Profitability, Ownership, Risk, and Deposit Insurance of Commercial Banks in Africa.

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Abstract

The paper empirically examines the relationship between profitability, ownership structure, bank risk (Z-score), and deposit insurance schemes in African commercial banks. Using the Generalized Method of Moments (GMM) and Fixed Effects (FE) estimation techniques with sample data of 141 banks in 19 African countries from 2009-2020.

The study presents four key findings, first, foreign ownership decreases bank return on equity (ROE), while state ownership enhances it. Second, a higher Z-score enhances bank stability, reduces risk, and increase profitability. Third, Deposit insurance negatively impacts profitability and increases risk in the short term. However, explicit deposit insurance could enhance profitability by 0.6% in the long run. Finally, bank capitalization, size, asset composition, and macroeconomic factors (GDP, inflation) are critical determinants of profitability in Africa.

Policymakers should consider these factors when designing policies to enhance banking sector stability and growth, including the adoption and implementation of explicit deposit insurance in Africa.

JEL Classification: E32, G3, G18, G21, G28,G38

Keywords: African banking, Profitability, Ownership, Deposit Insurance, Bank Risk (Z-score)

1. Introduction

The dynamic nature of global banking environment influenced by internal, external, and country-specific factors affecting bank profitability inspired this research. This study explores how ownership structure, deposit insurance (DI), and bank risk affect profitability in the African banking sector. We examine the impact of foreign vs. state ownership, DI, and risk-taking (Z-score).

The literature highlights various studies on ownership structure and its impact on firm profitability. Lepore et al. (2017) examined higher ownership concentration's effect on judicial efficiency and firm performance. Other studies, like Ozili et al. (2017), Tsegba and Herbert (2013), Uwuigbe and Olusanmi (2012), and Gugong et al. (2014), worked on similar context but focused on Nigerian banks. For instance, Ozili et al. (2017) categorized ownership into high, moderate, and dispersed structures. Mutarindwa et al. (2021), Leech and Leahy (1991)

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also analyzed ownership concentration's relationship with profitability, while Pervan et al. (2012) explored ownership's effect on return on assets (ROA).

Theoretical frameworks on financial governance, as discussed by Prowse (1997a), Freixa and Rochet (1997), Caprio and Levine (2002), Macey and O'Hara (2003), and Levine (2004), and others, emphasize depositors' key role as key financial resource providers in banking. Nonetheless, deposit insurance can diminish depositors' motivation to monitor banks, as they may assume their deposits are fully protected by the government. Research by Chernykh and Cole (2011) and Karels and McClatchey (1999) highlights the positive impact of deposit insurance on financial stability and intermediation. [2]Despite these vast existing studies, a research gap persists in analyzing foreign-owned vs. state-owned banks, risk (Z-score), and deposit insurance (DI) across African countries. This paper addresses this gap, which was noted by Flamini et al. (2009) and Ozili et al. (2017), who emphasize the need for country-level policy insights and novel research on economic drivers of profitability.

Our study identifies key factors influencing bank profitability in Africa, including bank characteristics (size, business nature, capital), ownership structure, risk (stability), regulatory environment (Deposit Insurance), and macroeconomic factors (GDP, inflation). We focus on the impact of foreign and state ownership on profitability, addressing a literature gap using the approach of Claessens et al. (2015) and Allen J. et al. (2017), in analyzing African banks ownership structure from 2010-2015.

The paper introduces a novel approach by recalculation of foreign and state holdings of banks located in the countries in our sample. The dataset shows that 58% of banks are foreign-owned, while 28% are state-owned. [3]The CFA Franc Zone and the West African Economic and Monetary Union (WAEMU) Zone present the highest proportion of foreign-owned banks, with an average of 69.3% exceeding the threshold suggested by Claessens et al. (2015) and Allen J. et al. (2017).

Concerning bank risk, we measured risk using a modified version of the Z-score formulae built upon by Lepetit and Strobel (2013) and Hesse and Čihák (2007) to examine a bank's stability, this approach combines capital asset ratio (bank capitalization) and expected return on asset and divide by the standard deviation of asset returns. A higher z-score indicates greater bank stability and lower insolvency risk and vice versa, which are crucial to sustained profitability and operational efficiency.Furthermore, we analyzed Deposit Insurance Schemes (DIS) across Africa using the DIS database and approach by Demirgüç-Kunt et al. (2002, 2015) and Cull et al., 2005. This study highlights DIS's role in boosting depositor confidence and financial stability, by distinguishing between explicit (legislated) and implicit (informal) deposit insurance systems

The study attempts to answer whether ownership structure, bank risk, and deposit insurance affect the profitability of African commercial banks. We hypothesize that foreign ownership, greater bank stability (Z-score), and deposit insurance(explicit) significantly influence profitability.

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The resilience of Africa's banking system is critical for developing the financial markets and connecting the region to developed economies. Africa ranks as the second most profitable banking region globally, with a 14.9% return on equity (ROE), surpassing the 9% global average (McKinsey, 2018). Flamini et al. (2009) also note that Sub-Saharan African banks outperform other regions in profitability. Africa's retail banking penetration accounts for 38% of GDP, projected to grow by 70% by 2025. Additionally, mobile banking has captured 21% of the adult market in Sub-Saharan Africa, according to the World Bank.

This research focuses on Africa's banking industry due to its superior profitability compared to other regions and its resilience against banking crises despite economic vulnerability. However, [4]Africa is significantly the most impacted by any global crises (e.g., pandemics, financial crises) as suggested by (Darko et al., 2025). Therefore, it's relevant to empirically examine factors contributing to banking stability and profitability in the region.

This paper is motivated by three main reasons, first, the gap in studies on how foreign vs. state ownership and deposit insurance (DI) affect bank profitability across Africa. Most existing research focuses on different ownership types or single countries, resulting in lack of recent comprehensive analysis of these factors all together.

In that respect, we reviewed recent studies for better understanding the impact of ownership structure on bank profitability in our quest to fill the gap. Mutarindwa et al. (2021) compared privately-owned versus state-owned banks and foreign versus domestic banks in Africa, but they did not make a direct comparison between state-owned and foreign-owned banks. Flamini et al. (2009) focused on private vs. foreign ownership in sub-Saharan Africa, favoring private ownership. Ozili et al. (2017) categorized ownership in Nigerian banks, while Kobeissi et al. (2010, 2004) examined ownership effects on performance in the MENA region. Figueira et al. (2006) explored private vs. state-owned banks but did not directly analyze foreign vs. state ownership in Africa context.

Second, the [5]African banking system remains underdeveloped, with limited economic integration and inconsistent common banking regulations and supervisory frameworks, affecting bank profitability and efficiency in the region, especially in cross-border activities (Darko et al., 2025). As Africa aims to build a resilient financial system, addressing these issues is pivotal for economic integration and mitigating global financial volatility. Consequently, a proper evaluation of bank profitability will not only enhance the industry resilience but could improve resource allocation, aligning with the upcoming African Continental Free Trade Area (AfCFTA) goals.

Finally, the continents lack financial safety nets in the banking and financial systems. unsurprisingly, examining the database on Deposit Insurance schemes around the world shows that for the entire African continent only four (4) countries namely Nigeria, Kenya, Uganda, and Tanzania have explicit deposit insurance in place, and this inspired our study to provide findings and insightful recommendations about relevance of embracing financial safety net (explicit deposit insurance) in Africa.

The presence of efficient financial intermediaries is essential for directing savings and investments into productive sectors, thus enhancing economic growth (Gulde et al., 2006; Levine, 1997). This study stands out by examining how foreign and state ownership influence

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bank profitability and stability specifically in Africa, providing new insights into these dynamics.

This paper adds to literature by being the first study to examine the impact of foreign vs. state ownership concentration and explicit deposit insurance (DI) on bank profitability from the African perspective. Second, it also introduces new DI design features specifically for Africa by modifying existing models from previous research by (Demirgüc-Kunt et al., 2015 and Detragiache, 2002; Cull et al., 2005) . Additionally, the paper creates an explicit DIS coverage database and advocates for broader adoption of explicit DIS frameworks across Africa as a novelty.

The rest of the paper proceeds as follows. In section 2, discuss the literature review. Section 3, we introduce data and method. Section 4, Results, and Discussion. Section 5 concludes the paper.

1. Literature Review

The impact of ownership structure, bank risk (z-score), and deposit insurance on bank profitability in empirical studies has produced mixed findings. This study examines how foreign and state ownership, risk, and DI influence bank return on equity (ROE).[6]This metric provides a clear insight into a bank's profitability and operational efficiency, making it an excellent indicator of effective management. ROE is [7]preferred over ROA due to potential biases from off-balance sheet activities (Samuel, 2015).

Recent research by Mutarindwa et al. (2021) on 607 commercial banks across 53 African countries (2005-2015) found that foreign-owned banks are not more profitable and cost-efficient than domestic ones. Additionally, privately owned banks outperform state-owned banks, while ownership concentration (block holding) negatively impacts banks' profit and cost efficiency. The study of Kalyvas and Mamatzakis (2017) shows that foreign-owned banks achieve greater efficiency in countries with stronger creditor rights and financial freedom, this preposition was supported by the works of Lin et al. (2016).

Theoretical views suggest that foreign-owned banks outperform domestic ones in less regulated host countries, especially when their home countries are more developed. Efficiency is further enhanced by linguistic similarities between host and home countries (Claessens & Van Horen, 2012). Also the recent study of Darko et al. (2025) found that most African commercial banks operate at low efficiency, struggling to optimize asset-to-loan conversion in the study of 70 African commercial banks.

From single-country studies perspective, Ozili et al. (2017) found that in Nigeria, high ownership concentration improves bank performance metrics such as return on assets, return on equity, net interest margins, and overall efficiency. The foreign ownership notion was further argued by Bokpin (2013) , who noted that foreign-owned banks in Ghana reduced costs more effectively than domestic banks but didn't significantly raise profits. Furthermore, De Haas and van Lelyveld (2006) observed that strong foreign parent banks-maintained

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lending during crises, especially in newly established subsidiaries. However, Beck and Hesse (2009) found no performance gains from privatization or foreign bank entry in Uganda.

The study explores two contrasting perspectives on the advantage strand hypothesis. First, the global advantage hypothesis on bank performance (efficiency) suggests that foreign-owned banks benefit from superior technology, economies of scale, better corporate governance, and financial backing from their parent companies, leading to greater efficiency (Berger et al., 2005; Berger, DeYoung, Genay, & Udell, 2000). The global advantage has been predominant in recent studies which suggests that foreign-owned banks in developing countries, including Africa, perform better as suggested by (Berger et al., 2009) Berger, Hasan, & Klapper, 2004; Bonin et al., 2005; Claessens et al., 2001). In contrast, La Porta et al. (2002) argue that state-owned banks often pursue political objectives, especially in developing countries with weak property rights and political motivations in lending policies argued by (Carvalho, 2014; Claessens, Feijen, & Laeven, 2008; Dinc¸, 2005; Sapienza, 2004). These banks typically exhibit worse performance in profitability, capital holdings, and efficiency (Micco et al., 2007). Additionally, they tend to face higher credit risk Cornett et al. (2010), and lower cost efficiency (Fries & Taci, 2005). Motivated by these findings, our study focuses on how state-owned banks consistently underperform in profitability and efficiency compared to their foreign-owned counterparts.

Flamini et al. (2009) found that bank profits in Sub-Saharan Africa are higher than in other regions, regardless of the profitability measure (ROA, ROE, NIM). However, these higher returns could lead to increased loan interest rates, potentially affecting financial intermediation. [8]Demirgüc-Kunt and Huizinga (2001) note that in Africa's underdeveloped financial systems, financial development explains bank profitability more than financial structure. Higher pre-tax profits and interest margins are common, with financial structure having little impact once financial development is considered. Lepore et al. (2017) also found that greater ownership concentration, alongside an efficient judicial system, enhances firm performance, particularly in regions with weak investor protection.

Furthermore, ownership is a significant factor influencing bank profitability, extensively studied across various dimensions. Previous studies focused on ownership categories, such as promoters, institutional investors, and retail investors (Rastogi et al., 2021), and public versus private banks (Barry et al., 2011; Cornett et al., 2010). Other studies compared domestic and foreign banks (Abraham, 2013; Banerjee & Velamuri, 2015), family-run versus professionally managed banks (Rahman & Reja, 2015), and the effects of ownership concentration among majority shareholders or shareholder groups (Bian and Deng 2017; Peterson et al. 2017). Also, Saghi-Zedek and Tarazi (2014) investigate the influence of shareholders' excess control rights of the ultimate owner. They found that excessive shareholder control rights were linked to reduced profitability, higher earnings volatility, and increased default risk during the financial crisis. Despite this extensive research, there is a notable gap in studies focusing on the impact of foreign and state ownership on bank profitability specifically in Africa, which our study aims to address.

The literature that explored the impacts of profitability, regulation, and risk measures on bank performance are (Keeley 1990; Agoraki et al. 2011; Triki et al. 2017; Athaley et al. 2020). However, there are no recent studies on African context assessing the combined effects of foreign ownership, state ownership, bank risk (stability), and deposit insurance on bank profitability. We use a modified Altman's z-score to evaluate bank risk-taking as extended by

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Lepetit and Strobel (2013) and Hesse and Čihák (2007), a measure of insolvency risk , and computed as the return on assets(ROA) plus capital asset ratio (bank capitalization) divided by the standard deviation of returns on asset. A higher z-score indicates greater stability and lower insolvency risk, which enhances bank profitability.

The standard z-score approach is computed as.

$$Z = \frac{CAR+E(ROA)}{\sigma(ROA)}, \qquad (A.1)$$

This simply defines a situation (default event) where current losses exceed capital, and the probability of default is given by; $P\tau$ [-Y>K], where Y is the bank's profit and K is the capital of banks. To normalize according to the bank's size, we could express the bank's asset level by A, then again, the probability of default becomes $P\tau[Y \leq -K] = P\tau$ [ROA≤-CAR],where ROA = Y/A represents the return on assets ratio, and CAR = K/A denotes the bank capitalization.

The bank's performance is normally expressed by its profit or returns on assets (ROA), is a random event, and is reflected by its distribution.

Furthermore, Boyd and Runkle (1993), Hannan and Hanweck (1988), and Boyd et al. (1993) suggest that traditional methods assume ROA is normally distributed, and thus, the probability of default can be determined by.

$$P\tau[ROA \leq -CAR] = P\tau\left[\frac{CAR-E(ROA)}{\sigma(ROA)} \leq -\frac{CAR+E(ROA)}{\sigma(ROA)}\right] = N(-Z) = 1-N(Z) \qquad (A.2)$$

where E(ROA) represents the expected value of ROA, σ(ROA) is its standard deviation, and $N(.)$ denotes the cumulative distribution function of the normal distribution.

In addition, Altman's Z-score approach, which measures bankruptcy risk, is positively linked to bank regulation (Klomp and De Haan, 2015). Barth et al. (2004) noted that effective regulation requires improved disclosures. We also examined deposit insurance (DI) for its role in reducing risk and enhancing stability.

Deposit insurance (DI) gained prominence during recent crises, including the COVID-19 pandemic, the 2008-2009 global financial crisis, and the European debt crisis. Government officials and regulators quickly adopted measures to enhance financial stability and bolster confidence in banking systems (Anginer et al., 2014; Nguyen et al., 2016). DI affects bank risk-taking, economic growth, and overall performance. In a global context with interconnected economies, a country lacking DI may face deposit outflows (Kleimeier et al., 2019). Fecht and Weber (2019) suggest that without DI, state-owned and large banks may benefit from implicit guarantees. The risk of bank runs and financial instability during crises has highlighted the need for DI to restore stability. [9]DI provides risk-free deposits for small savers, reduces inefficiencies among small banks, ensures market discipline, and enhances bank performance (Demirgüç-Kunt and Detragiache, 2002; Ketcha, 1999).

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Some studies highlight limitations of deposit insurance schemes (DIS). [10]Explicit DIS can make bank risk-taking nearly risk-free from depositors perspective, as banks are not required to pay risk premiums. This often leads banks to invest in high-risk assets, shifting potential costs to the deposit insurance fund rather than the depositors. Additionally, DIS may fail if it does not ensure immediate access to guaranteed deposits.

Our paper emphasizes that explicit DIS offers stronger guarantees compared to implicit DIS, which depends on government promises and may falter during financial crises. While DIS provides important benefits, such as flexible stabilization tools (Sabourin, 2020), it enhanced banking stability, and economic growth (Merton, 1977), it also has drawbacks. Critics argue that DIS can exacerbate moral hazard by encouraging excessive risk-taking, a concern echoed by Demirguc-Kunt and Detragiache (2002) and others. Additionally, Merton (1977) argues that deposit insurance safeguards the interests of less sophisticated depositors and helps prevent bank runs, thereby enhancing social welfare. Group and Vesala (2004) show that implementing deposit insurance in the European Union reduces bank risk. Group and Vesala (2004) show that implementing deposit insurance in the European Union reduces bank risk. Chernykh and Cole (2011) showed that deposit insurance enhances financial intermediation in Russia.

3. Data and Method

3.1 Sample Description

Our dataset covers 141 commercial banks across 19 African countries: Benin, Botswana, Eswatini, Egypt, Ghana, South Africa, Ivory Coast, Kenya, Mauritius, Morocco, Namibia, Niger, Nigeria, Tanzania, Uganda, Sudan, Togo, Tunisia, and Zambia for the period of 2009 to 2020. Banks financial data was collected from Bloomberg, while ownership structure details from frequency of African bank's ownership characteristics from 2010-2015 proposed by Claessens et al. (2015) and Allen et al. (2017). Macroeconomic data, including inflation and GDP, was obtained from the World Bank. Information on deposit insurance schemes was sourced from the Demirgüç-Kunt et al. (2015) database, national agencies, and IMF Staff Working Papers. Initially, we obtained 172 banks in 26 countries but excluded 22 inactive banks and 7 countries (Cameroon, Chile, Chad, Congo, Central African Republic, Senegal, Zimbabwe) with substantial missing data. After excluding banks with missing values for key variables over 5-6 consecutive years and addressing outliers by removing negative values in ascending order sorting method, we finalized a sample of 141 banks in 19 countries without distinction between commercial and non-commercial banks for the purposes of the large sample and data coherence in achieving the research aims.

3.2 Measuring Bank Ownership and Deposit Insurance Schemes

To assess the impact of ownership structure concentration on bank profitability, we classify banks into two categories: foreign-owned and state-owned. Due to limited time-varying ownership structure data in the Bloomberg database, we adapted the methodology from Claessens et al. (2015) and Allen et al. (2017), using the empirical ownership data of frequency of bank ownership characteristics from African banks in 2010-2015. Foreign-owned banks

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include those with foreign, foreign-private, or foreign-government ownership, while state-owned banks comprise domestic and domestic-government ownership. A bank is deemed foreign-owned if at least 50% of its shares are held by foreign individuals or entities. We computed each country's total ownership, total foreign-owned and State-owned banks, and the percentage average of the sample. We find 52% foreign-owned and 28% state-owned banks which is reported in **Appendix B.3**.

Second, exploring financial safety net through deposit insurance schemes (DIS) has produced mixed results by other scholars. In our study, we assessed DIS across Africa using database from Demirgüç-Kunt et al. (2015) and the World Bank Survey. We distinguished between implicit and explicit DIS: where explicit DIS refers to countries that have formally legislated and implemented deposit insurance, while implicit indicates the absence of such formal legislation. This distinction is important because explicit DIS comes with a binding government obligation to provide financial protection during crises, whereas implicit DIS depends on government promises and capacity to offer relief.

Our findings indicate that Africa has not widely adopted DIS. To measure this, we introduced a dummy variable, named 'DIS,' where a value of 1 indicates explicit deposit insurance and 0 denotes implicit insurance. By 2013, only four African countries; Nigeria, Kenya, Uganda, and Tanzania had explicit DIS in place, with extremely low statutory limits and government-backed coverage, and coverage limit/GDP per capita (%). Among the 141 banks in our sample, just forty-five (45) banks (representing 32%) were covered by explicit DIS, with Nigeria accounting for 25, Kenya 16, and Uganda and Tanzania 2 of each.

3.3 Design Features of Explicit Deposit Insurance Schemes in Africa.

In designing explicit deposit insurance schemes (DIS) for Africa, we followed the definitions and methodologies outlined by Demirgüç-Kunt et al. (2006) and Demirgüç-Kunt et al. (2015). We differentiate between explicit and implicit insurance: explicit DIS is defined by formal legislation outlining insurance coverage, while implicit DIS relies on government assumptions of relief without formal regulations. In countries lacking explicit DIS, implicit insurance is presumed.

We also noted that DIS coverage often increases during financial crises. Coverage was categorized as "numerical" or "unlimited" based on whether a country provides full government guarantees in local currency. The Coverage Limit-to-GDP per Capita ratio measures the insurance coverage limit in relation to GDP per capita, taking into account statutory limits and government guarantees. If a national statutory limit specifies "unlimited coverage," this is reflected in the ratio as "Unlimited." Details on explicit DIS coverage, including government guarantees and per capita GDP, for 2003, 2010, and 2013, are presented in **Appendix B.4.1**, with values in local currencies and US dollars. Converted using the end-of-year exchange rate equivalent in US dollars (US$).

The design features of DIS definitively differ across countries and regions, the effectiveness and efficiency of DIS functions are also dependent on how it is being organized, administered and (1) the types of the deposit insurance scheme in question, (2) participation and coverage, (3) funding, (4) contribution, and assessment base, (5) payout to depositors, etc. in the African context we outline the DIS features as follows,

First, the types of DIS, in our sample only four (4) out of nineteen (19) countries has in place explicit deposit insurance while the rest are considered to have implicit deposit insurance as a proxy on whether governments would have the capacity to provide relief and pay depositors in case of banking crisis. How is it organized (Organization) in each country is based on international standards whether it is a separate legal entity, or national central bank, or country's supervisory/regulatory structure, or a specific government ministry in charge of it. In Africa, explicit deposit schemes can be administered (Administration) either by public or private or jointly. The overview of the design features of explicit DIS countries and how they are organized and administered is marked by "X" and reported in **Appendix B.4.2.**

Furthermore, it is mandatory to have a "Paybox" function in all explicit DIS schemes, which ensures that there will be a payout to depositors in case of bank failure. With this, there is another optional window, where countries can decide to combine a couple of DIS functions, with resolution functions or that of banking supervisor or macro-prudential regulator, referred to as "pay box plus. In order for a country's DIS to minimize losses to the taxpayer with legal components(legal procedure) in the process, there could be a legitimate procedure that empowers authorities to consolidate, and create consolidated or bridge banks [(in the case of Ghana, the regulator created Consolidated Bank Ghana Ltd (CBG)], take over management from affected banks. Since specific roles of DIS differ worldwide. we categorize DIS as a pay box only or as a "pay box plus," including loss or risk minimizer as proposed by Demirgüç-Kunt et al. (2015). All the countries (Kenya, Nigeria, Uganda, Tanzania) with explicit DIS in our sample opted for "pay box plus", including loss or risk minimizer."

Second, we examine the participation and Coverage to see how explicit Deposit Insurance Schemes (DIS) address coverage for local domestic banks, local branches of foreign banks, foreign currency deposits, and interbank deposits, noting variations across countries. Comparatively, for example, EU schemes cover all deposits in member countries' currencies, whereas EEA schemes exclude deposits in non-EEA bank branches, and the U.S. DIS (FDIC) does not take into account the home country of foreign institutions. In our sample, DIS coverage is primarily mandatory for domestic banks, with some coverage extending to local subsidiaries and branches of foreign banks, as detailed in **Appendix B.4.2**

Third, Funding is an important component for Deposit Insurance Schemes (DIS) to ensure depositors are compensated if a bank fails. There are two main types of DIS funding: ex-ante, which involves regular premium collections, and ex-post, where funds are raised from surviving institutions after a failure, often leading to shortfalls. Funding can come from government, private sources, a combination of both, or a backstop – is a predefined mechanism for emergency funding, including government support. In our study, only Kenya has a backstop mechanism.

Fourth, the contribution and assessment base of Deposit Insurance Schemes (DIS) are vital for determining how premiums are set to ensure adequate coverage payout during bank failures. Premiums vary by country to manage financial risk-taking and are adjusted based on banks' solvency, liquidity, and internal controls systems. We categorize premiums into four areas under the assessment base: covered deposits, eligible deposits, total deposits, and total liabilities. In our study, the total deposit premium is the most used assessment base in Africa.

Lastly, the form of Deposit Insurance Scheme (DIS) coverage determines how payments are made to depositors. The Common coverage types in Africa and globally include per depositor per institution, per depositor account, and per depositor. Coverage per depositor account is more generous than per depositor per institution, as it allows depositors to increase their

coverage by opening multiple accounts within the same institution. Conversely, per depositor per institution coverage permits greater coverage by spreading deposits across multiple institutions. For example, Kenya provides coverage per depositor account, while Nigeria, Uganda, and Tanzania offer coverage per depositor per institution.

3.4 **Methodology**

Our dataset covers the same financial institution (bank) across different periods, prompting us to use a dynamic panel data model (Arellano and Bond, 1991, 1998). Specifically, we applied a One-step system GMM estimator (SE) with adjusted standard errors to address heteroskedasticity (Blundell and Bond, 1998). GMM effectively manages unobserved heterogeneity and simultaneity between ownership structure and corporate value (Demsetz and Villalonga, 2001), and is widely accepted in banking research (Carbo and Rodriguez, 2007; Andres and Vallelado, 2008). We validated model specifications using the Sargan test for over-identifying restrictions, ensuring the instruments were exogenous. The test follows a χ^2 distribution with (J-K) degrees of freedom, where J is the number of instruments and K is the number of regressors . We assessed first- and second-order serial correlations using AR (1) and AR (2) tests.To ensure GMM estimates' reliability, we confirmed no second-order autocorrelation and performed Wald tests to assess variable significance. STATA (SE) 18.5 was used for estimation.

In the second phase, we apply Fixed Effects (FE) panel regression, which corrects for country-specific and time-specific effects, making it preferable over Random Effects (RE), which isn't feasible here. FE controls individual heterogeneity and causal inference, avoiding endogeneity issues linked to RE, as noted by John et al. (2019). It adjusts for unobserved confounders, using within-variations to analyze the same bank across time, ensuring strict exogeneity. We include time and country dummy variables to address heterogeneity and use clustered standard errors to account for heteroscedasticity and improve estimate accuracy (Bruderl & Ludwig, 2015). We used R Studio, version 4.2.3, for our statistical analysis.

The model specification for return on equity (ROE) is given as; Eq.(A.1)

$$ROE_{ijt} = \beta_0 + \beta_1 ROE_{ijt-1} + \beta_2 Foreign_{ijt} + \beta_3 State_{ijt} + \beta_4 DIS_{jt} + \beta_5 EQTA_{ijt} + \beta_6 LnTA_{ijt} + \beta_7 Zscore_{ijt} + \beta_8 LOTA_{ijt} + \beta_9 GDP_{jt} + \beta_{10} INFLA_{jt} + \beta_{11} YearDummy_{jt} + \beta_{12} CountryDummy_{jt} + \varepsilon_{it}$$

Where ROE_{ijt} is the dependent variable measuring bank profitability; return on equity (ROE). ROE is the ratio of net income to total equity, indicating the profit of the bank i in country j at year t, and also measure of firm's operational performance.

Foreign ownership is measured for bank i in country j. We expect foreign ownership to positively impact bank profitability (ROE) due to advanced technology, economies of scale, superior corporate governance, and financial backing from parent banks.

The Deposit Insurance Scheme (DIS) variable controls for country-level banking regulations, assessing whether explicit or implicit DIS is implemented. DIS is a dummy variable, assigned

a value of 1 for countries with explicit insurance (Kenya, Nigeria, Uganda, Tanzania) and 0 for countries with implicit insurance. We predict DIS negatively affects profitability due to insurance premiums, which increase costs, reduce profit margins, and impact bank asset composition.

Bank capitalization (EQTA) is calculated as the ratio of total equity to total assets for bank i in country j during year t. We expect a positive impact on profitability, as a higher EQTA ratio indicates stability and risk aversion. However, while stability enhances financial soundness, it may lower ROE due to reduced risk-taking.

Bank size (LnTA), the natural logarithm of total assets for bank i in country j at year t, may have mixed effects on profitability. Larger banks could see increased profitability if loan interest income exceeds expenses and default losses.

The Z-score, which measures bank risk by adding return on assets (ROA) to the bank capitalization and dividing by the standard deviation of asset returns, we expect a varied effects. A higher Z-score could indicate stability and greater profitability relative to equity levels.

Asset composition (LoTA), is calculated as loans to total assets for bank i in country j at year t, is expected to negatively affect profitability. Higher LoTA usually signals increased risk and inefficiencies in loan management.

We control for macroeconomic factors with GDP growth and inflation rates for each country at year t. Time and country fixed effects was also controlled by introducing two sets of dummies, $YearDummy$(D1) which takes the value of one (1) if the year is (2009,2012,2013,2014) and zero (0) otherwise Country Dummy (D2) takes the value of one if the country is a Southern African and zero (0) otherwise. The $\beta_1, \beta_2 \ldots\ldots \beta_8$ and β_{12} are the coefficient of the estimates and, finally, ε_{it} is the error term. The model validity is tested using the Sargan and Hausman tests. We defined all the variables (both dependent and independent) used in the study and their sources as reported in **Appendix B.6**

4. Discussion of Results

4.1 Descriptive Statistics and Correlation

In **Table 1**, we report the summary descriptive statistics of the variables of the full sample. Thus, the mean, median, standard deviation, minimum, maximum values, and the number of observations of the variables used in the study.

[Insert , Table 1, here]

We presented the distribution of each year's number of observations for the period of 2009-2020 accounting for 795 total number observations in **Table.2** .

[Insert , Table 2 , here]

In **Appendix A.1,** We present the distribution of African commercial banks and their representatives detailed as follows: Column 2 shows the number of banks per country, while Column 3 indicates their percentage of total assets. Nigeria and Egypt each have the highest representation with 25 banks, followed by South Africa and Kenya with 16 banks. Benin, Ivory Coast, Sudan, Eswatini, and Niger Republic each have only 1 bank. Columns 3, 5, and 6 display

each country's average total assets, as a percentage of both the full sample and the subsample averages.

In **Appendix B.5** we present the correlation matrix for the variables employed. We used return on equity (ROE) to measure bank profitability, as it indicates how well banks are managed to boost profitability and operational efficiency. Our analysis shows that foreign ownership, asset composition, deposit insurance, bank capitalization, time, and country effects are negatively correlated with ROE, while state ownership, risk, bank size, inflation, and GDP have positive correlations with ROE. The study found no multicollinearity issues, as the correlation coefficients among variables were not excessively high.

4.2 Empirical Results

Our analysis examined the effects of ownership (foreign vs. state), bank risk (Z-score), and deposit insurance schemes (implicit vs. explicit) on bank profitability. Our findings show that 52% of the banks are foreign-owned, while 28% are state-owned. Among the sample, only Kenya, Nigeria, Uganda, and Tanzania have explicit deposit insurance policies, covering 21.1% of the sample. The remaining 78.9% are presumed to have implicit insurance. We assessed bank risk through the Z-score, and detailed results from the One-step system GMM and Fixed-effects regression are in **Appendices B.1 and B.2.1. respectively.**

First, we analyze the impact of ownership structure (foreign vs. state), bank risk (Z-score), and deposit insurance on return on equity (ROE). Foreign ownership negatively affects ROE, state ownership has statistically insignificant positive effect, while bank risk improves ROE. Deposit insurance negatively impacts ROE in the short run especially the implicit DIS. Specifically, the coefficient for foreign-owned banks shows a significant negative impact on bank profitability, with a 1% statistically significance level in both the full and sub-sample. In contrast, state-owned banks exhibit an insignificant positive effect on return on equity (ROE) in both samples. This suggests that state-owned banks may focus more on social welfare policies and domestic development decisions , while foreign-owned banks prioritize profit maximization. Bank risk (Z-score) is positively correlated with ROE at a 1% statistically significance level, indicating that higher stability and lower insolvency risk are associated with improved profitability. Higher Z-scores reflect stability, capital accumulation, and cautious asset investment. Risk-averse investors seek higher earnings to compensate for credit risk, aiming for risk-adjusted returns.

Deposit insurance (DI) significantly and negatively impacts bank profitability (ROE) at a 1% significance level, indicating it harms performance in the short term, aligning with implicit DI. Thus, DI reduces profitability and increases risk due to costs from insurance premiums, which weaken profit margins. Although DI stabilizes banks during crises, it disadvantages banks in countries without explicit insurance. Despite its short-term negative effects partly due to evolution of time, data and other regulations, banks operating in explicit DI countries could potentially increase their profitability by about 0.6% in the long run compared to implicit DI countries.

Furthermore, we controlled for bank characteristics and macroeconomic variables and found that bank capitalization negatively impacts profitability (ROE) with 1% statistical significance, suggesting that reinvesting retained earnings can predict future profitability. Bank size (LnTA) shows an insignificant positive effect on ROE, supporting the economies of scale hypothesis, where foreign-owned banks are more efficient in less competitive markets. Bank asset

composition (LoTA) is positively linked to ROE but is statistically insignificant. This suggests that increases in assets may heighten risk and inefficiencies in loan management affecting profitability.

Second, the study finds that macroeconomic factors significantly impact bank profitability. GDP has a positive and statistically significant effect on return on equity (ROE) at the 1% level, indicating that economic growth enhances bank profitability. Similarly, inflation also shows a strong positive and significant relationship with ROE, suggesting that banks benefit from inflation if they accurately forecast future movements to adjust interest rates and margins. These findings confirm that both bank characteristics and macroeconomic factors are key determinants of bank profitability in Africa, consistent with existing empirical evidence.

Lastly, we controlled for time and country-fixed effects (FE) by introducing dummies to reduce bias from unobserved panel effects. Time FE showed a significant negative effect on ROE at 5%, while country FE had a significant positive effect at 1%. In addition, we checked the impact of bank asset composition, by excluding it (LOTA) from the model, time FE remained negatively significant at 1%, and country FE was significant at 10% on ROE.

In addition, we checked past bank performance to analyze fluctuations in current and future profitability by lagging return on equity (ROE) annually. The lagged ROE coefficient is positive and significant at 1% in both the One-Step GMM and Fixed Effect estimations for all samples. This indicates a positive conditional serial correlation exists between ROE and performance, meaning past performance helps explain current and future profitability. Our results are consistent in One-Step GMM and Fixed Effect methods, show that foreign ownership, bank risk, deposit insurance, and bank-specific variables significantly impact African bank profitability.

4.3. **Robustness of the results**

To test the robustness of our results, we used both the One-Step system GMM and Fixed Effects techniques, by excluding countries with fewer than four banks from our 2009-2020 dataset. The revised sample includes 126 banks across nine African countries (Botswana, Egypt, Ghana, Kenya, Morocco, Nigeria, South Africa, Tunisia, Zambia), representing 71% of the full sample, with 687 observations. We further computed the distribution of banks and their percentage to the total assets of the subsample as reported in **Appendix A.2** . We adhered to the foreign ownership threshold of at least 50%, following the guidelines set by Claessens and Van Horen (2015), Allen et al. (2017), and Hasan and Song (2012).We also introduced a dummy variable to account for regional effects, assigning a value of 1 for banks in Southern Africa (Botswana, South Africa) and Western Africa (Nigeria, Ghana) and 0 otherwise.

Our One-Step system GMM and Fixed Effects (FE) regression results, detailed in **Appendices B.1.2 and B.2.2**, show that foreign ownership negatively affects bank profitability at a 1% statistically significance level, while state ownership positively impacts profitability, though insignificantly. Bank risk (Z-score) has a significant positive effect on profitability at 1%, whereas deposit insurance negatively impacts profitability, also at a 1% statistically significance level.

In addition, individual bank characteristics (bank capitalization, size, asset composition) and country-level macroeconomic factors (GDP, Inflation) maintained the same effect on bank profitability compared to the full sample. This consistency re-echoes the significant role these variables played in determining bank profitability in Africa.

Comparing our results to other studies. Our findings are consistent with the recent study of Mutarindwa et al. (2021), they found that foreign-owned banks are not more profitable or cost efficient than domestic peers and have lower returns on equity (ROE). We address a gap by directly comparing foreign and state-owned banks, revealing that state-owned banks outperform foreign peers in ROE. In contrast, Kobeissi et al. (2010) found foreign banks performance superior in the Middle East and North Africa, which could be possibly due to Islamic banking practices in that region

Additionally, our results on deposit insurance align with that of Hasan et al. (2022), who found that banks in countries with explicit deposit insurance (DI) increase loan spreads by 11.3%, compared to 69.2% in countries without explicit DI during crises. Their study also showed that foreign-owned banks in explicit DI countries see a 0.8% decline in lending to domestic borrowers, while those in countries without explicit DI see a 3.4% decline. Our findings indicate that banks in explicit DI countries average 0.6% higher profitability than those in implicit DI countries. During crises, banks in explicit DI countries experience a 10.863% decline in profitability, slightly less than the 11.073% decline in implicit DI countries.

Finally, Our estimation is consistent with the study of Mohamed Zaroug's (2015) , which used One-Step GMM to examine ownership's impact on Oman commercial banks efficiency, found Arellan-Bond autocorrelation AR(1), Pvalue = 0.033, AR(2) Pvalue = 0.236, and Hansen test = 0.453, while we also found AR(1) Pvalue = 0.031, AR(2) Pvalue = 0.926, and Sargan test = 0.386. The consistency in both methods confirms the robustness and reliability of our findings.

5. Conclusion

Our paper investigates the impact of ownership structure, bank risk (z-score), and deposit insurance (DIS) on bank profitability in Africa, using data from 141 commercial banks across 19 countries from 2009 to 2020. We employed a One-Step System GMM Dynamic Data Panel and Fixed Effects (FE) Estimation. We compared foreign-owned and state-owned banks, assessed risk through Z-scores, and analyzed deposit insurance schemes, distinguishing between explicit and implicit DIS. We controlled for time, country effects, and macroeconomic variables, with Return on Equity (ROE) as the profitability measure

The study reveals four key findings. First, our results show that foreign ownership negatively affects bank profitability, while state ownership has a positive but statistically insignificant impact. Thus, higher foreign ownership reduces Return on Equity (ROE) whereas state ownership improves it. Foreign -owned banks did not exhibit superior performance compared to State-owned peers, and higher foreign ownership concentration does not directly translate to higher profitability.

Second, bank risk positively influences profitability; a higher Z-score enhances stability, thus lowering risk and improving bank ROE. Third, Deposit Insurance (DI) initially harms profitability, particularly under implicit insurance, by increasing risk and reducing profitability in the short term. However, explicit DI could improve bank profitability by 0.6% in the long run as result of stabilization effect. Fourth, bank characteristics (capitalization, size, asset composition) and macroeconomic factors (GDP, inflation) are crucial determinants of profitability in Africa.

These findings suggest that State ownership outperforms foreign ownership could be due to state pursuing social intervention policies, earnings reinvestment, and state-backed guarantees. While effective deposit insurance schemes can enhance profitability, Africa needs explicit Deposit Insurance Schemes with strong implementation oversight to improve stability and reduce credit risk. Future research should explore the impact of institutional versus managerial ownership and other regulatory factors on bank profitability in Africa.

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TABLES

Table 1: Descriptive Statistics for Return on Equity (ROE)

Variable	Obs	Mean	Std. Dev.	Min	Max
ROE	795	.158	.104	-.012	1.109
Foreign-owned	795	8.281	3.653	1	12
State-owned	795	5.717	3.825	1	14
LoTA	795	3.667	22.686	0	562
Depo	795	.326	.469	0	1
Risk	795	1.262	1.102	-.069	9.374
LnTA	795	8.028	1.582	3.622	11.927
Infla	795	8.18	5.148	.303	29.507
EQTA	795	.137	.11	-.952	.956
Gdp	795	3.184	3.227	-9.182	14.047

[a]Note: The observation, mean, standard deviation, minimum, and maximum of the variables.

Table 2: Distribution of the number of observations from 2009 to 2020.

Year	Number Of Observation	Percentage (%)	
2009	62	7.8%	
2010	68	8.6%	
2011	72	9.1%	
2012	72	9.1%	
2013	68	8.6%	
2014	72	9.1%	
2015	72	9.1%	
2016	74	9.3%	
2017	68	8.6%	
2018	43	5.4%	
2019	67	8.4%	
2020	57	7.2%	
Total	795	100	

[b]Note: The above table reports the distribution of each year's number of observations for the period of 2009-2020 accounting for 795 total number observations.

APPENDICES

A.1: Distribution of banks per country and their percentage of total asset

SN	Country	Number of banks	Percentage of Total assets
1	BENIN	1	1.33
2	BOTSWANA	6	1.50
3	EGYPT	25	5.36
4	ESWATINI	1	0.76
5	GHANA	8	0.91
6	IVORY COAST	1	2.49
7	KENYA	16	1.99
8	MAURITIUS	3	5.91
9	MOROCCO	13	11.79
10	NAMIBIA	2	2.02
11	NIGER REPUBLIC	1	0.30
12	NIGERIA	25	4.42
13	SOUTH AFRICA	16	42.64
14	SUDAN	1	0.36
15	TANZANIA	2	1.60
16	TOGO	2	13.30
17	TUNISIA	13	1.92
18	UGANDA	2	0.89
19	ZAMBIA	4	0.50
	Total/average	141	100

[c]Note: The table shows the breakdown of the number of banks per country and their percentage total asset of the final sample. To ascertain each bank distribution, we compute the average balance sheet total asset of each bank in every country divided by the global average total asset of all the banks in the 19 countries multiply by 100, from 2009 to 2020.

A.2 : The subsample Distribution of banks and their percentage to the total asset

SN	Country	Number of banks	Total Asset (US$million)	Percentage of full Sample	Percentage of the subsample
1	BOTSWANA	6	24035.332	0.015	2.112
2	EGYPT	25	85910.082	0.054	7.549
3	GHANA	8	14598.475	0.009	1.283
4	KENYA	16	31883.586	0.020	2.801
5	MOROCCO	13	188860.043	0.118	16.594
6	NIGERIA	25	70816.001	0.044	6.222
7	SOUTH AFRIC	16	683262.602	0.426	60.036
8	TUNISIA	13	30741.542	0.019	2.701
9	ZAMBIA	4	7982.746	0.005	0.701
Subsample Total		126	1138090.41	0.710	100
Full Sample Total			1602367.25		

[d]Notes:The table shows the breakdown of the number of banks per country and their percentage total asset of the final sample. To ascertain each bank distribution, we compute the average balance sheet total asset of each bank in every country divided by the global average total asset of all the banks in the 9 countries multiplied by 100, from 2009 to 2020.

B.1: Full sample of Ownership, Risk, and Deposit Insurance effect on bank profitability (ROE)

VARIABLES	(1) One-step System GMM	(2) One-step System GMM	(3) One-step System GMM
L.ROE (-1)	0.128***	0.127***	0.127***
	(0.027)	(0.027)	(0.027)
Foreign	-0.003***	-0.003***	-0.003***
	(0.001)	(0.001)	(0.001)
State	0.001	0.001	0.001
	(0.001)	(0.001)	(0.001)
LoTA		0.000	0.000
		(0.000)	(0.000)
Depo	-0.020***	-0.020***	-0.020***
	(0.003)	(0.003)	(0.003)
Risk	0.050***	0.050***	0.050***
	(0.010)	(0.010)	(0.010)
LnTA	0.002	0.002	0.002
	(0.002)	(0.002)	(0.002)
Infla	0.003***	0.003***	0.003***
	(0.001)	(0.001)	(0.001)
EQTA	-0.257***	-0.260***	-0.260***
	(0.026)	(0.025)	(0.025)
Gdp	0.004***	0.004***	0.004***
	(0.001)	(0.001)	(0.001)
year	-0.000**	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)
Constant	0.177***	0.178***	0.178***
	(0.038)	(0.036)	(0.036)
#Observations	795	795	795
Number of countries	19	19	19
Arellano-Bond Auto.			
AR (1)	0.031	0.031	0.031
AR (2)	0.926	0.903	0.903
Sargan test	0.385	0.377	0.377
Wald test (chi2)	1648.78	1422.45	1422.45
Wald test (pvalue)	0.000	0.000	0.000
Year Dummies	Yes	Yes	Yes
Country Dummies	Yes	Yes	Yes

[e]Note: Robust Standard errors are clustered individually in parentheses with Statistical significance of 1%, 5%, and 10% level.

B.1.2: Subsample of ownership, Risk, and Deposit Insurance effect on bank profitability (ROE)

VARIABLES	(1) One-Step System GMM	(2) One-Step System GMM	(3) One-Step System GMM
L.ROE (-1)	0.129***	0.129***	0.129***
	(0.026)	(0.027)	(0.027)
Foreign	-0.003***	-0.003***	-0.003***
	(0.001)	(0.001)	(0.001)
State	0.001	0.001	0.001
	(0.001)	(0.001)	(0.001)
Depo	-0.019***	-0.019***	-0.019***
	(0.003)	(0.003)	(0.003)
Risk	0.050***	0.050***	0.050***
	(0.010)	(0.010)	(0.010)
LnTA	0.002	0.002	0.002
	(0.002)	(0.001)	(0.001)
LoTA	0.000		
	(0.000)		
Infla	0.003***	0.003***	0.003***
	(0.001)	(0.001)	(0.001)
EQTA	-0.256***	-0.253***	-0.253***
	(0.025)	(0.026)	(0.026)
Gdp	0.004***	0.004***	0.004***
	(0.001)	(0.001)	(0.001)
year	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)
Constant	0.176***	0.175***	0.175***
	(0.036)	(0.038)	(0.038)
#Observations	687	687	687
#Number of countries	9	9	9
AR (1)	0.03	0.031	0.031
AR (2)	0.893	0.916	0.916
Sargan Test	0.386	0.395	0.395
Wald Test (Chi2)	3389.83	2061.88	2061.88
Wald Test (pvalue)	0.000	0.000	0.000
Year dummies	Yes	Yes	Yes
Country dummies	Yes	Yes	Yes
#Year	12	12	12

[f]Note: Robust Standard errors are clustered individually in parentheses with Statistical significance of 1%, 5%, and 10% level.

B.2.1: Full sample of ownership, Risk, and Deposit Insurance effect on bank profitability (ROE)

VARIABLES	(1) Fixed Effect (ROE)	(2) Fixed Effect (ROE)	(3) Fixed Effect (ROE)	Clustered Std. Errors Fixed Effect (ROE)
Foreign	-0.004***	-0.004***	-0.015***	-0.015***
	(0.001)	(0.001)	(0.004)	(0.004)
State	-0.002*	-0.002*	-0.001	-0.001
	(0.001)	(0.001)	(0.004)	(0.004)
Risk	0.059***	0.058***	0.057***	0.057***
	(0.003)	(0.003)	(0.003)	(0.003)
LnTA	0.001	0.001	0.001	0.001
	(0.002)	(0.002)	(0.002)	(0.002)
Infla	0.003***	0.003***	0.002*	0.002*
	(0.001)	(0.001)	(0.001)	(0.001)
EQTA	-0.342***	-0.336***	-0.320***	-0.320***
	(0.033)	(0.032)	(0.032)	(0.032)
Gdp	0.005***	0.005***	0.003*	0.003*
	(0.001)	(0.001)	(0.001)	(0.001)
Year dummy	-0.000*	-0.000*	-0.002***	-0.002***
	(0.000)	(0.000)	(0.001)	(0.001)
			(0.058)	(0.058)
Country dummy	0.041***	0.041***	0.048*	0.048*
	(0.012)	(0.012)	(0.025)	(0.025)
LoTA	0.000			
	(0.000)			
Constant	0.896**	0.910**	5.009***	5.009***
	(0.417)	(0.417)	(1.863)	(1.863)
Observations	795	795	795	795
R-squared	0.425	0.424	0.442	0.442
Number of Years	12	12	12	12
Number of countries	19	19	19	19
Country FE	NO	NO	YES	YES
Time FE	YES	YES	NO	NO
F test (pvalue)	0.000	0.000	0.000	0.000
F stats (pvalue)	0.000	0.000	0.000	0.000
Hausman Test:				
Specification Chi2 (10) = 71.68				
Prob > Chi2 = 0.000				
H0: difference in coefficient not systematic				

[g]Note: Robust Standard errors are clustered individually in parentheses with Statistical significance of 1%, 5%, and 10% level.

B.2.2: Subsample of ownership, Risk, and Deposit Insurance effect on bank profitability (ROE)

VARIABLES	(1) Fixed Effect (ROE)	(2) Fixed Effect (ROE)	(3) Fixed Effect (ROE)	Clustered Std. Errors Fixed Effect (ROE)
Foreign	-0.015***	-0.004***	-0.004***	-0.007***
	(0.004)	(0.001)	(0.001)	(0.002)
State	-0.001	-0.002*	-0.002*	0.003
	(0.004)	(0.001)	(0.001)	(0.003)
Risk	0.057***	0.059***	0.059***	0.053***
	(0.003)	(0.003)	(0.003)	(0.010)
LnTA	0.001	0.001	0.001	0.002
	(0.002)	(0.002)	(0.002)	(0.002)
LoTA		0.000	0.000	0.000*
		(0.000)	(0.000)	(0.000)
Infla	0.002*	0.003***	0.003***	0.003**
	(0.001)	(0.001)	(0.001)	(0.001)
EQTA	-0.320***	-0.342***	-0.342***	-0.289***
	(0.032)	(0.033)	(0.033)	(0.039)
Gdp	0.003*	0.005***	0.005***	0.005***
	(0.001)	(0.001)	(0.001)	(0.001)
Year dummy	-0.002***	-0.000*	-0.000*	-0.000**
	(0.001)	(0.000)	(0.000)	(0.000)
Country dummy.	0.048*	0.041***	0.041***	0.030
	(0.025)	(0.012)	(0.012)	(0.031)
Constant	5.009***	0.896**	0.896**	0.215***
	(1.863)	(0.417)	(0.417)	(0.055)
#Observations	687	687	687	687
R-squared	0.442	0.425	0.425	0.294
Number of Years	12	12	12	12
Country FE	YES	YES	YES	YES
Time FE	NO	NO	NO	NO
Number of Countries	9	9	9	9
F test (pvalue)	0.000	0.000	0.000	0.000
F stats (pvalue)	0.000	0.000	0.000	0.000
Hausman Test:				
Specification Chi2 (10) = 55.09				
Prob > Chi2 = 0.000				
H0: difference in coefficient not systematic				

[h]Note: Robust Standard errors are clustered individually in parentheses with Statistical significance of 1%, 5%, and 10% level.

B.3 : Banks foreign and state ownership by country from 2010-2015

SN	Country	Total Ownership	Foreign (own)	State (own)	Foreign (%)	State (%)
1	Benin	40	40	0	100%	0%
2	Botswana	48	28	10	58%	21%
3	Ivoire Coast	63	48	15	76%	24%
4	Egypt	106	56	28	53%	26%
5	Ghana	95	48	30	51%	32%
6	Kenya	136	52	46	38%	34%
7	Mauritius	76	44	17	58%	22%
8	Morocco	68	16	26	24%	38%
9	Namibia	44	24	12	55%	27%
10	Niger	31	27	2	87%	6%
11	Nigeria	82	16	33	20%	40%
12	South Africa.	134	15	64	11%	48%
13	Sudan	24	4	12	17%	50%
14	Esthwani	16	12	4	75%	25%
15	Tanzania	126	74	30	59%	24%
16	Togo	28	4	12	14%	43%
17	Tunisia	64	28	24	44%	38%
18	Uganda	72	54	9	75%	13%
19	Zambia	62	42	10	68%	16%
	Total/Average	1315	632	384	52%	28%

[i]**Notes:** Total country ownership (including Domestic-Private owned), Foreign ownership (Foreign-owned, Foreign-private owned, foreign government-owned), State ownership (domestic-owned and Domestic-Government owned). The average (%) of both foreign and state is computed as the average percentage of each country's foreign or state-owned to the total ownership.
Source[1]: Authors computation 2024.

B.4: Coverage of explicit deposit insurance in Africa ending 2013.

B.4.1:Coverage of Explicit Deposit Schemes in Africa

		Statutory Limit		Cov. Incl. Gov. Guara.	Cov.limit/GDP per Capita
SN	**Country**	**Local Currency**	**USD (US$)**	**USD (US$)**	**Cov.limit/ GDP per Capita (%)**
1	NIGERIA	NGN500,000	3118	3118	184
2	KENYA	KES100,000	1157	1157	114
3	UGANDA	UGX3,000,000	1188	1188	190
4	TANZANIA	TZS1,500,000	944	944	134
5	CAMROON	XAF5,000,000	10480	10480	1031
6	CENTRAL A.	XAF5,000,000	10480	10480	3142
7	CHAD	XAF5,000,000	10480	10480	860
8	ZIMBABWE	USD500	500	500	51
9	CONGO	XAF5,000,000	10480	10480	318

[j]Notes: 1. Statutory limit in value ($USD), coverage including government guarantees, and coverage limit/GDP per capita (%)
2. Countries 1-4 are in the sample while countries 5-10 are out of sample are reported just for emphasis on explicit DIS schemes in Africa.
3. Blanket guarantee system was introduced in 2008 and expired by the ending of 2010.
4. The explicit guaranteed systems emerged in August 2008 to replace the blanket guarantee and subsequently the Deposit Protection Agency (DPA) establishment.
Source[2]: Kunt et al. (2015), IMF Staff Working Paper, and national Central Bank and deposit insurance agencies.

Source[3]: Authors Modified version 2024.

B.4.2 : The modified Design of Explicit Deposit Insurance Schemes in Africa, by the end of 2013.

		Country			
	Design Features	**Kenya**	**Nigeria**	**Uganda**	**Tanzania**
1	**Type of Deposit Insurance Scheme**				
	Explicit	X	X	X	X
	Legally separate		X		
	Central bank, supervisory, or ministry	X		X	X
	Administered publicly		X		
	Administered privately			X	X
	Administered jointly	X			
	Paybox only				
	Paybox plus, loss or risk minimizer	X	X	X	X
2	**Participation and Coverage**				
	compulsory for domestic banks	X	X	X	X
	local subsidiaries of foreign banks	X	X	X	X
	local branches of foreign banks	X	X	X	
	foreign currency deposits		X		X
	Interbank deposits	X			
3	**Funding**	X	X	X	X
	ex-ante fund				
	ex-post scheme				
	funded by government				
	funded privately	X	X	X	X
	funded jointly				
	backstop	X			
4	**Contributions and Assessment Base**				
	risk-adjusted premiums			X	
	assessment base				
	covered deposits				
	eligible deposits				
	total deposits	X	X	X	X
	total liabilities				
5	**Payouts to Depositors**				
	per deposit account	X			
	per depositor per institution		X	X	X
	per depositor				

[k]Notes: The table excludes voluntary and contractual schemes other than natural statutory schemes. Coverage is for all countries with explicit deposit insurance schemes in our sample updated as of 2013.

Source[4]: Kunt et al. (2015), IMF Staff Working Paper
Source [5]: Authors Modified version 2024.

B.5: Correlation Matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1) ROE	1.000											
(2) Foreign	-0.253	1.000										
(3) State	0.098	0.126	1.000									
(4) LoTA	-0.061	0.063	0.028	1.000								
(5) Depo	-0.097	0.384	0.212	-0.002	1.000							
(6) Risk	0.445	-0.128	0.203	-0.006	0.030	1.000						
(7) LnTA	0.009	0.106	0.032	-0.136	-0.095	-0.126	1.000					
(8) Infla	0.213	-0.073	-0.102	0.009	0.220	0.015	0.001	1.000				
(9) EQTA	-0.029	0.020	0.103	0.202	0.076	0.508	-0.313	-0.052	1.000			
(10) GDP	0.257	-0.048	0.005	-0.022	0.141	0.087	-0.158	0.117	0.044	1.000		
(11) Year(D1)	-0.096	-0.073	-0.013	0.040	0.021	0.065	0.177	-0.018	-0.074	-0.431	1.000	
(12) Country(D2)	-0.224	0.168	0.096	0.030	0.113	-0.156	-0.212	-0.230	-0.002	-0.263	0.094	1.000

[m]Notes : ROE is bank return on Equity, Foreign (foreign-owned), State(state-owned), LoTA (Asset composition),Depo (Deposit Insurance), Risk (Zscore), LnTA (bank Size), Infla(country inflation), EQTA (bank capitalization), GDP (Gross Domestic Product), Year Dummy (D1) and Country Dummy (D2).

B.6 : Definition of Variables and Sources

Variable name	Definition	Author/source
Dependent Variable:		
Return on equity (ROE)	Return on equity as defined as the ratio bank net income to total equity	Pi and Timme (1993); Bonin et al. (2005); Barontini et al. (2006)
Independent Variables:		
Foreign	The foreign ownership (private and government) with at least 50% stakes	Claessens et al. (2015), Allen et al. (2017), and Hasan and Song (2012)
State	The state ownership comprises of domestic and domestic government	Claessens et al. (2015), Allen et al. (2017), and Hasan and Song (2012)
Bank Risk (Zscore)	the measure of banks probability to insolvency i.e banks stability	Lepetit and Strobel (2013) and Hesse and Čihák (2007
Deposit Insurance Schemes (DIS)	Dummy equal to one if a country has explicit deposit insurance, and zero otherwise	Asli Demirgüç-Kunt, Edward Kane, and Luc Laeven (2013)
Bank Capitalization (EQTA)	Total equity to total assets, measures banks capitalization.	Bloomberg
Asset Composition (LoTA)	Loans to total assets, determines bank business nature and income sources	Pi and Timme (1993); Berger and Mester (1997); Bonin et al. (2005)
Bank Size (LnTA)	The natural logarithm of total asset, measures bank size.	Pi and Timme (1993); Bonin et al. (2005); Barontini and Caprio (2006)
Year Dummy(D1)	Dummy equal to one if the year is (2009,2012, 2013, 2014) and zero otherwise	Bloomberg database
Country Dummy(D2)	Dummy equal to one if the country is in (Southern and West African) and zero otherwise	Bloomberg database
Inflation	The change in prices of goods and service over period of time	Worldbank database
GDPGrowth	Real Gross Domestic Product (GDP) growth rate (%)	Worldbank database

[n]Note: The above table defines the variables and their sources.