The Implications of Cross Border Banking and Funding Strategy for Risk and Return

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This paper investigates the effects of cross-border banking and funding modes on risk and return. We sample 320 banks across 29 African countries and employ System GMM estimator as a methodological approach to shed further light on the funding sources-stability nexus by examining the complex interaction between three key constructs: cross-border banking, funding strategy, and bank stability and return. We find that though cross border banking increases insolvency risk, it promotes deposit funding which in turn decreases insolvency risk, implying that when banks cross border, they reduce their inherent instability by employing more of less risky deposit funds and less of wholesale and internally generated funds. Our results also suggest that banks that finance their operations with deposit funds are more profitable than those who employ wholesale and internal funds.

INTRODUCTION

The adoption of financial liberalisation policies by most economies has given rise to numerous cross border banking activities across the globe (Ho, 2003). Africa has had its own share of rapid cross border bank penetration. Indeed, Beck (2015) has observed that Africa had the highest share of cross border banks until the 2000s when it was overtaken by the former transition countries of Central and Eastern Europe. The fact that the financial crises of 2007 occurred in economies with the most advanced banking systems has raised concerns as to whether cross border baking will not spread financial contagion and escalate global economic and financial crises. Again, the fact that the global financial crises occurred in economies with the most developed banking systems calls for the need to take a critical look at the banking sector and examine the various factors that affect the stability and performance of banks, especially foreign ones.

Cross border banking is significant in a respective ways: Frist of all, cross border banking has implications for risk exposures in the banking system (Wall, 2013). Foreign banks can transfer both positive and negative shocks across the economies they operate and the regulatory authorities ought to be aware of the repercussions of these shocks for financial markets and the economy as a whole. Second, cross border banks can spur financial innovation which can deepen financial penetration. Thirdly, cross border banking can increase competition and for that matter lead to efficient provision of banking services to bank clientele. Fourth, foreign banks have stability benefits and stability risk as well (Beck, 2015). When domestic banks are capital constrained, domestic firms can borrow from cross border banks to ensure stable flow of funds for investments. On the flipside, foreign banks can spread contagion across borders and render domestic finance volatile. Lastly, cross border banking has implications for regulatory and supervisory oversight as their operations complicate financial market operations. These enumerated significance of foreign banks imply that they confer benefits as well as costs to the financial systems of the economies they operate in.

Moreover, cross border banking has implications on the funding mix of banks, and the type of funding mode employed by banks also affects their risk and return behaviour. Demirguc-Kunt and Huizinga (2010) show that the use of noninterest income increases return and lowers diversification risk when employed at low levels; non-deposit funding reduces return on assets but only offers risk diversification when employed in small amounts. It has also been shown by Norden and Weber (2010) that the use of deposit funding can affect bank performance. Amidu (2013) reveals that increasing competition and the use of internally generated funds are responsible for the low insolvency risk in African Banks.

Notwithstanding the preponderance of studies on cross border banking, we are unaware of any study that investigates the simultaneous interactions of cross border banking and funding modes on risk and return behaviour of banks. This is the gap this study seeks to fill in the African banking context where cross border banks abound and the banking system remains the main provider of funds. We are aware of studies that examine cross border banking, diversification and risk and return (Sissy, Amidu and Abor, 2017) without considering funding modes, and studies that examine funding strategy, competition and risk and return without factoring in the cross border dimension (Demirguc-Kunt and Huizinga, 2010 and Amidu 2013). We build on these studies by investigating the complex interactions among three concepts of policy relevance: cross border banking, funding modes and risk and return using the African banking landscape as a case study.

The contribution of this paper to knowledge is centred on answering the following three critical questions: (a) What determines bank funding modes within a cross border banking context? (b) How do cross border banking and the choice of funding mode influence risk and return behaviour of banks in Africa? (c) How are the effects of cross border banking and funding mix on risk and return intermediated by banking freedom, expropriation risk and capital requirements of the host country?

In response to these questions, we use the dynamic GMM estimator to analyse the relationship among cross border banking, funding strategy and risk and return of African banks. Estimations are done with Windmeijer (2005) corrected standard errors to produce robust estimates. Cross border banking is proxied by a dummy variable taking the value 1 if the bank is controlled by a foreign shareholder and 0 otherwise. We identify and use three bank funding strategies: deposits, non-deposits/wholesale and internal funding. Z-score is used as proxy for overall bank insolvency risk; risk adjusted return on asset (RAROA) and equity (RAROE) are used as measures of return.

The results show that while cross border banking reduces bank stability, deposit funding increases it. Deposit funding is positively and significantly related to risk adjusted return on assets implying that banks that employ more deposits are more profitable than those that employ wholesale and internal funds. While well capitalised banks are more stable when deposit and internal funds are used to finance assets, they are less profitable when internal and non-deposit funds are employed. These results have implications for banking sector stakeholders such as banks, regulators and economic policy makers.

The rest of the paper is structured in the following manner. Section 2 reviews related literature. Section 3 elaborates on the empirical strategy. Section 4 presents analysis and discussion of results while section 5 concludes.

LITERATURE REVIEW

In this section, we review literature on the link between cross border banking and risk and return and the link between funding mix and risk and return. Starting with the cross border banking-risk return nexus, Hassan, Sanchez and Safa (2013) analyse the effect of financial liberalisation and entry of Islamic banks on the profitability of Islamic banks. The authors find that foreign Islamic banks employ very aggressive financing strategies and for that matter earn high returns. On barriers to Islamic bank entry, the authors find that the financial crises of 2007 did not deter bank entry; banking sector return affects entry decisions of banks; and macroeconomic stability promotes bank entry while high taxes deter Islamic bank entry. Tonzer (2015) explains the implications of cross border banking networks for risk and contagion. From the theoretical perspective, on one hand, interlinkages in the network offers opportunities for risk sharing and therefore lead to stability. On the other hand, shocks can be propagated through the network. This means that country specific and bank specific conditions will determine which of these effects dominates. The empirical results produced mixed results. While cross border exposures tended to be stability reducing, the diversification brought about by cross border networks offsets this instability. The author finds some evidence that countries that are interconnected via cross border borrowing or lending positions to more stable banking systems overseas are significantly impacted by positive spill over effects.

Beck (2015) supports the two-edged impact of cross border banking on stability in Africa by showing how foreign banks can promote funding stability for domestic firms while being capable of transmitting negative shocks across borders. A more recent study seems however to be more definite on the effects of foreign banks on bank stability in Africa. Sissy, Amidu and Abor (2017) investigate the effects of cross border banking and diversification on insolvency risk and return in the African banking system. The authors find that cross border banking and diversification reduce insolvency risk while promoting profitability in the African banking sector. This is due to the fact that cross border banking allows banks to diversify their portfolios and also opens up more financing avenues. This present study will contribute to the debate by introducing financing modes to explain the cross border banking-stability and profitability links.

Empirical findings on the implications of funding modes for risk and return behaviours of banks are equally ambiguous. The works of Demirguc-Kunt and Huizinga (2010), Norden and Weber (2010) and Amidu (2013) all agree that a decline in deposits reduces bank return because a decline in customers' deposits is counterbalanced by a rise in none deposit funding. The explanation is that an alteration in the funding mix of banks given a particular asset combination will lead to a higher interest expense. In line with this thinking, the substitution of deposit funding with wholesale funding adversely impacts bank profit. Again, Demirguc-Kunt and Huizinga (2010) and Amidu (2013) both agree that banks that employ deposit and internal funding are more stable than those that rely on wholesale funds. This is partly because the providers of wholesale funds have the tendency to withdraw funding at the least suspicion of a decline in bank asset quality and for that matter cause healthy banks to become insolvent (Huang and Ratnovski, 2008).

From a corporate governance perspective, Calomiris (1999) however seems to suggest that wholesale funding will have a stabilising effect on banks since bondholders will exert some monitoring oversight over the bank to ensure that things are done right. The author shows that subordinated debts can perform a monitoring role especially when subordinated debt holders cannot benefit from deposit insurance. Thus, non-deposit funding in bank funding structure can reduce bank fragility through better monitoring. Finally, Khan, Scheule and Wu (2016) show that banks with minor funding liquidity risk as measured by higher deposit ratios, have the tendency to take more risk. We build on these findings and contribute to the literature by investigating the simultaneous influence of bank funding strategies and cross border banking on risk and return.

DATA AND METHODOLOGY

Variable Measurements

Cross-Border Banking Measure: Cross border banking or foreign bank is measured as a dummy variable: it takes the value 1 when the shareholding proportion of the local bank by a foreign bank is above 50%, otherwise, it is 0. Cross border banks are considered to be foreign owned if they are controlled by a shareholder or group of shareholders from outside the licensing jurisdiction. Control over a bank can be exercised if an individual or entity holds more than 50 percent of shares in a bank, subsidiary or branch (Beck *et al*. 2014).

We identify three funding sources in the sample as bank funding strategies: deposits, non-deposits/wholesale and internal funding. **Deposits** as a source of bank funding include demand, saving and time deposits. Customer deposits are traditionally considered to be the main funding source of banks and to be cheap relative to other sources of funding. They allow banks to maintain relatively high profit (Ianotta *et al*., 2007). Deposit funding is measured as total deposits as a percentage of total assets. The **Non-deposit funding** is the funding resources from other banks and other sources that include notes, debentures, short-term bills and all other related debts not covered in the deposit modes. It is a short-term funding with relatively higher interest cost compared to deposits from customers. Non-deposit funding is calculated as all other debts (except deposits) divided by total assets. The measurement of **internally generated funds** is similar to that of Houston *et al*. (1997) as the sum of net profits before extraordinary items and loan loss provisions relative to bank loans at the end of the period.

Insolvency Risk Measures

The main measure for insolvency risk is the Z-score which measures the number of standard deviations that a bank's profit should fall to drive it into insolvency. Z-score is calculated as:

$$Z-score=\frac{ROA+Equity}{\sigma_{ROA}} \tag{1}$$

where ROA is the ratio of profit after tax to total assets of a bank, *Equity* captures bank ratio of equity to assets and σ_{ROA} is the standard deviation of the return on assets. The value of Z-score is lagged to reduce the probability of simultaneous bias and improve the regression goodness of fit. The study uses a four year rolling time window period for the calculation of σ_{ROA} to allow for variation in denominator of the Z-score. This approach avoids that, the Z-scores are exclusively driven by variation in the level of capital and profitability (Schaeck and Cihak, 2010).

Additionally, bank specific data is used to calculate the two risk adjusted performance measures of return on assets (RAROA) and return on equity (RAROE).The formulas for RAROE and RAROA are shown below;

$$RAROA=\frac{ROA}{\sigma_{ROA}} \quad \text{and} \quad RAROE=\frac{ROE}{\sigma_{ROE}} \tag{2}$$

where ROE is ratio of profit before tax to total equity and ROA is return on assets. The risk –adjusted return on equity and asset are calculated by dividing the Return on Equity (ROE) and Return on Asset (ROA) by their respective standard deviations.

The paper also controls for bank specific characteristics and characteristics of the macroeconomic and regulatory environment that affect the relationship among funding modes, cross-border banking and risk and return. A ratio of equity to total assets ***equity/asset*** is used as a measure of the level of capitalization and to control for the relationship between bank fragility and levels of capitalization. Capital absorbs large shocks and shields banks when asset value decline reducing the likelihood of failure (Lehar, 2005). The natural logarithm of banks' total assets is used as a proxy for ***bank size*** to allow for the probability that bigger banks are inherently more stable since idiosyncratic risk tends to decline with size (Baele *et al*. 2007). Also, larger banks may have better diversification opportunities and as a result less income volatility from entering into new markets (Demsetz and Strahan, 1997). Cost to gross income ratio is used as a proxy for ***Efficiency***. Banks that are efficient in their normal operations are less likely to diversify their funding base or engage in cross border banking since they are able to generate enough income to support their activities. GDP growth and Inflation is included in the regression to account for difference in macroeconomic environments. ***GDP growth and Inflation*** are used to control for general economic development, macroeconomic stability and institutional frameworks that are likely to affect bank performance in a country. Weak macroeconomic environment will deter foreign investments, reverse capital flows and discourage financial innovation. On the contrary, financial instability may also increase if banks find it more profitable to diversify during periods of economic growth (Nilsen and Rovelli, 2011). *GDP growth* is measured as the annual rate of growth in GDP and *Inflation* is the annual growth rate of the Consumer Price Index (CPI). ***Property right*** measures the degree of legal protection on private property and the judicial efficiency in enforcing laws. It uses an Index from the Heritage Foundation (2014) and scaled from 0 to 100 with high levels indicating certainty of legal protection and expropriation risk. ***Banking freedom*** provides for the overall influence of banking sector openness and the extent to which banks are free to operate their business. It also measures whether a bank's activities have a restricted effect on its performance and stability using the Heritage Foundation Index (2014). ***Capital stringency*** measures the influence of regulatory capital stringency on bank stability and performance. Higher values indicate more capital stringency and there is an expectation that this will reduce bank risk and increase performance.

Data Sources

The paper employs financial information from the unconsolidated financial statements of banks in the most recent Bank scope database. The sample data includes development banks, saving banks, commercial banks, mortgage banks and co-operative banks for which data are available for 2002-2013.

Macro-economic data are obtained from World Bank: World Development Indicators database (2014). Regulatory and supervisory variables are obtained from Barth *et al*. (2014) and banking freedom and property rights index from Heritage Foundation (2014).

Estimation Strategy: The dynamic panel model approach

Concerning the cross-country determinants of funding mix of banks, Equation (3) is estimated using random effect model depending on the Hausman test proposed by Hausman (1978).

$$\begin{aligned} Funds_{it} &= \alpha_0 + \alpha_1 CBB_{it} + \alpha_2 Efficiency_{it} + \alpha_3 Equity_{it} + \alpha_4 Size_{it} + \alpha_5 Bankingfreedom_{it} \\ &+ \alpha_6 propertyright_{it} + \alpha_7 Capitalstringent_{it} + \alpha_8 GDPgrowth_{it} + \alpha_9 Inflation_{it} + \varepsilon_{it} \end{aligned} \tag{3}$$

The Equation (4) and (5) follows the argument put forward by Carbo Valverde and Rodriguez Fernandez (2007) that banks maximise wealth by considering both initial and end- of –period information and that previous values of bank performance may affect current performance values. This is because banks need to match the random deposit supply function and the random demand of lending activities and non-traditional activities across the period. Therefore, the dynamic model technique is employed to estimate the implication of funding strategies and cross border banking on risk and return. However, the estimation strategy is conducted following Roodman (2009).

$$Risk_{it} / return_{it} = a_1 risk_{it-1} / return_{it-1} + a_2 CBB_{it} + a_3 Efficiency_{it} + a_4 Equity_{it} + a_5 Size_{it} + a_6 GDPgrowth_{it} + a_7 Inflation_{it} + \varepsilon_{it} \quad (4)$$

$$Risk_{it} / return_{it} = b_1 risk_{it-1} / return_{it-1} + b_2 CBB_{it} + b_3 Funds_{it} + b_4 Efficiency_{it} + b_5 Equity_{it} + b_6 Size_{it} + b_7 GDPgrowth_{it} + b_8 Inflation_{it} + \varepsilon'_{it}$$

$$\varepsilon_{it} = \mu_i + v_{it}$$
$$E(\mu_i) = E(v_{it}) = E(\mu_i v_{it}) = 0 \quad (5)$$

Where $risk_{it} / return_{it}$ is the insolvency risk or return of bank i at period t , $risk_{it-1} / return_{it-1}$ is the observation on the same bank in the previous year. $Funds_{it}$ is the funding strategy of bank i at a period t, CBB_{it} is a cross border banking dummy variable; it is set at 1 when the shareholding proportion of the local banks by foreign banks is above 50%, otherwise it is set as 0 , $Efficiency_{it}$ is cost efficiency of a bank i at time t, $Equity_{it}$ is equity of bank i at time t, $Size_{it}$ is bank size of bank i at time t , $Bankingfreedom_{it}$ is banking freedom of bank i at time t, $propertyright_{it}$ is property right of bank i at time t, $Capitalstrigency_{it}$ is capital stringency of bank i at time t, $GDPgrowth_{it}$ is the annual rate of growth in GDP of bank i at time t , $Inflation_{it}$ is annual growth rate of consumer price inflation of bank i at time t, $\alpha's$ are the parameter vectors and ε_{it} are the unobserved disturbances.

The paper employs the System GMM as previous studies identify the need to control for endogeneity of funding decisions and cross border banking as banks may choose to take funding and ownership structure decisions mainly as a reaction to the available business opportunities (Baele *et al.*, 2007). The problem with applying OLS in estimating Equations (4) and (5) are that $risk_{it}$ and $return_{it}$ which are the dependent variables cause a correlation between the previous observations $risk_{it-1} / return_{it-1}$ the error term, which gives rise to a dynamic panel bias. There is also evidence to support that OLS produces bias when attempts are made to control for heterogeneity. In addition, if significant events such as mergers and acquisition are not explicitly modelled, they will remain embedded in the error term and continue to influence subsequent contemporaneous observations. This autocorrelation is a violation of an assumption necessary for the consistency of OLS. Therefore, as proposed by Arellano and Bond (1991) and Arellano and Bover (1995) as an alternative estimator, System GMM addresses the persistence of endogeneity bias. System GMM is more robust to missing data since lagged observations enter the equation as instrument instead of as regressors. System GMM also creates a possible instance to include time- invariant regressors for instance specific regulators which would have otherwise disappeared in the first-difference GMM. Furthermore, it uses a Windmeijer correction to the standard errors which improves robustness to heteroscedasticity.

EMPIRICAL RESULTS

Descriptive Statistics

Table 1 presents summary statistics for key variables used in the study. All bank specific variables are averaged by bank over the period, 2002-2013. Bank level variables are grouped into cross border and non-cross border bank samples. Macro level variables are grouped into zones. The zones are North, Central and South. We begin by discussing the bank level variables. On the average, cross border banks tend to mobilise more deposits, non-deposit funds and internally generated funds than their non-cross border counterparts. They deploy their 'global' experience and knowledge to develop and implement strategies that bring more revenue. Deposit funding however remains the dominant source of funding for all banks, averaging 67% of assets. The 15.8% equity ratio aggregate means that less than a sixth of the assets of selected banks are financed by equity capital. Non cross border banks use more equity in their financing (17.1%) than cross border banks (14.7%). The risk adjusted return on equity is the same for cross border and non-cross border banks, averaging 5.5%. Non-cross border banks however have a slightly higher risk adjusted return on assets (6.2%) than cross border banks (5.6%), suggesting that domestic banks are more profitable. In terms of insolvency risk, non-cross border banks in African are more stable (44.3) than their cross border counterparts (35.2). The measure of bank efficiency shows that cross border banks are more efficient than non-cross border banks. This implies that cross border banks spend comparatively less in the course of their income generating activities. In terms of bank size, interestingly, non-cross border banks are larger on the average than cross border banks in the sample.

From Panel B of Table 1, there is not enough variation on real per capita GDP growth across the regions, with growth averaging 3% per annum. Prices are lowest in the North of Africa and highest in the South. The respect for property rights is highest in the South and lowest in the Central part of Africa. Again, in terms of banking freedom and capital stringency, the South performs better on the average than the other zones while the North lags behind. The low banking freedom in the North is understandable because, the Northern part of African is populated by Islamic states enforce stringent banking procedures entailed in Islamic banking

TABLE 1
DESCRIPTIVE STATISTICS

Table 1 presents summary statistics of selected banks funding strategy, risk, return, bank-specific variables and macro level variables. ***Deposit*** and ***non-deposit funding*** is the share of deposit and non-deposit funding to total assets respectively. The ***internal funding*** is the sum of net profit before extraordinary items and loan loss provisions relative bank loans at the end the period. ***Z-score*** is used as a measure of bank insolvency risk while risk adjusted return on asset ***(RAROA)*** and risk adjusted return on equity ***(RAROE)*** measure banks' profitability. ***Cross-border banking*** is measured as a dummy variable taking the value of 1 where the shareholding proportion of the local banks by foreign banks is 50% or more and 0 otherwise. Cost to gross income ratio is used as a proxy for ***efficiency.*** A ratio of banks ***equity*** capital to total asset is used as a proxy to measure the level of capitalization. The ***bank size*** is proxied by the natural logarithm of banks' total assets valued in US dollars. The higher value of ***banking freedom*** signifies the higher freedom from government controls. Higher scores of ***property right*** indicate certainty of legal protection of property right and limited expropriation risk. ***Capital stringent*** is the regulatory capital requirement. ***GDP growth*** accounts for the difference in economic development across countries. ***Inflation*** is the rate of inflation based on CPI.

Panel A		Mean	Median	Max	Min.	Std. Dev.	Obs.
Funding strategy							
Deposit funding	Aggregate	0.672991	0.723005	0.989188	0.005074	0.189144	2005
	Non-Cross border	0.641979	0.696240	0.989188	0.005517	0.203875	932
	Cross border	0.699928	0.746330	0.961877	0.005074	0.170933	1073
Non deposit funding	Aggregate	0.139543	0.065325	0.920630	2.56E-05	0.193415	1764
	Non-Cross border	0.127859	0.063170	0.909674	5.17E-05	0.172969	770
	Cross border	0.148594	0.067199	0.920630	2.56E-05	0.207510	994
Internal funding	Aggregate	0.086982	0.061143	0.936663	-0.019590	0.092486	1944
	Non-Cross border	0.083934	0.056604	0.900156	-0.019590	0.095047	913
	Cross border	0.089682	0.065934	0.936663	0.000454	0.090116	1031
Risk and return							
Risk adjusted return on equity	Aggregate	5.590775	3.484930	111.6000	-5.303300	8.317541	2853
	Non-Cross border	5.596964	3.312020	60.81120	-3.465260	7.914524	1315
	Cross border	5.585484	3.615040	111.6000	-5.303300	8.649804	1538
Risk adjusted return on assets	Aggregate	5.895120	3.556900	160.8490	-5.327560	10.14364	2874
	Non-Cross border	6.208911	3.521815	160.8490	-5.327560	11.63899	1324
	Cross border	5.627082	3.573060	150.9120	-3.998590	8.659301	1550

	Aggregate	39.34138	23.88790	474.8100	-21.06450	47.92119	2916
Insolvency risk	Non-Cross border	44.27508	27.37990	474.8100	-3.214970	54.13196	1337
	Cross border	35.16383	20.90090	340.3680	-21.06450	41.51124	1579
Bank specific variables							
Equity ratio	Aggregate	0.158055	0.113012	0.997868	-0.454444	0.163428	3081
	Non-Cross border	0.171151	0.122135	0.997868	-0.454444	0.169712	1422
	Cross border	0.146831	0.107869	0.996797	-0.142857	0.157027	1659
Efficiency	Aggregate	0.403624	0.387610	0.999102	0.014440	0.166195	2956
	Non-Cross border	0.378536	0.362416	0.982759	0.018371	0.162583	1349
	Cross border	0.424683	0.405970	0.999102	0.014440	0.166320	1607
Bank size	Aggregate	2081.481	346.9000	123214.0	0.200000	7297.298	2117
	Non-Cross border	2988.680	370.8000	123214.0	0.200000	9099.257	989
	Cross border	1286.073	332.5000	99644.70	3.700000	5102.989	1128

Panel B		Mean	Median	Max	Min.	Std. Dev.	Obs.
Macroeconomic variables							
GDP growth	Aggregate	0.031141	0.031814	0.217566	-0.175037	0.035886	2560
	North	0.033785	0.035871	0.085850	-0.005294	0.019415	648
	Central	0.027432	0.028114	0.217566	-0.081355	0.033451	1128
	South	0.034290	0.037924	0.190943	-0.175037	0.047448	784
Inflation	Aggregate	0.086807	0.076445	0.982237	-0.030998	0.086109	2473
	North	0.058803	0.045078	0.183168	0.009826	0.042618	648
	Central	0.093223	0.092341	0.443913	-0.030998	0.069887	1098
	South	0.102079	0.079522	0.982237	0.013854	0.123500	727
Property rights	Aggregate	39.07422	30.00000	75.00000	5.000000	13.01224	3732
	North	41.21528	40.00000	70.00000	30.00000	9.638540	864
	Central	35.99882	30.00000	50.00000	10.00000	9.748827	1692
	South	41.92602	40.00000	75.00000	5.000000	17.53568	1176
Banking freedom	Aggregate	46.74973	50.00000	90.00000	10.00000	14.13146	3732
	North	39.35185	30.00000	90.00000	20.00000	13.79527	864
	Central	46.64303	50.00000	70.00000	20.00000	11.75676	1692
	South	52.33844	50.00000	70.00000	10.00000	14.96291	1176

Capital stringency	Aggregate	3.551953	4.000000	6.000000	0.000000	1.586810	3763
	North	3.066872	3.000000	5.000000	1.000000	1.563175	972
	Central	3.977146	4.000000	5.000000	0.000000	1.382871	1619
	South	3.366894	3.000000	6.000000	1.000000	1.715015	1172

The pair wise correlations in table 2 show very low co-linearity among the explanatory variables.
The implication is that we can proceed to estimate our models without fear of multicolinearity and its associated consequences.

TABLE 2
CORRELATION MATRIX

The pair wise correlation coefficient between selected variables. The data set comprises of 320 banks in 29 countries during the period 2002-2013. * implies significant at 5% or more. ***Deposit*** and ***non-deposit funding*** is the share of deposit and non-deposit funding to total assets respectively. The ***internal funding*** is the sum of net profit before extraordinary items and loan loss provisions relative bank loans at the end the period. **Z-score** is a measure of insolvency risk and it is defined as the number of standard deviations that a bank rate of return has to fall for the bank to become insolvent. ***Equity ratio*** is used as a proxy to measure the degree of capitalization, ***Bank size*** is the natural logarithm of the total assets, ***RAROA,*** risk adjusted return on asset, ***RAROE,*** risk adjusted return on equity. **Cross-border banking** is measured as a dummy variable taking the value of 1 where the shareholding proportion of the local banks by foreign banks is 50% or more and 0 otherwise. Cost to gross income ratio is used as a proxy for **efficiency**. Higher value of ***banking freedom*** signifies the higher freedom from government controls. Higher scores of ***property right*** indicate certainty of legal protection of property right and limited expropriation risk. ***Capital stringent*** is the regulatory capital requirement.

	Deposit funding	Non deposit funding	RAROA	RAROE	Z-score	Internal funding	Cross border banking	Efficiency	Equity ratio	Bank size	GDP growth	Inflation	Bank freedom	Property rights	Capital stringency
Deposit funding	1.000														
Non deposit funding	-0.689*	1.000													
RAROA	0.043	-0.061	1.000												
RAROE	0.038	0.006	0.424*	1.000											
Z-score	-0.012	-0.043	0.710*	0.357*	1.000										
Internal funding	-0.133*	0.143*	0.010	0.029	-0.056	1.000									
Cross border banking	0.153*	0.053	-0.029	-0.001	-0.095*	0.031	1.000								

	Deposit funding	Non deposit funding	RAROA	RAROE	Z-score	Internal funding	Cross border banking	Efficiency	Equity ratio	Bank size	GDP growth	Inflation	Bank freedom	Property rights	Capital stringency
Efficiency	0.071	-0.059	-0.156*	-0.156*	-0.155*	-0.068	0.138*	1.000							
Equity ratio	-0.312*	0.068	-0.067*	-0.079*	0.2248*	0.258*	-0.074*	0.028	1.000						
Size	0.080*	-0.094*	0.123*	0.083*	0.164*	-0.145*	-0.102*	-0.380*	-0.126*	1.000					
GDP growth	0.028	-0.012	0.025	0.002	0.120*	-0.026	-0.023	-0.001	0.285*	0.029	1.000				
Inflation	-0.119*	0.109*	-0.014	-0.023	-0.023	0.424*	0.005	-0.031	0.027	0.059	-0.044	1.000			
Bank freedom	0.087*	-0.012	0.044	0.036	-0.004	-0.127*	0.111*	0.056	-0.044	-0.166*	-0.026	-0.086*	1.000		
Property rights	0.042	-0.093*	0.021	0.012	0.019	-0.187*	-0.021	-0.198*	-0.087*	-0.063	-0.018	-0.099*	0.446*	1.000	
Capital stringency	-0.070	0.041	0.024	-0.007	-0.042	-0.022	0.007	0.158*	-0.038	-0.031	-0.244*	0.037	0.137*	0.199*	1.000

What Influences Bank Funding Strategies in a Cross Border Banking Context?

Table 3 shows the factors that influence the funding sources employed by banks in acquiring assets in a cross border banking environment. Columns 1-3 show results for deposit funding, columns 4-6 for non-deposit funding while column 7-9 displays results for internally generated funds. Cross border banking estimates are all positive and significant with respect to deposit funding. This means that cross border banks employ more deposits in financing their assets compared to non-cross border banks. Given that deposit funds are relatively cheaper, it means that cross border banks are in a position to be more efficient than local banks as confirmed under the descriptive statistics part in section 4.1. Cross border banks have a significant impact on internally generated funds only when we control for banking freedom, but not capital stringency and property rights.

Bank efficiency is significant across all nine models with varying signs of coefficients. The coefficients are positive for deposit funding but negative for both non deposit and internal funding. This means that efficient banks employ more deposit funding than inefficient ones even in the presence of banking freedom, protection of property rights and capital stringency. In line with expectation, equity ratio has a negative and statistically significant relationship with deposit funding and positive coefficient on internal funding. This implies that banks that are well capitalised finance their investment using internal funds, thus decreasing their leverage position. This result is consistent with Amidu (2013) that banks in developing countries finance their growth with internally generated funds. Bank size has a positive and significant relationship with deposit funding, but a negative and significant relationship with non-deposit and internal funding. This means that large African banks depend more on deposit funding to finance the acquisition of assets.

Analysis of the macro variables reveal that country level variables are important in shaping the funding strategies employed by banks in Africa. Economic growth is positively and significantly associated with deposit funding but negatively related to internal funding; implying that in economies where economic activities are booming, citizens channel more of their increased incomes into the banking sector by way of deposits. This causes banks in such economies to rely more on deposits than internal funds in financing their assets. However, an unstable and inflationary macroeconomic environment reduces the supply of deposits, forcing banks to rely on wholesale funds and internally generated funds to acquire their assets. This is seen in the negative and significant coefficient of inflation on deposit funding and positive coefficient of inflation on wholesale and internal funds. The results further show that banks shy away from internal funds in economies where banking freedom prevails and when protection of property rights is high. Again, deposit funding reduces when property rights are well enforced. It is however shown that, capital stringency does not affect the funding mix of banks in Africa.

Effect of Cross Border Banking on Risk and Return

The aim here is to examine the effect (if any) of cross border banking on risk and return of banks in Africa. The results are reported in Table 4 with insolvency risk (Z-score), risk adjusted return on equity (RAROE) and RAROA as dependent variables in the respective columns. Cross border banking is negative and insignificant relative to both stability and performance measures. This means that cross border banks are not any more profitable and stable than other banks. Surprisingly, efficient banks have a lower RAROE. The lag terms are all positive and significant signalling the persistent nature of bank stability and profitability. Bank efficiency does not however significantly affect stability and RAROA. Based on the RAROE, large banks are less profitable. As expected, inflation reduces both bank stability and performance as seen in the positive and significant coefficient for inflation.

TABLE 3
DETERMINANTS OF BANK FUNDING STRATEGIES

The dependent variable in columns 1, 2 and 3 is ***deposit funding***; ***non-deposit funding*** is dependent variable for columns 4, 5 and 6; and the dependent variable in column 7, 8 and 9 is ***internal funding***. **Z-score** is a measure of insolvency risk. ***Equity ratio*** is used as a proxy to measure the degree of capitalization, ***Bank size*** is the natural logarithm of the total assets, ***RAROA,*** risk adjusted return on asset, ***RAROE,*** risk adjusted return on equity. **Cross-border banking** is measured as a dummy variable taking the value of 1 where the shareholding proportion of the local banks by foreign banks is 50% or more and 0 otherwise. Cost to gross income ratio is used as a proxy for **efficiency**. Higher value of ***banking freedom*** signifies the higher freedom from government controls. Higher scores of ***property right*** indicate certainty of legal protection of property right and limited expropriation risk. ***Capital stringent*** is the regulatory capital requirement. The diagnostic test: the R^2 measures the goodness of fit, the Hausman test tests the null hypothesis of absence of correlation between individual effects and the explanatory variable to be rejected in all cases, thus the fixed effect model being inconsistent. ***, ** and * indicates the statistical significance at 1%, 5% and 10% respectively.

	Deposit funding			Non deposit funding			Internal funding		
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Cross border banking	0.0366**	0.0343**	0.0322*	0.0176	0.0187	0.0170	0.0132*	0.0122	0.0119
	(0.0174)	(0.0174)	(0.0177)	(0.0197)	(0.0197)	(0.0200)	(0.00803)	(0.00800)	(0.00816)
Efficiency	0.158***	0.152***	0.160***	-0.145***	-0.142***	-0.146***	-0.208***	-0.211***	-0.208***
	(0.0234)	(0.0235)	(0.0240)	(0.0273)	(0.0274)	(0.0281)	(0.0136)	(0.0137)	(0.0141)
Equity ratio	-0.438***	-0.449***	-0.455***	-0.0661	-0.0586	-0.0522	0.122***	0.117***	0.123***
	(0.0398)	(0.0401)	(0.0412)	(0.0466)	(0.0469)	(0.0482)	(0.0191)	(0.0192)	(0.0196)
Bank size	0.0134***	0.0114***	0.0111***	-0.0176***	-0.0162***	-0.0168***	-0.0157***	-0.0166***	-0.0165***
	(0.00310)	(0.00322)	(0.00326)	(0.00371)	(0.00386)	(0.00393)	(0.00161)	(0.00166)	(0.00168)
GDP growth	0.133*	0.127*	0.158*	0.127	0.131	0.151	-0.101**	-0.104**	-0.116***
	(0.0767)	(0.0766)	(0.0818)	(0.0905)	(0.0906)	(0.0973)	(0.0406)	(0.0406)	(0.0432)
Inflation	-4.40e-06*	-4.38e-06*	-4.43e-06*	7.98e-06***	8.01e-06***	7.97e-06***	0.000399***	0.000396***	0.000392***
	(2.30e-06)	(2.30e-06)	(2.31e-06)	(2.99e-06)	(2.99e-06)	(3.02e-06)	(3.35e-05)	(3.35e-05)	(3.37e-05)
Banking freedom	-0.000148	5.81e-06	7.33e-05	4.01e-05	-4.44e-05	-7.10e-05	-0.000321***	-0.000257**	-0.000263**
	(0.000197)	(0.000208)	(0.000213)	(0.000218)	(0.000228)	(0.000234)	(0.000104)	(0.000108)	(0.000110)
Property rights		-0.000868**	-0.000868**		0.000536	0.000527		-0.000409**	-0.000423**
		(0.000392)	(0.000403)		(0.000422)	(0.000434)		(0.000192)	(0.000197)
Capital stringency			-0.00345			-0.00129			0.000946
			(0.00396)			(0.00482)			(0.00199)
Constant	0.580***	0.624***	0.635***	0.297***	0.268***	0.280***	0.250***	0.271***	0.267***
	(0.0288)	(0.0352)	(0.0378)	(0.0342)	(0.0412)	(0.0451)	(0.0150)	(0.0181)	(0.0192)

	Deposit funding			Non deposit funding			Internal funding		
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Diagnostics									
Observations	1,855	1,855	1,819	1,658	1,658	1,627	1,848	1,848	1,812
Number of bank	303	303	297	286	286	280	306	306	300
R^2	0.1478	0.1451	0.1459	0.0162	0.0111	0.0111	0.2110	0.2248	0.2268
Random effect	Y	Y	Y	Y	Y	Y	Y	Y	Y
Hausman	38.81***	43.00***	41.83***	19.66**	28.65***	36.03***	107.63***	108.86***	109.09***
Wald	190.71***	195.70***	194.37***	52.60***	54.23***	54.36***	494.96***	500.98***	483.57***

TABLE 4
EFFECTS OF CROSS BORDER BANKING ON RISK AND RETURN

Table 4 reports the two stage System GMM regression result, Windmeijer- correct standard error, small sample adjustment and orthogonal deviation. All regressions are conducted using dynamic panel data estimation. The dependent variables are the measures of bank risk ***(Z-score),*** risk adjusted return on asset ***(RAROA)*** and risk adjusted return on equity ***(RAROE). Cross border banking*** measured as a dummy taking the value of 1 where shareholding proportion of the local banks by foreign banks is 50% or more and 0 otherwise. The bank specific controls included in the regression are; ***lag Z-score, lag RAROA*** and **lag *RAROE*** are the first lags of the dependent variables included as regressors. ***Bank size*** is the natural logarithm of total Asset in millions of US$, ***Efficiency*** is a proxy to cost to gross income ratio; ***Equity ratio*** is the ratio of equity to total Asset used as a proxy for capitalization. Two macroeconomic controls included are ***GDP growth*** is the annual growth rate of Gross Domestic Product and ***Inflation*** is the annual consumer price inflation. Standard errors are reported in parenthesis; ***,** and *indicates statistical significance at 1%, 5% and 10% respectively. The following diagnostic tests are reported. (1) The instrument count, (2) number of banks used in the sample (3) the F-test for joint significance of instruments, (4) the Hansen test of over identifying restrictions which the null hypothesis is that instruments are exogenous, (5) the Arellano-Bond test for second order serial correlation in the residuals which the null hypothesis is there is no second order serial correlation..

	(1) Z-score (1)	(2) Risk-adjusted ROE (2)	(3) Risk adjusted ROA (3)
Lag Z-score	0.520***		
	(0.0902)		
Lag RAROE		0.577***	
		(0.139)	
Lag ROROA			0.597***
			(0.224)
Cross border banking	-0.718	-1.800	-1.474
	(0.494)	(1.879)	(1.592)
Efficiency	-0.601	-5.160***	-3.363
	(0.556)	(1.746)	(2.545)
Equity ratio	0.853*	0.188	0.692
	(0.443)	(1.908)	(1.639)
Bank size	0.0534	-0.579*	-0.00135
	(0.0400)	(0.315)	(0.280)
GDP growth	0.473	3.855	2.347
	(0.555)	(3.503)	(3.770)
Inflation	-1.98e-05**	-0.000495***	-0.000899*
	(8.84e-06)	(0.000167)	(0.000540)
Constant	1.648**	8.524***	4.430
	(0.650)	(3.138)	(4.481)
Diagnostics			
Observations	1,626	1,604	1,633
Number of banks	316	316	317
Instrument count	57	29	29
F-statistic	14.09***	12.87***	23.07***
AR(2)	1.21	0.97	-1.04
P value	0.226	0.333	0.299
Hansen	61.28	22.28	28.60
P value	0.112	0.383	0.124

Table 5 shows the effect of cross border banking on risk and return after factoring in role of baking freedom, property rights and capital stringency. Cross border banking reduces bank stability in Africa only when capital stringency is introduced into the equation. Other than that cross border banking has no significant effect on bank risk and return after controlling for banking freedom, and expropriation risk. All lag values are significant once again, confirming the earlier finding that bank performance and stability in Africa have persistent effects. While bank efficiency has no impact on stability, the effect on performance is negative and significant after controlling for banking freedom, capital stringency and property rights. A new insight is, well capitalised banks are more stable but not more profitable. This is seen in the positive sign and significance of the equity ratio on the insolvency risk measure. The negative effect of price fluctuations on profitability and stability is confirmed by the negative and significant coefficient of inflation on bank Z-score and RAROA.

Risk and Return: The roles of Cross Border Banking and Funding Modes

The aim here is to investigate simultaneously, the implications of cross border banking and funding mix for risk and return of banks in Africa. The results are shown in Table 6 where columns 1-3 depict the effect of cross border banking on risk and return when banks rely on deposit funding; columns 4-6 show the effects when banks use non deposit funding while column 7-9 show the effects when banks rely on internal funding. From column 1, cross border banking reduces bank stability while deposit funding increases it. The implication is that when cross border banks are encumbered by instability, they mobilise less risky deposits to restore stability. Thus, cross border banks address the inherent instability in their operations by employing less of more risky wholesale funds in favour of its less risky deposit counterpart. Deposit funding is also positively and significantly related to RAROA implying that banks that employ more deposits are more profitable than those that employ wholesale and internal funds. This is because the cost of mobilising deposits is less than the cost involved in obtaining wholesale funds. This is buttressed by the fact that non deposit funding is negatively and significantly related to z-score in column 4. The coefficient of internal funding is not significant in all the models implying that internal funds do not play much role in stability and performance of banks.

With the introduction of funding modes, we now see that efficient banks are both less stable and less profitable when deposit funds are employed in a cross border banking environment. Here, while well capitalised banks are more stable when deposit and internal funds are used to finance assets, they are less profitable when internal and non-deposit funds are employed. There is some evidence that economic growth improves bank profitability when non deposit and internal funds are used by banks to acquire assets. This implies that a good macroeconomic environment makes banks employ internal and non-deposit funds to good effect. Economic growth promotes bank stability when internally generated funds are used. We still find evidence of inflation reducing profitability.

TABLE 5
EFFECTS OF CROSS BORDER BANKING ON RISK AND RETURN: SUPERVISORY AND REGULATORY ENVIRONMENTS

Table 5 reports the two stage System GMM regression result, Windmeijer- correct standard error, small sample adjustment and orthogonal deviation. All regressions are conducted using dynamic panel data estimation. The dependent variables are the measures of bank risk ***(Z-score),*** risk adjusted return on asset ***(RAROA)*** and risk adjusted return on equity ***(RAROE).*** We show results showing controlling for regulatory and supervisory conditions such as ***banking freedom, exploration risk*** and ***capital stringency*** for each dependent variable. ***Bank size*** is the natural logarithm of total Asset in millions of US$, ***Efficiency*** is a proxy to cost to gross income ratio; ***Equity ratio*** is the ratio of equity to total Asset used as a proxy for capitalization. Two macroeconomic controls included are ***GDP growth*** is the annual growth rate of Gross Domestic Product and ***Inflation*** is the annual consumer price inflation. Standard errors are reported in parenthesis; ***,** and *indicates statistical significance at 1%, 5% and 10% respectively. The following diagnostic tests are reported. (1)The instrument count,(2) number of banks used in the sample (3) the F-test for joint significance of instruments, (4)the Hansen test of over identifying restrictions which the null hypothesis is that instruments are exogenous, (5) the Arellano-Bond test for second order serial correlation in the residuals which the null hypothesis is there is no serial correlation..

	Z-score			RAROE			RAROA		
VARIABLES	Banking freedom	Expropriation risk	Capital stringency	Banking freedom	Expropriation risk	Capital stringency	Banking freedom	Expropriation risk	Capital stringency
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Lag Z-score	0.508***	0.499***	0.518***						
	(0.0912)	(0.0920)	(0.0914)						
Lag RAROE				0.588***	0.313	0.766***			
				(0.140)	(0.552)	(0.0879)			
Lag RAROA							0.479***	0.502***	0.757***
							(0.131)	(0.140)	(0.125)
Cross border banking	-0.736	-0.651	-0.874*	-2.150	-2.709	-0.227	-0.740	-0.484	0.251
	(0.491)	(0.556)	(0.519)	(1.675)	(2.701)	(1.496)	(1.261)	(1.208)	(0.746)
Efficiency	-0.522	-0.547	-0.511	-5.202***	-7.191***	-3.010**	-3.289***	-3.192***	-0.424
	(0.577)	(0.599)	(0.564)	(1.611)	(2.731)	(1.416)	(1.072)	(1.195)	(2.239)
Equity ratio	1.003**	1.016**	0.990**	0.356	-0.829	0.00595	0.339	1.003	-0.631
	(0.454)	(0.491)	(0.458)	(1.889)	(3.178)	(0.986)	(1.916)	(1.801)	(1.532)
Bank size	0.0535	0.0834	0.0661	-0.561*	-0.698	-0.227	0.223	0.227	0.0146
	(0.0415)	(0.0690)	(0.0444)	(0.292)	(0.520)	(0.309)	(0.195)	(0.191)	(0.154)
GDP growth	0.512	0.559	0.525	4.368	3.923	4.698	5.222	4.596	2.307
	(0.577)	(0.597)	(0.594)	(4.004)	(5.781)	(3.453)	(3.489)	(3.356)	(4.535)
Inflation	-2.07e-05**	-2.11e-05**	-2.22e-05**	-0.00044***	-0.000264	-0.000354	-0.000121*	-0.000120*	-3.94e-05
	(9.05e-06)	(9.48e-06)	(1.05e-05)	(0.000163)	(0.000392)	(0.000241)	(6.87e-05)	(7.02e-05)	(6.73e-05)
Banking freedom	0.00289			0.0110			0.00962		
	(0.00292)			(0.0192)			(0.0116)		
Property rights		0.00554			-0.0179			0.0110	
		(0.00870)			(0.0349)			(0.0245)	

VARIABLES	Z-score			RAROE			RAROA		
	Banking freedom	Expropriation risk	Capital stringency	Banking freedom	Expropriation risk	Capital stringency	Banking freedom	Expropriation risk	Capital stringency
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Capital stringency			0.0392			0.297			0.0908
			(0.0594)			(0.342)			(0.196)
Constant	1.506**	1.219	1.460**	8.034***	12.79***	2.765	2.596*	2.211	1.039
	(0.727)	(1.114)	(0.697)	(2.893)	(3.714)	(3.454)	(1.520)	(2.170)	(2.386)
Model Diagnostics									
Observations	1,597	1,597	1,598	1,575	1,575	1,578	1,603	1,603	1,606
Number of banks	307	307	310	307	307	310	308	308	311
Instrument count	57	57	57	29	29	29	57	57	56
F-statistic	12.02***	11.69***	15.76***	13.28***	3.47**	34.12***	12.95***	13.45***	10.09***
AR(2)	1.25	1.22	1.21	0.95	0.81	1.03	-0.93	-0.94	-0.61
P value	0.211	0.224	0.224	0.340	0.415	0.305	0.350	0.347	0.544
Hansen tests	60.08	60.92	60.04	21.13	19.30	26.08	56.31	53.49	51.92
P value	0.113	0.100	0.114	0.389	0.502	0.163	0.192	0.272	0.288

TABLE 6
EFFECTS OF CROSS BORDER BANKING AND FUNDING STRATEGY ON RISK AND RETURN

Table 6 reports the two stage System GMM regression result, Windmeijer- correct standard error, small sample adjustment and orthogonal deviation. All regressions are conducted using dynamic panel data estimation. The dependent variables are the measures of bank risk ***(Z-score),*** risk adjusted return on asset ***(RAROA)*** and risk adjusted return on equity ***(RAROE).Cross border banking*** measured as a dummy taking the value of 1 where shareholding proportion of the local banks by foreign banks is 50% or more and 0 otherwise. ***Bank size*** is the natural logarithm of total Asset in millions of US$, ***Efficiency*** is a proxy to cost to gross income ratio; ***Equity ratio*** is the ratio of equity to total Asset used as a proxy for capitalization. Two macroeconomic controls included are ***GDP growth*** is the annual growth rate of Gross Domestic Product and ***Inflation*** is the annual consumer price inflation. Standard errors are reported in parenthesis; ***,** and *indicates statistical significance at 1%, 5% and 10% respectively. The following diagnostic tests are reported. (1)The instrument count,(2) number of banks used in the sample (3) the F-test for joint significance of instruments, (4)the Hansen test of over identifying restrictions which the null hypothesis is that instruments are exogenous, (5)the Arellano-Bond test for second order serial correlation in the residuals which the null hypothesis is there is no second order serial correlation..

	Deposit funding			Non deposit funding			Internal funding		
	Z-score	RAROE	RAROA	Z-score	RAROE	RAROA	Z-score	RAROE	RAROA
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Lag Z-score	0.494***			0.583***			0.565***		
	(0.114)			(0.104)			(0.103)		
Lag RAROE		0.771***			0.866***			0.791***	
		(0.186)			(0.150)			(0.191)	
Lag RAROA			0.410**			0.540***			0.468**
			(0.199)			(0.173)			(0.182)
Cross border banking	-0.748*	-1.563	-1.194	-0.554	0.623	-1.791	-0.195	-0.472	-3.521
	(0.393)	(1.381)	(2.080)	(0.350)	(2.243)	(2.665)	(0.235)	(1.464)	(2.453)
Deposit funding	0.711**	0.957	3.538*						
	(0.359)	(1.391)	(2.076)						
Non deposit funding				-0.911**	-0.362	-1.434			
				(0.447)	(0.995)	(1.876)			
Internal funding							0.388	3.034	1.885
							(0.833)	(2.344)	(2.659)
Efficiency	-1.064*	-2.113	-6.659***	-0.685	0.814	-2.789	0.0413	1.362	-4.170
	(0.644)	(2.712)	(2.422)	(0.592)	(2.734)	(2.524)	(0.500)	(2.662)	(3.360)
Equity ratio	0.359**	-0.559	0.304	0.274**	-1.411**	0.0487	0.121	-1.157*	0.154
	(0.175)	(0.637)	(0.827)	(0.126)	(0.664)	(0.860)	(0.0867)	(0.614)	(0.934)
Bank size	0.000865	-0.254*	0.0567	0.0314	-0.145	0.0865	0.0598	-0.143	0.0535
	(0.0487)	(0.150)	(0.292)	(0.0425)	(0.186)	(0.221)	(0.0383)	(0.206)	(0.226)
GDP growth	0.353	4.019	1.884	0.899	8.547***	3.016	0.743*	7.779***	2.477
	(0.563)	(2.719)	(4.811)	(0.687)	(3.057)	(3.668)	(0.433)	(2.689)	(3.492)
Inflation	-1.55e-05	-2.09e-05	-2.92e-05	-9.35e-06	-5.86e-05*	-5.22e-05	-0.000977	-0.00596	-0.00502*
	(1.05e-05)	(2.40e-05)	(6.12e-05)	(1.51e-05)	(3.34e-05)	(3.58e-05)	(0.000624)	(0.00404)	(0.00295)

	Deposit funding			Non deposit funding			Internal funding		
	Z-score	RAROE	RAROA	Z-score	RAROE	RAROA	Z-score	RAROE	RAROA
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Constant	2.679***	2.626	4.590	2.347**	-2.159	4.287	1.328**	-0.988	6.629
	(0.984)	(2.472)	(2.840)	(0.926)	(2.832)	(3.614)	(0.517)	(2.875)	(4.671)
Diagnostics									
Observations	1,548	1,529	1,557	1,338	1,369	1,394	1,481	1,531	1,555
Number of banks	310	310	311	285	292	293	308	315	315
Instrument count	51	51	51	51	51	51	51	51	51
F-statistic	13.78***	28.54***	4.30***	13.06***	44.38***	5.86***	23.43***	6.25***	3.10**
AR(2)	1.25	1.04	-0.74	1.41	1.08	-0.74	0.81	1.09	-0.82
P value	0.213	0.300	0.462	0.159	0.281	0.460	0.420	0.277	0.415
Hansen tests	49.33	47.55	34.57	48.72	29.53	42.52	48.17	37.00	17.20
P value	0.204	0.257	0.785	0.221	0.926	0.449	0.237	0.690	0.840

Determinants of Risk and Return: Regulatory and Supervisory Environments

The aim of this section is to analyse the effects of cross border banking and funding strategies on risk and return after controlling for bank regulation and supervision. This consideration is important because the various countries in Africa have different legal regimes governing the operations of banks. Countries also differ in supervisory tightness. These have implications on the extent of cross border banking, the adoption of funding mix and the risk and performance of banks. The supervisory and regulatory variables covered here are degree of property rights protection which measures expropriation risk, capital stringency and banking freedom.

Results from table 7 (in the appendix) which includes exploration risk as a control variable shows that when we introduce exploration risk into our models, cross border banking no longer leads to bank instability. This means that in countries where there is a strong legal protection for investors, and the judicial system dispatches justice fairly and with finesse, any inherent instability of cross border banking is curtailed. Again, deposit funding is found to still promote bank stability while non deposit funding reduces it. The impacts of equity ratio, efficiency, size and macroeconomic variables are similar to those found in the previous section confirming the reliability of the estimates.

We reiterate that capital stringency measures the influence of the regulatory capital stringency on bank stability and performance. Higher values reflect more capital stringency and there is an expectation that this will reduce bank risk and increase performance. Table 8 (in the appendix) shows that when we control for capital stringency, cross border banking reduces banking stability while deposit funding promotes it; non deposit funding reduces both bank stability and profitability; capitalisation enforces stability; economic growth promotes profitability. Again, we find that capital stringency promotes profitability when deposit funding is employed.

From table 9 (in the appendix) where we control for banking freedom, cross border banking still reduces banking stability while deposit funding promotes it. This reinforces the earlier finding that when banks cross border, they reduce their inherent instability by employing less risky deposit funds and less of wholesale and internally generated funds. Non deposit funding reduces stability while economic growth promotes bank profitability; capitalisation improves stability but reduces performance.

CONCLUSION

This study contributes to the literature by investigating the effects of cross border banking and bank funding strategies on risk and return in the African banking landscape. We employ data from 29 African countries covering 320 banks over the period 2002-2013. Systems Generalized Method of Moments estimator (System GMM) is used as the estimation strategy to correct for endogeneity and reverse causality. Furthermore, estimation is done with Windmeinjer corrected standard errors to produce valid estimates.

We find that at the bank level, the determinants of funding modes in a cross border context are bank efficiency, equity ratio and bank size. Interesting implications in this regard are that efficient banks employ more deposit funding than inefficient ones even in the presence of banking freedom, protection of property rights and capital stringency; well capitalised banks finance their investments using internal funds; and large African banks depend more on deposit funding to finance the acquisition of assets. At the macro level, inflation and economic growth are found to be important determinants of choice of bank funding mix which highlights the significance of macroeconomic stability in the development of the African banking sector. Cross border banking is found to promote deposit mobilisation.

We further find that cross border banking reduces bank stability while deposit funding increases it; deposit funding is also positively and significantly related to risk adjusted return on assets implying that banks that employ more deposits are more profitable than those that employ wholesale and internal funds. While well capitalised banks are more stable when deposit and internal funds are used to finance assets, they are less profitable when internal and non-deposit funds are employed. In the presence of exploration risk, cross border banking is found to no longer lead to bank instability. This means that in countries where there is a strong legal protection for investors, and the judicial system works well, any inherent instability of cross border banking is curtailed.

These findings give rise to some key recommendations for banks, regulators, and macroeconomic policymakers. In the case of banks, much as funding diversification is good, for the sake of ensuring stability, banks should employ deposit funding more given that it is less risky and more profitable. For regulatory authorities and policy makers, a strong regulatory framework which protects the rights of investors and reduces private expropriation is required to reduce banking sector instability. For their part, macroeconomic policy makers have a role to play in ensuring stability and profitability of banks. The major problem in Africa is not how to achieve macroeconomic stability but how to sustain it. Ensuring sustainable macroeconomic stability will require innovative macroeconomic policy making and management, fiscal discipline, and unwavering governmental commitment among others.

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APPENDIX

TABLE 7
THE EFFECTS OF CROSS BORDER BANKING AND FUNDING STRATEGY ON RISK AND RETURN: CONTROLLING FOR EXPROPRIATION RISK

The dependent variables are the measures of bank risk ***(Z-score),*** risk adjusted return on asset ***(RAROA)*** and risk adjusted return on equity ***(RAROE). Deposit*** and ***non-deposit funding*** is the share of deposit and non-deposit funding to total assets respectively. The purpose of the table is to test the robustness of the results to the inclusion of ***property rights (expropriation risk). Bank size*** is the natural logarithm of total Asset, ***Efficiency*** is cost to gross income ratio; ***Equity ratio*** measures the level of capitalization. Two macroeconomic controls included are ***GDP growth*** and ***Inflation***. Standard errors are reported in parenthesis; ***,** and *indicates statistical significance at 1%, 5% and 10% respectively. The diagnostic tests are reported. (1) The instrument count, (2) number of banks used in the sample (3) the F-test for joint significance of instruments, (4) the Hansen test of over identifying restrictions which the null hypothesis is that instruments are exogenous, (5) the Arellano-Bond test for second order serial correlation in the residuals which the null hypothesis is there is no second order serial correlation.

	Z-score	RAROE	RAROA	Z-score	RAROE	RAROA	Z-score	RAROE	RAROA
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Lag z-score	0.522***			0.557***			0.552***		
	(0.114)			(0.0997)			(0.109)		
Lag RAROE		0.553***			0.824***			0.695***	
		(0.147)			(0.155)			(0.175)	
Lag RAROA			0.410**			0.558***			0.427**
			(0.194)			(0.212)			(0.167)
Cross border banking	-0.660	-2.260	-0.770	-0.582	-0.956	-2.081	-0.295	-0.209	-2.837
	(0.466)	(2.629)	(2.669)	(0.391)	(2.798)	(2.874)	(0.277)	(2.505)	(3.409)
Deposit funding	0.613*	-0.519	2.137						
	(0.357)	(2.240)	(2.169)						
Non deposit funding				-0.869**	-0.260	-1.270			
				(0.418)	(1.287)	(1.935)			
Internal funding							0.519	3.667	3.764
							(0.805)	(2.669)	(3.144)
Efficiency	-0.876	-2.515	-4.940*	-0.759	1.078	-2.813	-0.0577	-0.938	-2.811
	(0.655)	(3.740)	(2.659)	(0.569)	(2.840)	(2.829)	(0.529)	(3.409)	(2.958)
Equity ratio	0.345**	-1.552	-0.0379	0.315**	-1.607**	-0.166	0.117	-1.687*	-0.137
	(0.159)	(1.045)	(0.868)	(0.139)	(0.756)	(0.875)	(0.107)	(0.975)	(0.997)
Bank size	0.0252	-0.347	0.318	0.0540	-0.401	0.330	0.0362	-0.165	0.403
	(0.0746)	(0.436)	(0.433)	(0.0604)	(0.377)	(0.522)	(0.0656)	(0.386)	(0.389)
GDP growth	0.577	5.972	5.305	0.961	9.236***	6.432	0.695	8.973**	7.559*
	(0.574)	(4.514)	(4.565)	(0.692)	(3.412)	(4.239)	(0.532)	(3.971)	(4.157)
Inflation	-1.62e-05	-0.0001**	-3.82e-05	-8.62e-06	-8.25e-05**	-4.55e-05	-0.00123*	-0.00650	-0.00405
	(1.07e-05)	(5.11e-05)	(6.75e-05)	(1.55e-05)	(3.77e-05)	(4.03e-05)	(0.000655)	(0.00469)	(0.00325)
Property rights	0.00379	-0.0647	0.0197	0.00423	-0.0561	0.0276	-0.00170	-0.0161	0.0183
	(0.00924)	(0.0604)	(0.0424)	(0.00830)	(0.0494)	(0.0526)	(0.00774)	(0.0570)	(0.0422)
Constant	2.203	6.577	1.337	2.245**	2.398	1.148	1.660*	0.0955	2.030
	(1.344)	(6.039)	(4.729)	(1.045)	(5.019)	(5.403)	(0.889)	(5.129)	(5.618)

	Z-score	RAROE	RAROA	Z-score	RAROE	RAROA	Z-score	RAROE	RAROA
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Diagnostics									
Observations	1,519	1,500	1,527	1,317	1,350	1,375	1,454	1,504	1,527
Number of bank	301	301	302	278	285	286	300	306	306
Instrument count	51	51	51	51	51	51	51	51	51
F-statistic	12.42***	12.75***	3.97***	11.39***	17.45***	5.22***	16.63***	3.17**	3.17**
AR(2)	1.32	1.05	-0.72	1.38	1.08	-0.81	0.85	1.10	-0.90
P value	0.187	0.293	0.471	0.168	0.282	0.415	0.397	0.272	0.366
Hansen tests	47.12	29.06	32.10	46.86	32.26	39.65	43.43	25.79	30.16
P value	0.236	0.919	0.839	0.245	0.834	0.531	0.368	0.969	0.894

TABLE 8
EFFECTS OF CROSS BORDER BANKING AND FUNDING STRATEGY ON RISK AND RETURN: CONTROLLING FOR CAPITAL STRINGENCY

The dependent variables are the measures of bank risk ***(Z-score),*** risk adjusted return on asset ***(RAROA)*** and risk adjusted return on equity ***(RAROE)***. ***Deposit*** and ***non-deposit funding*** is the share of deposit and non-deposit funding to total assets respectively. The purpose of the table is to test the robustness of the results to the inclusion of ***capital stringency.*** The ***internal funding*** is the sum of net profit before extraordinary items and loan loss provisions relative bank loans at the end the period. ***Cross border banking*** measured as a dummy taking the value of 1 where shareholding proportion of the local banks by foreign banks is 50% or more and 0 otherwise. ***Bank size*** is the natural logarithm of total Asset in millions of US$, ***Efficiency*** is a proxy to cost to gross income ratio; ***Equity ratio*** is the ratio of equity to total Asset used as a proxy for capitalization. Two macroeconomic controls included are ***GDP growth*** is the annual growth rate of Gross Domestic Product and ***Inflation*** is the annual consumer price inflation. Standard errors are reported in parenthesis; ***,** and *indicates statistical significance at 1%, 5% and 10% respectively. The following diagnostic tests are reported. (1) The instrument count, (2) number of banks used in the sample (3) the F-test for joint significance of instruments, (4) the Hansen test of over identifying restrictions which the null hypothesis is that instruments are exogenous, (5) the Arellano-Bond test for second order serial correlation in the residuals which the null hypothesis is there is no second order serial correlation.

	Z-score	ROROE	RAROA	Z-score	RAROE	RAROA	Z-score	RAROE	RAROA
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Lag Z-score	0.495***			0.559***			0.585***		
	(0.105)			(0.122)			(0.104)		
Lag RAROE		0.742***			0.882***			0.835***	
		(0.171)			(0.174)			(0.210)	
Lag RAROA			0.536***			0.420*			0.577***
			(0.169)			(0.226)			(0.154)
Cross border banking	-0.731*	-1.855	-2.547	-0.307	0.462	-0.738	-0.197	-0.380	-2.813*
	(0.393)	(2.041)	(1.761)	(0.393)	(2.591)	(1.756)	(0.256)	(1.598)	(1.557)
Deposit funding	0.755**	0.831	3.491**						
	(0.308)	(1.516)	(1.711)						
Non deposit funding				-0.689*	-0.763	-2.879**			
				(0.402)	(1.150)	(1.446)			
Internal funding							0.336	2.528	1.278
							(0.873)	(2.448)	(2.770)

	Z-score	ROROE	RAROA	Z-score	RAROE	RAROA	Z-score	RAROE	RAROA
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Efficiency	-0.837	-5.081	-6.919***	-0.326	0.0283	-4.698**	0.122	1.048	-3.791
	(0.609)	(3.979)	(2.577)	(0.612)	(2.734)	(2.206)	(0.563)	(2.964)	(2.876)
Equity ratio	0.380**	-0.787	-0.0153	0.273**	-1.480*	0.291	0.104	-1.174*	-0.210
	(0.152)	(0.780)	(0.784)	(0.120)	(0.759)	(0.654)	(0.0942)	(0.631)	(0.660)
Bank size	0.0254	-0.215	-0.183	0.0692	-0.0786	0.570*	0.0584	-0.207	0.0103
	(0.0465)	(0.282)	(0.259)	(0.0561)	(0.315)	(0.326)	(0.0482)	(0.290)	(0.265)
GDP growth	0.584	5.752	-1.501	1.124	10.64***	6.254*	0.808	8.347**	1.415
	(0.642)	(4.520)	(5.559)	(0.773)	(4.058)	(3.485)	(0.589)	(3.284)	(3.521)
Inflation	-1.83e-05	-3.52e-05	9.68e-06	-1.60e-05	-5.85e-05	-0.000126***	-0.000844	-0.00576	-0.00376
	(1.14e-05)	(4.78e-05)	(4.37e-05)	(1.36e-05)	(6.01e-05)	(4.63e-05)	(0.000651)	(0.00464)	(0.00258)
Capital stringency	0.0675	0.0505	-0.306	0.0861	0.136	1.176**	0.00235	-0.0712	0.0533
	(0.0555)	(0.465)	(0.394)	(0.0608)	(0.433)	(0.502)	(0.0663)	(0.390)	(0.410)
Constant	2.195**	3.333	6.802**	1.556	-2.892	-1.566	1.195*	-0.536	4.775
	(0.887)	(4.387)	(3.319)	(0.990)	(4.155)	(3.606)	(0.669)	(3.571)	(3.877)
Diagnostics									
Observations	1,520	1,503	1,530	1,313	1,346	1,370	1,453	1,505	1,528
Number of bank	304	304	305	279	287	287	302	309	309
Instrument count	51	51	51	51	51	51	51	51	51
F-statistic	14.69***	17.12***	6.33***	14.32***	36.71***	8.48***	22.46***	5.49***	8.17***
AR(2)	1.33	1.05	-0.68	1.47	1.07	-0.84	0.83	1.09	-0.74
P value	0.184	0.295	0.495	0.141	0.283	0.399	0.408	0.277	0.459
Hansen tests	48.75	38.13	33.80	50.43	28.91	40.64	50.11	34.19	44.36
P value	0.189	0.599	0.780	0.148	0.922	0.487	0.156	0.765	0.332

TABLE 9

THE EFFECTS OF CROSS BORDER BANKING AND FUNDING STRATEGY ON RISK AND RETURN: CONTROLLING FOR BANKING FREEDOM

The dependent variables are the measures of bank risk ***(Z-score),*** risk adjusted return on asset ***(RAROA)*** and risk adjusted return on equity ***(RAROE). Deposit*** and ***non-deposit funding*** is the share of deposit and non-deposit funding to total assets respectively. The purpose of the table is to test the robustness of the results to the inclusion of ***banking freedom. Bank size*** is the natural logarithm of total Assets, ***Efficiency*** is cost to gross income ratio; ***Equity ratio*** measures the level of capitalization. Two macroeconomic controls included are ***GDP growth*** and ***Inflation***. Standard errors are reported in parenthesis; ***,** and *indicates statistical significance at 1%, 5% and 10% respectively. The diagnostic tests are reported. (1) The instrument count, (2) number of banks used in the sample (3) the F-test for joint significance of instruments, (4) the Hansen test of over identifying restrictions which the null hypothesis is that instruments are exogenous, (5) the Arellano-Bond test for second order serial correlation in the residuals which the null hypothesis is there is no second order serial correlation.

	Z-score (1)	RAROE (2)	RAROA (3)	Z-score (4)	RAROE (5)	RAROA (6)	Z-score (7)	RAROE (8)	RAROA (9)
Lag Z-score	0.521***			0.561***			0.556***		
	(0.120)			(0.109)			(0.106)		
Lag RAROE		0.752***			0.853***			0.788***	
		(0.196)			(0.160)			(0.189)	
Lag RAROA			0.385**			0.543***			0.401***
			(0.178)			(0.170)			(0.140)
Cross border banking	-0.745*	-2.065	-1.809	-0.643*	0.0435	-2.360	-0.298	-0.462	-4.773
	(0.410)	(1.472)	(2.551)	(0.368)	(2.292)	(2.932)	(0.252)	(1.624)	(3.090)
Deposit funding	0.652*	0.750	2.857						
	(0.376)	(1.396)	(2.125)						
Non deposit funding				-0.932**	-0.257	-1.302			
				(0.464)	(0.989)	(2.019)			
Internal funding							0.375	3.386	2.508
							(0.843)	(2.403)	(3.233)
Efficiency	-0.976	-1.739	-5.557**	-0.801	0.764	-2.695	-0.0449	1.020	-3.775
	(0.686)	(2.659)	(2.623)	(0.614)	(2.711)	(2.818)	(0.512)	(2.380)	(2.828)
Equity ratio	0.336*	-0.675	0.0597	0.290**	-1.335*	0.112	0.105	-1.213**	0.147
	(0.177)	(0.682)	(0.824)	(0.135)	(0.679)	(0.925)	(0.0905)	(0.598)	(0.947)
Bank size	0.000893	-0.251	0.191	0.0323	-0.119	0.0871	0.0527	-0.136	0.162
	(0.0473)	(0.170)	(0.345)	(0.0442)	(0.197)	(0.232)	(0.0381)	(0.201)	(0.287)
GDP growth	0.387	4.118	3.524	0.865	8.418***	3.373	0.620	6.841***	2.547
	(0.565)	(2.809)	(4.542)	(0.727)	(2.960)	(3.890)	(0.468)	(2.578)	(3.347)
Inflation	-1.63e-05	-2.06e-05	-3.38e-05	-8.65e-06	-6.31e-05	-4.91e-05	-0.00114*	-0.00768*	-0.00494
	(1.08e-05)	(3.28e-05)	(6.32e-05)	(1.56e-05)	(3.95e-05)	(3.67e-05)	(0.000655)	(0.00459)	(0.00317)
Bank freedom	-0.000206	0.00169	0.00792	-0.000547	-0.00801	0.00149	-0.00207	-0.0160	0.00280
	(0.00289)	(0.0153)	(0.0120)	(0.00285)	(0.0148)	(0.0124)	(0.00254)	(0.0155)	(0.0110)
Constant	2.565**	2.708	3.292	2.575**	-1.324	4.654	1.562***	-0.172	6.646
	(1.082)	(2.608)	(3.190)	(1.063)	(3.124)	(4.298)	(0.578)	(2.663)	(5.042)
Diagnostics									
Observations	1,519	1,500	1,527	1,317	1,350	1,375	1,454	1,504	1,527
Number of bank	301	301	302	278	285	286	300	306	306
Instrument count	51	51	51	51	51	51	51	51	51
F-statistic	12.61***	26.39***	4.77***	11.43***	28.72***	5.22***	21.21***	6.08***	3.66***
AR(2)	1.29	1.03	-0.70	1.38	1.07	-0.74	0.82	1.08	-0.87
P value	0.198	0.305	0.485	0.168	0.286	0.460	0.413	0.278	0.387
Hansen tests	48.66	41.50	33.92	47.50	30.99	44.33	46.28	34.05	37.66
P value	0.192	0.449	0.776	0.225	0.872	0.333	0.263	0.771	0.620