					(.999)		
CC						2.002	
						(1.32)	
WGI_ind							.231
							(1.106)
Observations	161	161	161	161	161	161	161
# countries	27	27	27	27	27	27	27
Instruments	15	15	15	23	21	15	15
Hansen	0.353	0.349	0.378	0.342	0.396	0.369	0.328
AR(2)	0.527	0.468	0.475	0.478	0.515	0.556	0.492
F-stat	2538.403	2950.159	2663.588	1172.796	2292.674	3034.411	2187.841

Robust standard errors are in parentheses

**** p<.01, ** p<.05, * p<.1. In case of missing data for NewFirmRegistration, we assume that data observed 8 years in the future is observed in the current year (8 years leads were taken). All bank measures were lagged by 8 years in case of missing data. Income levels are constant and do not change over the sample period and are dropped by the Fixed Effect Model. Income levels (UpperINC – Upper Income $ LowerINC – Lower Income); crisis – dummy variable for years affected by Global financial Crisis; FSD - Financial Sector Development; VA- Voice and Accountability; PA - Political Stability and Absence of Violence /Terrorism; GE - Government Effectiveness; RQ - Regulatory Quality; RL - Rule of Law; CC - Control of Corruption; WGI ind - Composite indicator calculated using the PCA*

Table 10: Summary of regression results for control variables (Based on Tables 4-9)

Control Variable	Expected Sign	Boone Indicator				Lerner Index				CR5				Comments
		Significant?		Actual Sign		Significant?		Actual Sign		Significant?		Actual Sign		
		FE	Sys-GMM	FE	Sys-GMM	FE	Sys-GMM	FE	Sys-GMM	FE	Sys-GMM	FE	Sys-GMM	
GDPGROWTH	+	*	***	+	+	No	**		+	No	***		+	• Consistent, expected, positive sign across measures of competition. • The result for a positive relationship is robust.
POPGROWTH	+/–	**	No	–		No	***		–	No	***		+	• Growing demographic has an ambiguous effect on new firm registration.
Education	+	***	**	+	+	***	**	+	–	*	No	+		• Results expected except for Lerner Index GMM. Possible explanation is candidates with higher education level will attract employment instead of creating new firms.
Inflation	–	No	No			No	**		–	*	No	+		• Rising inflation may represent unstable macroeconomic conditions and opportunities to create new firms. It may also erode profits and reduces finance available to fund new firm creation.
StartBus	+	No	No			No	***		+	No	**		–	• FE negative sign not expected.
UpperINC	?	No	***		–	No	**		–	No	***		–	• Consistent sign across measures of competition and estimators.
crisis	–	**	*	–	–	***	***	–	–	***	No	–		• Consistent, expected sign across competition measures and estimators.
FSD	+	*	***	–	–	No	No			**	***	–	+	• Ambiguous results. Expectation was increasing FSD will increase firm registration.
VA	+	No	**		+	No	No			No	No			• The only result is provided by Sys-GMM and is in line with expectations.
PA	+	***	No	+		*	No	+		**	No	+		• Only FE estimations are significant and expected. Result not robust.
GE	+	**	***	+	+	*	**	+	+	**	No	+		• Consistent, expected sign across competition measures and estimators.
RQ	+	**	***	+	+	No	No			No	No			• Result only provided by Lerner Index and is expected across estimators.
RL	+	No	***		+	No	No			*	No	–		• Expected result provided by Sys-GMM and significant at 1% level.
CC	+	No	***		+	**	No	+		No	No			• Consistent, expected sign measured by two competition measures
WGI_ind	+	*	***	+	+	No	No			No	No			• Result only provided by Lerner Index and is expected across estimators.

Source: FE and Sys-GMM regression results from Tables 4-9

*Legend: *** p<.01, ** p<.05, * p<.1*; *No – Not statistically significant*; *? – no expectation*; (+) and (–) *– positive sign / relationship and negative sign / relationship, respectively*

In table 10, *POPGROWTH* has two signs expected because an increase in population may increase firm creation by providing more people available to work, while a growing population may decrease firm creation if the population grows faster than GDP. Additionally, there is no expectation for *UpperINC* because literature says high income countries should have more firm registration but figure 3 showed that this is not the case for SSA for the sample period 2014 and 2020.

The Hansen test of overspecification across all models with the three measures shows values greater than 0.05, confirming that the instruments used are valid. Furthermore, the number of instruments used in the models is lower than the number of countries, which is consistent with requirements for this estimator. The AR(2) test for second order serial correlation finds no evidence of serial correlation as the values reported are greater than 0.05.

5. Conclusion

This study investigates the relationship between banking sector competition and firm creation in a panel data set from 40 SSA countries, covering the period from 2006-2021 (initially including 48 countries, with 8 excluded due to missing data). The study also examines how World Governance Indicators can influence this relationship. The findings indicate higher competition is associated with an increase in the rate of new firm creation, supporting the market power hypothesis.

The results suggest that high banking competition will lead to an increase in the supply of credit to borrowers, particularly potential entrepreneurs. This hypothesis is further supported by positive relationships new firm creation has with economic growth and education. As education levels rise, individuals gain the ability to engage with sophisticated banking products. Additionally, increased competition within the banking sector improves access to previously unbanked areas, unlocking financial opportunities for more individuals with entrepreneurial ambitions. Overall, the results demonstrate that the measure of competition is statistically significant for different World Governance Indicators, suggesting that a different mix of governance indicators is important for creating an environment that will foster firm creation.

Our result is consistent even when using a more robust estimator, System-GMM. The relationship between bank competition and firm creation is positive and supports the market power hypothesis.

While existing literature suggests that upper-income countries register more firms relative to lower-income countries, this was not observed in the SSA sample. Instead, the results indicated that lower-income countries registered more firms. This presents an opportunity for further research in the SSA region to explore and better understand this finding.

Our dependent variable, density of new firm registration, only reports on formal companies registered per 1000 working-age people, excluding informal firms. This exclusion may lead to significant changes to our results, particularly for regions with high levels of informal entrepreneurship. However, despite this limitation, this measure is commonly used in literature and remains to be a reliable proxy for firm creation.

6. Appendix

6.1. Appendix A:

Countries with CR5 of 100 by year, extreme positive value for this variable.

Year	Country
2006	Gambia, The
2006	Madagascar
2006	Namibia
2006	Niger
2007	Gambia, The
2007	Mauritania
2007	Namibia
2007	Niger
2007	Rwanda
2007	Sudan
2008	Ethiopia
2008	Madagascar
2008	Malawi
2008	Mauritania
2008	Rwanda
2009	Gambia, The
2009	Madagascar
2009	Malawi
2009	Mauritania
2009	Togo
2010	Nigeria
2011	Burundi
2011	Malawi
2011	Mali
2012	Benin
2012	Burundi
2012	Malawi
2012	Mali
2012	Rwanda
2012	Togo
2013	Burkina Faso
2013	Malawi
2013	Mali
2013	Namibia
2013	Sierra Leone
2013	Togo
2014	Burkina Faso
2014	Gabon
2014	Malawi
2014	Mali
2014	Mauritania
2014	Namibia
2014	Rwanda
2015	Gabon
2015	Sierra Leone
2018	Burundi
2018	Liberia
2019	Burundi
2020	Burundi

2020	Cameroon
2020	Mali
2020	Namibia
2020	Senegal
2021	Burundi
2021	Zimbabwe

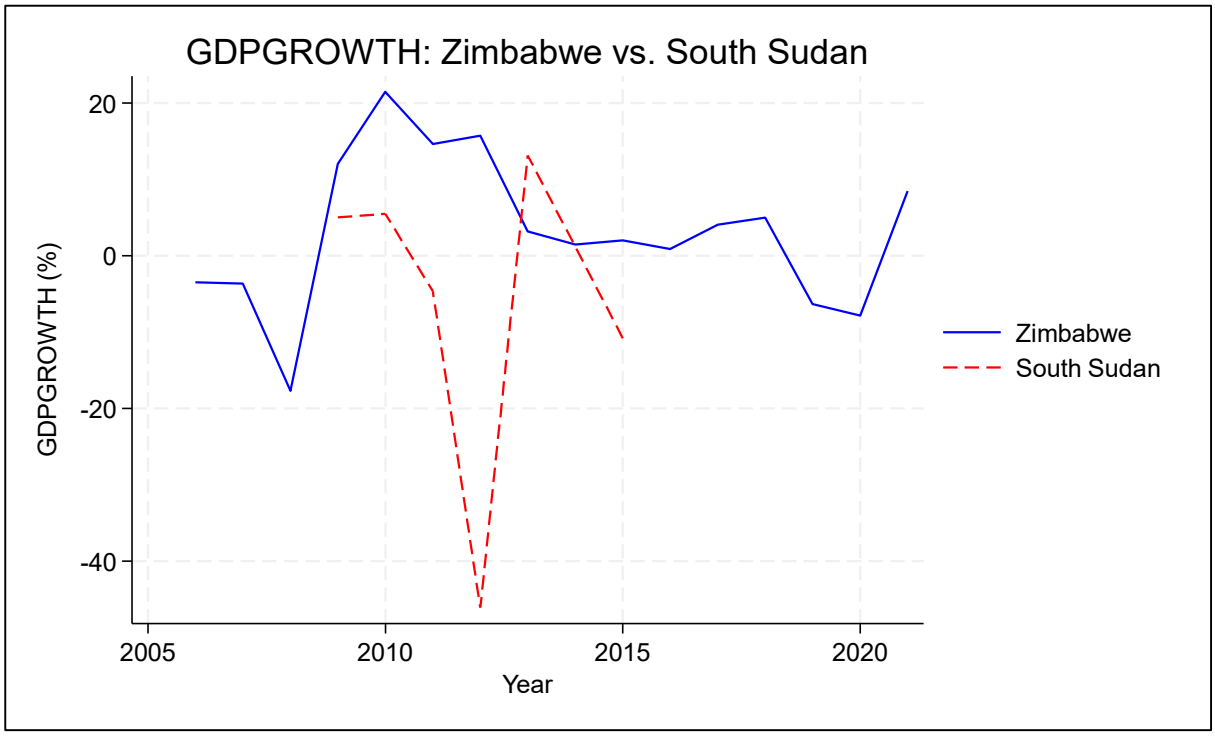
Source: World Bank Data

6.2. Appendix B:

Countries with annual GDP growth of -46% and +21% by year

Year	Country	GDPGROWTH
2012	South Sudan	-46.08212
2010	Zimbabwe	21.45206

Figure 4: The GDP growth of Zimbabwe vs South Sudan for the sample period 2006-2021



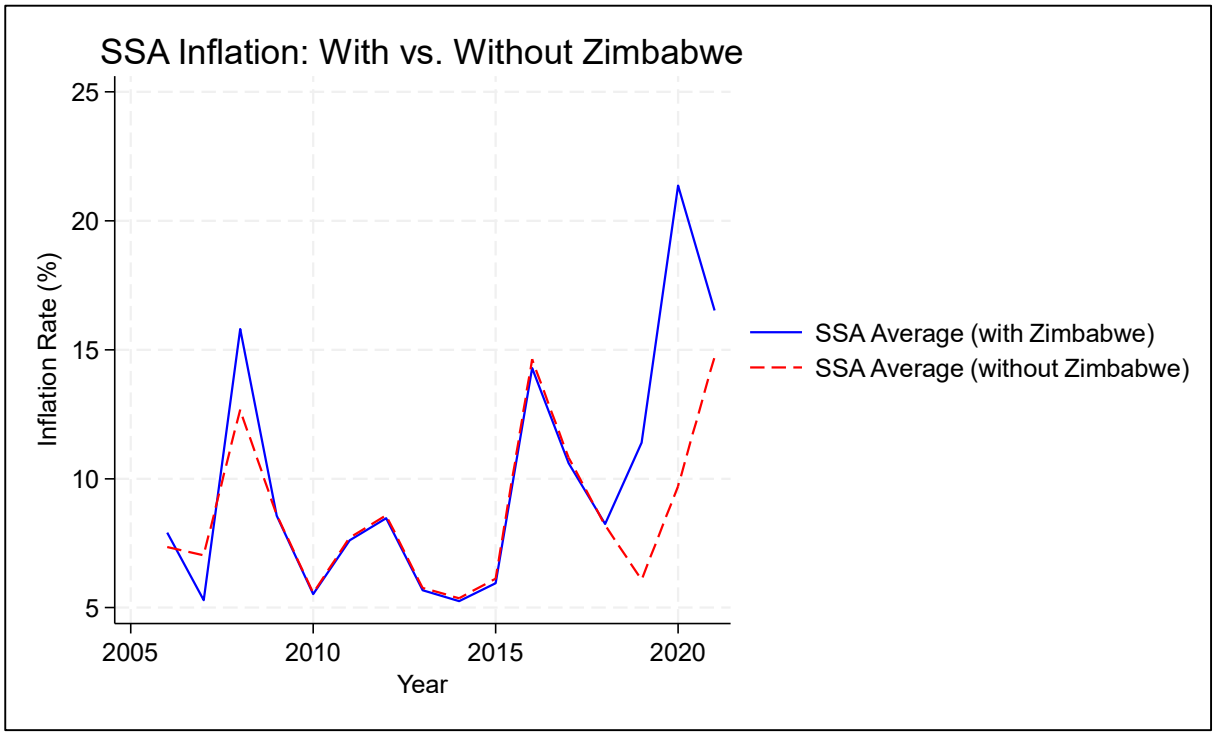
Source: World Bank Data

6.3. Appendix C:

Countries Reporting extreme values of inflation (-72% and 557.21%)

Year	Country	Inflation
2007	Zimbabwe	-72.729
2020	Zimbabwe	557.21

Figure 5: The average inflation rate for SSA countries with vs without Zimbabwe for the sample period 2006-2021



Source: World Bank Data

6.4. Appendix D:

Countries with governance indicators outside the range from -2.5 to +2.5

6.4.1. Political Stability and Absence of Violence /Terrorism

Year	Country	WGI value
2006	Somalia	-2.75
2007	Somalia	-3.23
2008	Somalia	-3.28
2009	Somalia	-3.31
2009	Sudan	-2.65
2010	Somalia	-3.13
2010	Sudan	-2.67
2011	Somalia	-3.08
2011	Sudan	-2.52
2012	Somalia	-2.86
2013	Somalia	-2.76
2014	Central African Republic	-2.7
2014	Somalia	-2.52
2014	South Sudan	-2.65
2019	South Sudan	-2.52
2020	Somalia	-2.58
2021	Somalia	-2.73

6.4.2. Regulatory Quality

Year	Country	WGI value
2008	Somalia	-2.55

6.4.3. Rule of Law

Year	Country	WGI value
2008	Somalia	-2.59

6.5. Appendix E:

Wooldridge test for autocorrelation in panel data.

H0: no first-order autocorrelation
F(1, 19) = 53.717
Prob > F = 0.0000

6.6. Appendix F:

Modified Wald test for groupwise heteroskedasticity in fixed effect regression model.

H0: sigma(i)^2 = sigma^2 for all i
chi2 (28) = 128628.10
Prob > chi2 = 0.0000

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