Bank profitability determinants: comparing the United States, Nigeria and South Africa

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BANK PROFITABILITY DETERMINANTS: COMPARING THE UNITED STATES, NIGERIA AND SOUTH AFRICA

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ABSTRACT

This study investigates the determinants of banking sector profitability in South Africa, Nigeria and the United States. The findings reveal that cost efficiency, the size of non-performing loans and overhead cost ratio are significant determinants of the banking sector profitability. In the comparative analysis, the findings from South Africa show that the cost efficiency ratio, overhead cost to total asset ratio and non-performing loans are significant determinants of banking sector profitability. In the United States, capital adequacy ratio and the size of non-performing loans are significant determinants of banking sector profitability. In Nigeria, the overhead cost to total asset ratio and cost efficiency ratio are significant determinants of the banking sector profitability. The descriptive analysis reveal that bank net interest margin and return on asset are higher in Nigeria and lowest in the United States which suggests that the Nigerian banking sector is more profitable than the US banking sector. Return on equity is higher in South Africa and lowest in the United States.

Keywords: banks, profitability, non-performing loans, efficiency, Nigeria, South Africa, United States.

JEL code: G21, G28

1. INTRODUCTION

This paper investigates the determinants of the banking sector profitability in Nigeria, South Africa and the United States. Banking sector profitability is an important indicator of a stable financial sector. Country-specific differences can affect the level of bank profit in unique ways. These differences may be amplified by differences in the level of financial development and the level of country development especially the differences in developed countries, emerging countries and developing countries. The focus on Nigeria, South Africa and the United States is due to the differences in the level of the financial sector and country development in the three countries. The literature shows that the level of financial (sector) development significantly affects bank profitability (see Demirgüç-Kunt & Huizinga, 2000).

The United States has a high level of financial development followed by South Africa while Nigeria has the lowest according to the World Bank's Global Financial Development Indicators. More so, the United States is a market-based economy where only 15 percent of total credit in the US financial system is supplied by banks. The remaining 85 percent of total credit are supplied by other financial institutions. In contrast, the financial system in Nigeria is dominated by banks where 64 percent of total credit supply is provided by the banking sector. The implication is that a significant drop in credit supply by Nigerian banks will significantly affect Nigeria's financial system. South Africa, on the other hand, is a bank-based economy where banks control about 52 percent of total credit supply which leaves room for other capital market lenders to offer loans to corporate borrowers. Arguably, the financial development differences in Nigeria, South Africa and the United States may explain the differences in bank profitability in the three countries.

Many studies focussed on bank profitability determinants in several contexts (e.g. Athanasoglou et al (2008); Borio et al (2017); Zheng et al (2017); Boungou (2019); Ali and Puah (2019); Batten and Vo (2019) and Huang (2020)). But studies that explicitly compare bank profitability determinants between countries are scarce in the literature.

This study contributes to the existing literature by exploring the determinants of banking sector profitability across countries. Secondly, this study is related to the bank stability literature as banking sector profitability is an important predictor of bank stability. Also, this study shows whether country development differences have a direct effect on bank profitability determinants.

The rest of the paper is structured as follows. Section 2 presents the related literature on bank profitability. Section 3 discusses the research design. Section 4 presents the empirical findings, while section 5 reports the conclusion.

2. LITERATURE REVIEW

Several studies examined the determinants of bank profitability. Bougatef (2017) found that a higher level of corruption is associated with higher bank profitability in Tunisia. Ozili (2017) investigated bank profitability determinants amongst African banks, and found that factors such as size of the bank, regulatory capital ratio and provisions for loan loss are significant determinants of the return on assets of listed banks in Africa. Borio et al (2017) investigated the impact of monetary policy on bank profitability in 14 major advanced economies from 1995 to 2012. They found that the level of the short-term rate has a positive impact on bank profitability measured as return on assets.

Zheng et al (2017) examined the effect of capital requirements on the profitability of banks in Bangladesh from 2000 to 2015. They found that higher regulatory capital ratios increased the profitability of banks in Bangladesh. Their results remained the same when the authors used equity to total assets ratio as an alternative measure of bank capital. Bonaccorsi di Patti and Palazzo (2018) investigated the effects of macroeconomic factors on the profitability of banks in the European Union (EU), and found that growth in GDP and loan growth influence the profitability of EU banks.

Ozili (2015) investigated the determinants of bank profitability in Nigeria, and found that non-performing loans, size of the bank and cost efficiency significantly affect the profitability of banks in Nigeria. Hesse and Poghosyan (2016) analysed the effects of oil price shocks on bank profitability for 145 banks in 11 oil-exporting MENA countries from 1994 to 2008. They found that oil price shocks have an indirect impact on bank profitability, and the indirect impact is channelled through country-specific macroeconomic and institutional variables. Ammar and Boughrara (2019) investigated the effects of revenue diversification on bank profitability in 14 Middle East and North African (MENA) countries from 1990 to 2011. They found that revenue diversification leads to higher bank profitability.

Bouzgarrou et al (2018) examined the profitability of domestic banks and foreign banks prior to the 2008 financial crisis and during the financial crisis. They found that foreign banks are more profitable compared with domestic banks during the 2008 financial crisis. Bolarinwa et al (2019) examined the determinants of bank profitability in Nigeria. They examined the effects of bank size, deposit growth, credit risk, capital ratio and cost efficiency on commercial bank profitability. They analysed 15 commercial banks from 2005 to 2015, and found that cost efficiency is a determinant of bank profitability in Nigeria. The current study is different from Bolarinwa et al (2019). They used bank level data while the current study examines bank profitability determinants using industry data for a longer period of 1996 to 2017.

Overall, the above studies, in their analyses, did not compare developed countries with emerging countries and developing countries. The current study adds to the literature by explicitly

comparing the profitability determinants of banks in a major developed country (the United States), emerging country (South Africa) and a developing country (Nigeria).

3. DATA AND METHODOLOGY

3.1. Data

Country-level bank information was collected from the global financial development indicators while macroeconomic data was collected from the World Development Indicators in the World Bank databank. Data was extracted for three countries with unique attributes: Nigeria (representing a major developing country), South Africa (representing a major emerging country) and the United States (representing a major developed country). The sample period spans 22 years from 1996 to 2017. The sample period is sufficient to cover two economic cycles.

3.2. Variable Justification

π is the dependent variable, representing a vector of bank profitability variables. The vector variable consists of the Net Income Margin (NIM), Return On Asset Before Tax (ROABT) and Return On Equity Before Tax (ROEBT) variables. The NIM, ROABT and ROEBT variables are widely used in the literature to measure bank profitability (Ben Naceur and Goaied (2008), Borio et al (2017), and Ozili and Uadiale, 2017).

Bank concentration (CN) variable represents bank concentration. High bank concentration signifies greater market power for banks. Such banks enjoy oligopolistic advantage in the credit market, which puts them in a position to charge high interest rates on loans and high fees for offering non-interest services to bank customers, thereby increasing their profit levels (Huang, 2020; Ozili and Uadiale, 2017). Thus, the relationship between CN and π is predicted to be positive.

CAP variable represents the capital adequacy ratio. Ideally, banks that have high capital ratio are more likely to engage in risky lending because they have the equity capital needed to absorb unexpected losses that may arise from risky lending (Batten & Vo, 2019; Hallunovi & Berdo, 2018). The higher the risk, the higher the return or profit. Thus, the relationship between CAP and π is predicted to be positive.

EFF variable represents the cost efficiency ratio. Efficient banks tend to have a low cost-to-income ratio because they are able to minimise cost and maximise income, and as a result, such banks are able to generate high profit levels (Bitar et al, 2018). Thus, the relationship between EFF and π is predicted to be negative.

OPTA variable is the overhead cost to total asset ratio. Banks that have high overhead cost will have lower profit levels due to rising overhead expenses (Serwadda, 2018). Thus, the relationship between OPTA and π is predicted to be negative.

NPL variable is non-performing loans to gross loan ratio. Ideally, banks that have high problem loans will have lower net interest income and reduced net profit (Panta, 2018). Thus, the relationship between NPL and π is predicted to be negative.

INF variable is the inflation rate. High inflation can make banks increase the price of loans and increase the fee charged for offering non-interest activities to bank customers (Bouzgarrou et al, 2018), thus leading to high bank profitability. Thus, the relationship between INF and π is predicted to be positive.

GDPR variable represents the growth in GDP. Banks tend to report high profit levels in times of economic prosperity. This is because a large number of debtors are able to repay their loan during periods of economic prosperity, thereby contributing to high interest income for banks. In contrast, banks often report low profit levels in recessionary periods because a large number of debtors may default on their loan repayment, thereby contributing to reduced interest income for banks (Kohlscheen et al, 2018). Thus, the relationship between GDPR and π is predicted to be positive.

3.3. Model Specification

The model used to analyse the determinants of bank profitability (π) is similar to the models used in prior studies such as Huang (2020), Ozili and Uadiale (2017) and Borio et al (2017).

π = f (bank specific determinants, macroeconomic determinants).

The econometric model is specified below as:

$$\pi it = c + \beta 1CNit + \beta 2CAPit + \beta 3EFFit + \beta 4OPTAit + \beta 5NPLit + \beta 6\, INFit + \beta 7GDPRit + e \quad (1)$$

π = vector of dependent variables, namely, ROABT, ROEBT and NIM.

Where:

CAP = bank capital to total assets (%); CN = bank concentration (%); EFF = bank cost to income ratio (%); NIM = bank net interest margin (%); NPL = bank non-performing loans to gross loans (%); OPTA = bank overhead costs to total assets (%); ROABT = bank return on assets (before tax); ROEBT = bank return on equity (before tax); INF = inflation, consumer prices (annual %); GDPR = GDP growth (annual %).

3.4. Estimation Procedure

Robust least squares estimation technique is used to estimate the model. The robust least square is a regression method that is less sensitive to outliers in the data. The robust least square estimation is the M-estimation based on Huber (1973). The M-estimation addresses outliers in the dependent variable when the value of the dependent variable differs significantly from the regression line. Eviews 11 was used to estimate the model. The robust least squares estimation method is a superior estimation method compared to the ordinary least squares estimators which is sensitive to outliers in the data.

4. RESULTS AND DISCUSSION

4.1. Summary of Descriptive Statistics

The descriptive statistics result is presented in table 2. The mean value of CN is 49 for the full sample. CN is the highest in South Africa and lowest in the United States. This suggests that the US banking sector is less concentrated compared with the banking sector in South Africa and Nigeria. The CAP variable, on average, is 9.63 for the full sample. CAP is much higher in United States and lowest in South Africa. This suggests that the US banking sector is well-capitalised compared with the banking sectors of Nigeria and South Africa. The EFF variable, on average, is 59.8 for the full sample. EFF is the highest in Nigeria and lowest in South Africa. This suggests that Nigeria's banking sector is largely cost inefficient as indicated by its high cost-to-income ratio. South Africa has a lower cost-to-income ratio. The mean value of OPTA is 4.78 for the full sample. OPTA is much higher in Nigeria and lowest in the United States. This suggests that the Nigerian banking sector has a high overhead cost to total asset ratio. The United States has a low OPTA which indicates that the US has a low overhead cost to total asset. The mean value of NPL is 6.75 for the full sample. NPL is much higher in Nigeria and lower in the United States. This suggests that the US banking sector has high loan quality compared to Nigeria and South Africa. The macroeconomic variables, INF and GDPR, are 6.75 and 3.56, respectively for the full sample. INF and GDPR are lower in the United States and much higher in Nigeria. This suggests that the US experience greater macroeconomic stability compared to Nigeria. For the profitability variables, ROABT and NIM are higher in Nigeria and lowest in the United States. This suggest that the Nigerian banking sector is more profitable than the US banking sector. ROEBT is higher in South Africa and lowest in the United States.

Table 2
Descriptive Statistics

	Variables	CN	CAP	EFF	OPTA	NPL	INF	GDPR	ROABT	ROEBT	NIM
		%	%	%	%	%	%	%	%	%	%
Full sample	Mean	49.3	9.63	59.8	4.78	6.53	6.75	3.56	1.61	18.66	5.37
	Median	38.7	9.3	58.85	3.36	3.35	5.69	2.99	1.75	19.11	3.81
	Maximum	99.5	17.7	81.37	18.36	37.30	29.26	15.32	4.13	43.11	16.08
	Minimum	20.2	1.49	47.68	0.75	0.70	-0.69	-2.53	-15.09	0.64	1.47
	St. Dev	23.5	2.73	5.91	3.12	7.97	5.422	2.76	2.25	8.86	3.03
	Observation	64	56	66	66	56	66	66	66	66	66
Nigeria	Mean	40.89	10.42	63.22	7.86	14.82	12.37	5.42	1.69	19.56	8.73
	Median	39.11	10.41	62.11	6.97	16.11	11.89	5.98	2.49	19.63	7.61
	Maximum	71.08	17.70	81.37	18.36	37.30	29.26	15.32	4.12	43.11	16.08
	Minimum	22.28	1.49	49.17	3.48	2.95	5.38	-1.61	-15.09	0.64	5.60
	St. Dev	14.36	3.97	7.29	3.32	9.66	5.32	3.49	3.86	8.95	2.54
	Observation	22	18	22	22	18	22	22	22	22	22
South Africa	Mean	80.17	7.79	56.80	3.41	3.37	5.69	2.80	1.60	20.38	3.78
	Median	77.59	7.91	57.17	3.05	3.18	5.71	2.82	1.51	20.38	3.36
	Maximum	99.53	9.30	71.73	11.45	5.90	10.05	5.61	4.13	42.63	11.66
	Minimum	75.14	5.70	47.68	0.75	1.10	-0.69	-1.53	0.33	3.00	1.47
	St. Dev	6.25	0.84	5.39	2.03	1.39	2.34	1.76	0.73	10.29	2.07
	Observation	20	18	22	22	18	22	22	22	22	22
United States	Mean	29.76	10.56	59.48	3.09	1.92	2.18	2.45	1.53	16.03	3.62
	Median	33.42	10.40	59.43	2.91	1.36	2.23	2.51	1.62	15.93	3.52
	Maximum	36.13	12.73	63.64	3.99	5.00	3.84	4.75	2.19	26.33	4.32
	Minimum	20.18	8.40	55.98	2.52	0.70	-0.35	-2.53	0.12	1.61	3.09
	St. Dev	6.11	1.45	1.99	0.43	1.28	1.04	1.66	0.53	6.78	0.33
	Observation	22	20	22	22	20	22	22	22	22	22

4.2. Correlation Analysis

In the full sample, ROABT is positive and correlated with CAP and GDPR, and negatively correlated with CN, EFF, OPTA, NPL and INF. The ROEBT profitability variable is positive and correlated with CN, OPTA, NPL, INF and GDPR, and negatively correlated with CAP and EFF. The NIM profitability variable is positive and correlated with CAP, EFF, OPTA, NPL, INF and GDPR, and negatively correlated with CN. The NIM and OPTA variables are highly correlated at 91.6 percent. The NPL and OPTA variables are highly correlated at 81.3 percent. The NIM and INF variables are highly correlated at 71.6 percent.

(see Appendix A1).

In the Nigerian sub-sample, ROABT is positive and correlated with CAP and EFF, and negatively correlated with CN, OPTA, NPL, INF and GDPR. The ROEBT profitability variable is positive and

correlated with CAP, OPTA, NPL, INF and GDPR, and negatively correlated with CN and EFF. The NIM profitability variable is positive and correlated with OPTA, NPL, INF and GDPR, and negatively correlated with CN, CAP and EFF. The NIM and OPTA variables are highly correlated at 75.1 percent (see Appendix A2).

In the United States sub-sample, ROABT is positive and correlated with OPTA, INF and GDPR, and negatively correlated with CN, CAP, EFF and NPL. The ROEBT profitability variable is positive and correlated with OPTA, INF and GDPR, and negatively correlated with CN, CAP, EFF and NPL. The NIM profitability variable is positive and correlated with OPTA and GDPR, and negatively correlated with CN, CAP, EFF and NPL. The ROEBT and CN variables are highly correlated at 81.3 percent. The NIM and CN variables are highly correlated at 74.8 percent. The OPTA and CN variables are highly correlated at 91.2 percent. (Refer Appendix A3).

In the South Africa sub-sample, ROABT is positive and correlated with CN, CAP, OPTA and GDPR, and negatively correlated with EFF, NPL and INF. The ROEBT profitability variable is positive and correlated with CN, EFF, OPTA and GDPR, and negatively correlated with CAP, NPL and INF. The NIM profitability variable is positive and correlated with CN, CAP, OPTA, NPL and GDPR, and negatively correlated with EFF and INF. The OPTA and CN variables are highly correlated at 90.7 percent. The INF and EFF variables are highly correlated at 74.4 percent. The INF and OPTA variables are highly correlated at 82.1 percent (see Appendix A4).

4.3. Regression Results

Pooled sample analyses

The result is presented in Table 3. The OPTA coefficient is significant and positively related to the ROABT, ROEBT and NIM variables. This indicates that higher overhead cost leads to higher profitability. The NPL coefficient is significant and negatively related to the ROABT, ROEBT and NIM variables. This indicates that higher non-performing loans lead to reduced profitability. The EFF coefficient is significant and negatively related to the ROABT, ROEBT and NIM variables. This indicates that a high cost-to-income ratio has a negative impact on profitability. The INF coefficient is significant and negatively related to NIM but insignificantly related to ROABT and ROEBT. This suggest that higher inflation leads to higher net interest margin. The GDPR coefficient is significant and positively related to ROABT and ROEBT but insignificantly related to NIM. This suggests that economic booms are associated with higher operating profit and higher profit to equity shareholders. The CAP coefficient is significant and positively related to ROABT and negatively related to ROEBT. This suggests that higher capital levels lead to higher operating profit and lower profit to equity shareholders. The CN coefficient is significant and positively related to ROEBT and negatively related to NIM. This suggests that high bank concentration leads

to higher profit to equity shareholders and lower net interest margin. Overall, the results indicate that the most consistent determinants of bank profitability in the full sample result (in columns 1 to 3) are the efficiency ratio, non-performing loans, and overhead cost to total asset ratio.

Table 3
Robust Least Square Regression – Full Sample

	1	2	3
	ROABT	ROEBT	NIM
	Coefficient (T-values)	Coefficient (T-values)	Coefficient (T-values)
C	2.257*** (3.20)	65.212*** (8.02)	5.355*** (4.04)
CN	-0.001 (-0.23)	0.056** (2.02)	-0.019*** (-4.14)
CAP	0.049** (2.39)	-0.976*** (-4.16)	0.059 (1.55)
EFF	-0.037*** (-3.27)	-0.855*** (-6.63)	-0.093*** (-4.41)
OPTA	0.305*** (6.58)	2.705*** (5.07)	1.231*** (14.15)
NPL	-0.047*** (-3.69)	-0.552*** (-3.79)	-0.065*** (-2.76)
INF	0.015 (0.92)	-0.240 (-1.26)	0.101*** (3.27)
GDPR	0.067*** (2.78)	1.278*** (4.62)	-0.019 (-0.42)
R-square	46.02	43.62	63.22
Adjusted R-square	37.63	34.85	57.50
Observations (after adjustment)	53	53	53

Nigeria

The result is presented in Table 4. OPTA coefficient is positive and significantly related to the ROABT, ROEBT and NIM variables. This indicates that higher overhead cost leads to greater bank profitability. NPL coefficient is negative for ROABT, ROEBT and NIM. The NPL coefficient is negative and significantly related to NIM, which indicates that higher non-performing loans lead to lower net interest margin. The EFF coefficient is negative and is significantly related to ROABT, ROEBT and NIM. This indicates that there is an inverse relationship between the cost-to-income ratio and profitability. The GDPR coefficient is positive and significantly related to ROEBT, which indicates that the Nigerian banking sector generates higher profit to equity shareholders during economic booms and vice versa. The CN coefficient report mixed signs in columns 1 to 3. CN coefficient is significant and positively related to ROABT and negatively to NIM. This indicates that high bank concentration is associated with high operating profit and low net interest margin. The INF and CAP coefficients are not significant in columns 1 to 3. Overall, the results suggest

that the most consistent determinants of bank profitability in Nigeria (in columns 1 to 3) are overhead cost to total asset ratio, and the cost efficiency ratio.

Table 4
Robust Least Square Regression – Nigeria Banking Sector

	1	2	3
	ROABT	ROEBT	NIM
	Coefficient (T-values)	Coefficient (T-values)	Coefficient (T-values)
C	3.315 (1.49)	46.483*** (3.30)	11.320*** (5.95)
CN	0.038** (2.44)	-0.008 (-0.08)	-0.039*** (-2.92)
CAP	-0.085 (-1.29)	-0.225 (-0.54)	-0.074 (-1.31)
EFF	-0.063* (-1.80)	-0.653*** (-2.92)	-0.104*** (-3.44)
OPTA	0.307*** (2.88)	2.219*** (3.28)	1.037*** (11.33)
NPL	-0.033 (-1.28)	-0.255 (-1.56)	-0.107*** (-4.84)
INF	0.059 (1.30)	-0.060 (-0.21)	-0.021 (-0.52)
GDPR	0.072 (1.38)	0.854*** (2.59)	0.065 (1.45)
R-square	45.83	59.81	62.72
Adjusted R-square	7.92	31.68	36.62
Observations (after adjustment)	18	18	18

South Africa

Table 5 reports the result for South Africa. OPTA coefficient is positive and significantly related to the ROABT, ROEBT and NIM variables. This indicates that higher overhead costs lead to higher profitability. The NPL coefficient is negative in columns 1 to 3, and the NPL coefficient is significant and negatively related to ROABT and ROEBT, which indicates that higher non-performing loans lead to reduced operating profit and lower profit to equity shareholders. The CAP coefficient is significant and positively related to ROABT and NIM, and negatively related with ROEBT. This suggests that higher capital ratios lead to higher operating profit, higher net interest margin and lower profit to equity shareholders in the South African banking sector. The INF coefficient reports a positive sign in columns 1 to 3. The INF coefficient is significant and positively related to ROABT, which indicates that the South African banking sector generates higher operating profit during high inflation. The CN, GDPR, EFF, CAP coefficients report mixed signs in columns 1 to 3. Overall, the findings suggest that the most consistent determinants of

bank profitability in South Africa (in columns 1 to 3) are the capital adequacy ratio and the overhead cost to total asset ratio.

Table 5

Robust Least Square Regression – South Africa Banking Sector

	1	2	3
	ROABT	ROEBT	NIM
	Coefficient (T-values)	Coefficient (T-values)	Coefficient (T-values)
C	0.706 (0.89)	74.546 (0.86)	1.264 (0.32)
CN	-0.011 (-1.61)	-0.793 (-1.07)	0.023 (0.68)
CAP	0.067** (2.55)	-7.442*** (-2.61)	0.294** (2.27)
EFF	-0.005 (-0.82)	0.474 (0.78)	-0.067** (-2.38)
OPTA	0.408*** (6.38)	13.334* (1.91)	0.598* (1.87)
NPL	-0.073*** (-5.20)	-2.607* (-1.69)	-0.038 (-0.54)
INF	0.056*** (3.95)	0.780 (0.50)	0.008 (0.11)
GDPR	0.063*** (6.82)	0.879 (0.87)	-0.049 (-1.08)
R-square	65.14	68.14	64.52
Adjusted R-square	30.26	36.28	29.04
Observations (after adjustment)	15	15	15

United States

Table 6 reports the results for the United States. OPTA coefficient is positive in columns 1 to 3. OPTA coefficient is significant and positively related to ROEBT, which suggests that higher overhead cost leads to higher profit to equity shareholders in the United States banking sector. The CAP coefficient is positively related to the ROABT, ROEBT and NIM variables. CAP coefficient is significant and positively related to ROABT and ROEBT which indicates that higher capital levels lead to higher operating profit and higher profit to equity shareholders in the United States banking sector. The NPL coefficient is significant and negatively related with ROABT and ROEBT but insignificantly related to NIM. This suggests that higher non-performing loans lead to reduced operating profit and lower profit to equity shareholders. The CN, EFF and GDPR coefficients are negatively related to the ROABT, ROEBT and NIM variables, but are not significant. INF coefficient is insignificant and reports mixed signs in columns 1 to 3. Overall, the results suggest that the

most consistent determinants of bank profitability in the United States in columns 1 to 3 (excluding the NIM model in column 3) are capital adequacy ratio and size of non-performing loans. Also, the profitability determinants are not significantly related to NIM ratio in the US banking sector.

Table 6

Robust Least Square Regression – United States Banking Sector

	1	2	3
	ROABT	ROEBT	NIM
	Coefficient (T-values)	Coefficient (T-values)	Coefficient (T-values)
C	-1.134 (-0.35)	-13.436 (-0.48)	2.549 (0.99)
CN	-0.046 (-1.15)	-0.501 (-1.47)	-0.030 (-0.96)
CAP	0.352** (2.45)	2.789*** (2.29)	0.105 (0.92)
EFF	-0.017 (-0.39)	-0.106 (-0.29)	-0.015 (-0.45)
OPTA	0.594 (1.37)	8.467** (2.30)	0.519 (1.52)
NPL	-0.358*** (-3.62)	-3.375*** (-3.99)	0.059 (0.75)
INF	0.047 (0.84)	-0.206 (-0.43)	-0.011 (-0.25)
GDPR	0.051 (0.83)	0.509 (0.97)	0.036 (0.74)
R-square	75.38	84.11	75.80
Adjusted R-square	61.02	74.85	61.69
Observations (after adjustment)	20	20	20

5. CONCLUSION AND POLICY RECOMMENDATIONS

This paper examined the banking sector profitability determinants in South Africa, Nigeria and the United States. The findings reveal that the determinants of banking sector profitability in the full sample analysis are the efficiency ratio, non-performing loans, and overhead cost to total asset ratio. The comparative analyses show that efficiency ratio, overhead cost to total asset ratio and non-performing loans are significant determinants of banking sector profitability in South Africa. In Nigeria, the significant determinants of bank profitability are the overhead cost to total asset ratio and the efficiency ratio. In the United States, the determinants of bank profitability are capital adequacy ratio and non-performing loans.

The implication of the results is that the determinants of bank profitability differ across countries. These differences may be explained by multiple factors, for example, differences in the nature of banking systems, differences in financial sector development and differences in banking regulation and supervision.

Some policy recommendations include the following. One, the findings show that Nigeria has a higher cost-to-income ratio compared to the United States which imply that the Nigerian banking sector is less efficient. Bank supervisors in Nigeria should ensure that banks operate more efficiently despite being profitable. Two, the findings show that the banking sectors of Nigeria and South Africa have high non-performing loans compared to the United States. Bank regulators in Nigeria and South Africa should issue strict policies against rising non-performing loans in banks while their bank supervisors should also ensure that banks improve their loan screening process and credit risk management system in order to reduce the size of non-performing loans in banks. Finally, the banking sectors of Nigeria and South Africa are more concentrated than that of the United States. Policy makers should issue policies that encourage the entry of non-bank financial intermediaries in the financial sector to reduce the dominance of banks in the credit market and in the financial sector.

One limitation of the study is the small number of countries examined. Using a larger sample of countries to analyse the determinants of bank profitability may provide greater insights on the factors that affect bank profitability across countries.

Future studies can analyse the determinants of banking sector profitability using a larger country sample. Secondly, future studies can employ several robust statistical techniques to estimate the determinants of bank profitability. Also, future studies can examine the impact of institutional factors on banking sector profitability. Such studies should make a comparison between several countries. Finally, it would be interesting to investigate the regional differences in bank profitability determinants. Such studies can compare the profitability determinants of banks in the G7 countries versus banks in the Euro sector, or compare the profitability determinants of banks in the MENA and ECOWAS countries.

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Appendix

A1: Correlation – full sample

P-values are reported in parentheses

Variable	CN	CAP	EFF	OPTA	NPL	INF	GDPR	ROABT	ROEBT	NIM
CN	1.000									

CAP	-0.260*	1.000								
	(0.06)	-----								
EFF	-0.166	-0.081	1.000							
	(0.23)	(0.56)	-----							
OPTA	-0.204	-0.011	0.496***	1.000						
	(0.14)	(0.93)	(0.00)	-----						
NPL	-0.155	-0.223	0.466***	0.813***	1.000					
	(0.26)	(0.11)	(0.00)	(0.00)	-----					
INF	-0.035	-0.093	0.240*	0.680***	0.683***	1.000				
	(0.79)	(0.50)	(0.08)	(0.00)	(0.00)	-----				
GDPR	-0.068	0.001	0.498***	0.635***	0.441***	0.466***	1.000			
	(0.62)	(0.99)	(0.00)	(0.00)	(0.00)	(0.00)	-----			
ROABT	-0.088	0.289**	-0.477***	-0.083	-0.351**	-0.014	0.013	1.000		
	(0.52)	(0.03)	(0.00)	(0.55)	(0.01)	(0.91)	0.92	-----		
ROEBT	0.200	-0.203	-0.139	0.286**	0.0412	0.141	0.391***	0.375***	1.000	
	(0.15)	(0.14)	(0.31)	(0.04)	(0.76)	(0.31)	(0.00)	(0.00)	-----	
NIM	-0.301**	0.139	0.307**	0.916***	0.687***	0.716***	0.605***	0.146	0.208	1.000
	(0.03)	(0.31)	(0.02)	(0.00)	(0.00)	(0.00)	(0.00)	(0.29)	(0.13)	-----

A2: Correlation – Nigeria

P-values are reported in parentheses

Variable	CN	CAP	EFF	OPTA	NPL	INF	GDPR	ROABT	ROEBT	NIM
CN	1.000									

CAP	0.351	1.000								
	(0.15)	-----								
EFF	0.364	-0.436*	1.000							
	(0.13)	(0.07)	-----							
OPTA	-0.336	-0.303	0.277	1.000						
	(0.17)	(0.22)	(0.26)	-----						
NPL	-0.224	-0.619*	0.365	0.635**	1.000					
	(0.36)	(0.01)	(0.13)	(0.00)	-----					
INF	-0.282	-0.263	0.062	0.204	0.277	1.000				
	(0.25)	(0.29)	(0.81)	(0.41)	(0.26)	-----				
GDPR	0.032	-0.069	0.438*	0.417*	0.199	0.169	1.000			
	(0.89)	(0.78)	(0.06)	(0.08)	(0.42)	(0.50)	-----			
ROABT	-0.317	0.398*	0.629**	-0.217	-0.523**	-0.047	-0.064	1.000		
	(0.19)	(0.10)	(0.01)	(0.38)	(0.02)	(0.85)	(0.79)	-----		
ROEBT	-0.464**	0.0931	-0.415*	0.483**	0.145	0.312	0.281	0.473	1.000	
	(0.05)	(0.71)	(0.09)	(0.04)	(0.56)	(0.21)	(0.25)	(0.04)	-----	
NIM	-0.663***	-0.094	-0.152	0.751***	0.208	0.198	0.418*	0.249	0.657**	1.000
	(0.00)	(0.71)	(0.55)	(0.00)	(0.40)	(0.43)	(0.08)	(0.31)	(0.00)	-----

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A3: Correlation – United States

P-values are reported in parentheses

Variable	CN	CAP	EFF	OPTA	NPL	INF	GDPR	ROABT	ROEBT	NIM
CN	1.000									

CAP	0.864***	1.000								
	(0.00)	-----								
EFF	0.192	-0.119	1.000							
	(0.41)	(0.61)	-----							
OPTA	-0.912***	-0.796***	0.035	1.000						
	(0.00)	(0.00)	(0.88)	-----						
NPL	0.536**	0.631***	0.184	-0.324	1.000					
	(0.01)	(0.00)	(0.43)	(0.16)	-----					
INF	-0.207	-0.451**	0.303	0.232	-0.326	1.000				
	(0.38)	(0.04)	(0.19)	(0.32)	(0.15)	-----				
GDPR	-0.504**	-0.423*	0.019	0.487**	-0.668***	0.293	1.000			
	(0.02)	(0.06)	(0.93)	(0.02)	(0.00)	(0.21)	-----			
ROABT	-0.631***	-0.459**	-0.376	0.495**	-0.801***	0.172	0.806***	1.000		
	(0.00)	(0.04)	(0.10)	(0.02)	(0.00)	(0.46)	(0.00)	-----		
ROEBT	-0.813***	-0.660***	-0.284	0.711***	-0.787***	0.211	0.799***	0.957***	1.000	
	(0.00)	(0.00)	(0.22)	(0.00)	(0.00)	(0.37)	(0.00)	(0.00)	-----	
NIM	-0.748***	-0.440*	-0.210	0.817***	-0.109	-0.042	0.440*	0.498**	0.629***	1.000
	(0.00)	(0.05)	(0.37)	(0.00)	(0.64)	(0.86)	(0.05)	(0.03)	(0.00)	-----

A4: Correlation – South Africa

P-values are reported in parentheses

Variable	CN	CAP	EFF	OPTA	NPL	INF	GDPR	ROABT	ROEBT	NIM
CN	1.000									

CAP	0.197	1.000								
	(0.48)	-----								
EFF	0.307	0.165	1.000							
	(0.26)	(0.55)	-----							
OPTA	0.907***	0.463*	0.498*	1.000						
	(0.00)	(0.08)	(0.05)	-----						
NPL	-0.163	-0.449*	-0.511*	-0.378	1.000					
	(0.56)	(0.09)	(0.05)	(0.16)	-----					
INF	-0.651***	-0.479*	-0.744***	-0.821**	0.416	1.000				
	(0.00)	(0.07)	(0.00)	(0.00)	(0.12)	-----				
GDPR	0.268	0.252	0.374	0.378	-0.660***	-0.487*	1.000			
	(0.33)	(0.36)	(0.16)	(0.16)	(0.00)	(0.06)	-----			
ROABT	0.521**	0.283	-0.151	0.565**	-0.114	-0.295	0.28	1.000		
	(0.04)	(0.30)	(0.59)	(0.02)	(0.68)	(0.28)	(0.29)	-----		
ROEBT	0.470*	-0.008	0.677***	0.581**	-0.686***	-0.548**	0.636**	0.223	1.000	
	(0.07)	(0.97)	(0.00)	(0.02)	(0.00)	(0.03)	(0.01)	(0.42)	-----	
NIM	0.604**	0.495*	-0.283	0.617**	0.022	-0.296	0.057	0.852***	-0.071	1.000
	(0.01)	(0.06)	(0.31)	(0.01)	(0.93)	(0.28)	(0.83)	(0.00)	(0.79)	-----

A5. Variable source and description		
Variable	Variable description	Source
CAP	Bank capital to total assets (%)	Global financial development indicators, World Bank
CN	Bank concentration (%)	Global financial development indicators, World Bank
EFF	Bank cost to income ratio (%)	Global financial development indicators, World Bank
NIM	Bank net interest margin (%)	Global financial development indicators, World Bank
NPL	Bank non-performing loans to gross loans (%)	Global financial development indicators, World Bank
OPTA	Bank overhead costs to total assets (%)	Global financial development indicators, World Bank
ROABT	Bank return on assets (%, before tax)	Global financial development indicators, World Bank
ROEBT	Bank return on equity (%, before tax)	Global financial development indicators, World Bank
INF	Inflation, consumer prices (annual %)	IMF
GDPR	GDP growth (annual %)	IMF