Economic Freedom and Bank Stability in the Rich African Economies

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Abstract

This study empirically examines the nexus between economic freedom and bank stability in rich African economies, seeking to uncover the underlying causes of the recent wave of bank failures in these countries. It employs the Heritage Foundation's Economic Freedom Index, utilizing its four main pillars to offer a more holistic approach compared to existing studies on the continent. Static panel regression analysis is applied to bank-level, economic freedom, and macroeconomic data from ten countries over the period 2013–2022 to test the hypotheses. The results largely support a positive relationship between bank stability and economic freedom, though at a lower intensity, as indicated by the insignificant positive coefficients of the overall economic freedom index. Specifically, the findings show insignificant positive coefficients for the rule of law (RLW) and government size (GVSZ), alongside significantly positive and negative coefficients for regulatory efficiency (REGE) and the open market system (OPM), respectively. These results highlight weaknesses in the OPM's components, including trade, investment, and financial freedom, despite their average level. The study also points to a need for improving the components of RLW, given its low mean score, which signals insufficient judicial effectiveness, government integrity, and property rights protection – factors essential for attracting business and fostering banking sector growth. While regulatory efficiency is seen as a key factor in enhancing bank solvency in the future, the study emphasizes that significant behavioural and policy changes are needed for other pillars to contribute meaningfully to bank stability in the rich African economies. The findings provide insights into how banks, especially those from wealthier African nations, can maintain global recognition and financial viability through economic liberalisation. At the same time, the study's limited access to bank-specific data presents an opportunity for future research to further build on these findings.

Keywords: bank stability, economic freedom, economic openness, regulatory efficiency, rich African countries, rule of law

Introduction

While an efficient banking system is considered to be a potent tool for driving the economy [1], the economy can also be a source of strength for the banking sector [2]. Economic freedom is often related to the seamless actualisation of the economic goals of individuals and corporate entities thanks to the absence of economic restrictions [3]. Bolstered by free competition, protection of individual and corporate property, and a greater volume of voluntary exchange [2], among other factors, economic freedom may be defined as an overall quality of political cum economic institutions [4] that provides for greater economic opportunities. This suggests that economic progress lies in the freedom to choose and supply factors of production, compete favourably in business and financial transactions, exchange goods and services with others and protect individual and corporate property rights.

The empirical link between economic freedom and bank soundness can be explained by several key factors. The ability of banks to provide more credit depends on the presence of multiple competing firms seeking funding through bank loans, which contributes to higher interest margins for banks [5]. Additionally, a greater national level of economic freedom encourages the entry of new domestic and foreign companies offering diverse products, leading to more diversified loan portfolios that enhance bank profitability and efficiency [6]. The increase in real income associated with a higher economic freedom index drives greater demand for banking services [7].

According to institutional theory, sound institutions – characterised by open markets, secure property rights, and minimal trade restrictions – create a favourable policy environment [8], which fosters national economic growth [9] and positively impacts banking sector efficiency [5]. This is further supported by new growth theory, which argues that robust institutions and policies are essential for sustained economic progress [10], with a stable and efficient banking sector being a natural outcome of such progress.

The construction of an economic freedom index, as reflected in the literature, is typically associated with the Heritage Foundation and the Fraser Institute [5; 11]. The Fraser Institute's index of economic freedom is built on five pillars: government size, legal systems and property rights, freedom to trade internationally, regulation, and sound money. In contrast, the Heritage Foundation's index is based on 12 factors across four pillars, each comprising three factors. The "rule of law" pillar includes judicial effectiveness, property rights, and government integrity, while the "open market system" pillar encompasses trade, financial, and investment freedom. The "regulatory efficiency" pillar is composed of business, monetary, and labour freedom, and, finally, the "government size" pillar is defined by government spending, fiscal health, and tax burden.

The connection between the four pillars of the economic freedom index, as defined by the Heritage Foundation, and banks' financial stability is particularly evident in the African context. In Kenya, despite an expanded regulatory framework, bank collapses have persisted over time. A key factor in the recurrence of banking crises is the abuse of insider lending practices to bank directors and major shareholders, which undermines the rule of law [12]. A similar situation has occurred in Nigeria, notably with First Bank of Nigeria Limited's loan facility to Honeywell Flour Mills Plc. The acquisition of Union Bank of Nigeria by Titan Trust Bank, facilitated by regulators according to a special investigation, has raised questions about government integrity in Nigeria [13].

South Africa has also faced a series of bank failures [14]. The placement of African Bank Limited and VBS Mutual Bank under curatorship is a typical example [14; 15]. The VBS Mutual Bank case, as revealed by the South African Reserve Bank, involved the misuse of short-term municipal deposits to fund long-term lending, clearly violating the rule of law [15]. Furthermore, the granting of substantial personal loans, amounting to R7.8 million, to President Jacob Zuma while he was still in office [16] casts doubt on both government integrity and regulatory efficiency in the country.

The persistence of bank failures in Ghana, despite government intervention [17], is also a cause for concern. Recently, Fitch, a globally-recognised credit rating agency, downgraded four systemically important Egyptian banks following a sharp increase in the net foreign asset deficit of Egypt's banking sector [18], despite Egypt's prominent position in the African economy [19]. This downgrade may increase the vulnerability of Egypt's banking sector [18]. Both Ghana and Egypt are known for having robust regulatory and supervisory frameworks [12; 14].

However, it is unclear if these banking crises are unique to these nations, as several catalysts of banking efficiency, such as trade, investment, and financial openness – key elements of greater economic freedom – are present in these countries [20], which are considered among the wealthier economies in Africa. These factors underscore the need for an empirical study examining the relationship between economic freedom and bank stability in rich African countries.

Several empirical studies have explored the nexus between economic freedom and bank performance within sub-Saharan Africa [21–23]. However, our study is unique in that it singles out Africa's wealthier economies. Since the challenges and opportunities organisations face differ across societies with varying levels of economic freedom [2], a more accurate reflection of the relationship between economic freedom and bank stability is achieved when studying a sample of banks operating in societies with relatively similar economic potential. By focusing on Africa's richer countries, this study strengthens its argument and contributes to the existing literature.

Our study is also the first of its kind, as far as we can tell from the available literature, to examine the empirical nexus of the major pillars of economic freedom (as developed by the Heritage Foundation) with bank stability in an African context. Previous studies have either adopted

the overall economic freedom index or focused on only a few selected factors [22–24]. As an empirical fact-finding study, this paper addresses the reality that nations with higher levels of economic freedom – according to the Heritage Foundation's economic freedom index – tend to have robust and profitable banking sectors. Thus, it produces a paradigm shift in the literature by determining whether the relatively high levels of economic freedom in rich African countries are reflected in their banks' financial standing.

Additionally, this study serves as a call to action for governments of Africa's wealthier countries to pursue greater economic openness. Such openness will enable those of their banks that aim to expand globally to compete favourably with leading international banks.

This paper also includes a literature review section integrated with hypotheses development, as well as a research methods section detailing the research design and model specification. Additionally, there are two sections focusing on data analysis, which is accompanied by a discussion of findings, and concluding remarks incorporating policy implications.

Empirical Literature and Hypotheses Development

The financial condition of banks, as an outcome variable in the economic freedom literature, is often considered in terms of bank performance and/or risk-taking. For bank performance, which reflects profitability, solvency, and/or stability, there is predominant evidence of a direct relationship: a higher economic freedom index, along with its components such as business, monetary, and financial freedom, as well as the index of freedom from corruption, has been found to positively impact the profitability of Malaysian banks [25]. Similar evidence, particularly for the overall economic freedom index, has been established by F. Sufian and M.K. Hassan [26] and F. Sufian [27], who used the bank interest margin and bank efficiency as outcome variables for banks in ASEAN-5 countries and Indonesia, respectively.

However, contrary evidence has been reported by F. Sufian and M.S. Habibullah for Malaysian banks [28] and by F. Sufian for banks in the MENA region [29]. Greater economic freedom and its components, including financial freedom, property rights, freedom from corruption, and business freedom but excluding government spending, are seen as ingredients of bank efficiency, as found by G.E. Chortareas et al. for banks in 27 European countries [3]. The positive impact of economic freedom on bank profitability was also highlighted by A. Shahabadi and H. Samari, with positive coefficients observed for most measures of economic freedom – such as government size, secured property rights, legal structure, access to sound money and financial, trade, and labour freedom – across developed and developing countries [30].

Using the Fraser economic freedom index, E. Mamatzakis et al. [31] found that neither the overall economic freedom index nor its five pillars (with the exception of the protec-tion of legal rights) had a positive impact on bank efficiency for banks in 10 Central and Eastern European countries, showing the directional relationship of economic freedom to bank performance.

Banks' return on assets is influenced by the level of economic freedom within a U.S. state [32]. Similar findings were reported by E. Sarpong-Kumankoma et al. [22] for sub-Saharan African banks over the period 2006–2012. The relationship between greater financial freedom and higher bank interest margins is highlighted in [33], though the opposite effect is observed for bank stability according to [23], using the same dataset as [22]. In Arab countries, bank profitability, as indicated by return on assets, is positively correlated with the quality of economic freedom based on the Fraser Institute's conceptualization [11]. In the European context, greater economic freedom is more strongly linked to improved bank interest margins than to other bank performance indicators [34]. Bank stability, however, is reflected in lower non-performing loans, higher Z-scores, and improved capital adequacy levels [34].

For 19 Eurozone countries, higher economic freedom, as measured by the Heritage Foundation's overall and pillar indexes and by the Fraser Institute's index, is causally linked to better profitability and stability of financial institutions [5]. Conversely, in the United Kingdom, higher economic freedom is found to be inversely related to bank solvency based on data from the 10 largest depository institutions [35]. In Africa, the Heritage Foundation's indexes of economic, business, monetary, and financial freedom positively explain bank interest margins, return on assets, and return on equity [24]. Indonesian evidence from all types of commercial banks shows that the overall index of the Heritage Foundation's four-pillar economic freedom model is positively associated with financial stability, as measured by the Z-score [36]. Additionally, economic freedom not only positively moderates the relationship between risk-based capital and U.S. banks' profitability, but also has a direct positive impact as a standalone explanatory variable on bank profitability [37].

B.M. Adam et al., using country-level data for the period 2008–2019, found a positive nexus between economic freedom and bank stability through increased economic efficiency, although greater financial, trade, business, and investment freedom could not be linked to substantial improvements in bank solvency [21]. However, in the MENA region, an increase in bank stability was attributed to higher indexes of economic, investment, financial, and business freedom [38]. The positive impact of economic freedom was reflected in the positive coefficients of government effectiveness, voice and accountability, regulatory quality, and control of corruption, yet not the rule of law, as noted by [39].

As to bank risk-taking, an inverse relationship between economic freedom and bank risk-taking – indicating a positive link between economic freedom and bank stability – was reported by S. Ghosh for the monetary and business freedom sub-components [40], F. Defung and R. Yadaruddin for Indonesian private, government, and

large commercial banks [36], R. Harkati et al. for both Islamic and commercial banks in Malaysia [41], S. Ali et al. and F. Abbas et al. for U.S. banking [2; 42], and F. Abbas et al. for the rule of law and open market systems in Japan [43].

In contrast, a direct link between economic freedom and bank risk-taking was found for MENA banks by S. Ghosh [40], for GCC countries by T. Akhter et al. [44], and for the overall economic freedom index and its sub-components of government size and regulatory efficiency by F. Abbas et al. [43].

As we see from our review of empirical literature, the majority of evidence supports a positive nexus between economic freedom and bank financial standing. The positive coefficients found for all four pillars of the Heritage Foundation index [5] and the individual pillars of government size [30; 31] and regulatory efficiency [31; 39] lead us to make the following hypotheses:

Hypothesis 1 (H1): Effective rule of law leads to increased bank stability in rich African countries.

Hypothesis 2 (H2): The open market system has a significantly positive impact on the stability of banks in rich African countries.

Hypothesis 3 (H3). Regulatory efficiency has a significantly positive influence on the stability of banks in rich African countries.

Hypothesis 4 (H4): The size of government in rich African countries is positively related to the stability of their banks.

These hypotheses have been previously emphasized as shown above. The empirical findings of D. Asteriou et al. indicate that effective rule of law, an open market system, regulatory efficiency, and government size are instrumental in improving bank performance and stability in

Eurozone countries [5]. While these findings are comprehensive, other studies partially support our hypotheses, particularly regarding government size [30], government size and regulation [31], regulatory quality [39; 40], and the rule of law and open market systems [43]. In contrast, a direct relationship of bank risk-taking with government size and regulatory efficiency has been found in the Japanese context [43]. Additionally, negative coefficients for the rule of law [39] and all dimensions of the open market system [21] in relation to bank stability, as reported for MENA and sub-Saharan African banks, provide contradictory evidence to our hypotheses.

Methodology

To establish the relationship between economic freedom and bank stability, this study focuses on all depository financial institutions in all rich African countries. According to the World Population Review, as presented in Table A1 in the Appendix, there are twenty-one rich countries in Africa. This classification is based on the "Top-10 richest African countries" in terms of overall gross domestic product (GDP), GDP per capita, GDP by purchasing power parity (PPP), and gross national income (GNI) per capita (Atlas method). However, as shown in Table A2 in the Appendix, there are over 400 banks in the identified countries, according to information from each country's central bank and *Global Brands Magazine*. Despite the number of banks in these wealthy African economies, access to bank-level data from annual reports is limited to ten countries. As presented in Table 1, there are 264 banks in the sampled countries, of which 54 banks were selected based on the availability of their annual audited financial statements.

Table 1. Study Sample

S/N	Country	Population of banks	Sampled banks	% Population	% Sample
1	Nigeria	27	16	10.2	29.6
2	Ghana	23	11	8.7	20.4
3	South Africa	28	4	10.6	7.4
4	Egypt	32	3	12.1	5.6
5	Sudan	14	3	5.3	5.6
6	Seychelles	6	2	2.3	3.7
7	Kenya	39	9	14.8	16.7
8	Tanzania	35	2	13.3	3.7
9	Mauritius	18	2	6.8	3.7
10	Botswana	9	2	3.4	3.7
	Total	264	54	100	100

Source: Authors' compilation.

The study's bank-level data related to the dependent variable and some control variables were manually extracted from the annual reports of the sample banks. In contrast, data for the economic freedom index (independent variable) and certain macroeconomic variables are sourced from the Heritage Foundation and World Development Indicators. The data cover a ten-year period from 2013 to 2022, reflecting changes in the presentation of economic freedom data by the Heritage Foundation starting in 2013. By that year, the definitions of the components of economic freedom were standardized by the Heritage Foundation. Although the Fraser Institute also provides data on economic freedom, a comparative analysis cannot be made with the Heritage Foundation due to the unavailability of Fraser Institute data up to 2022 as of the third quarter of 2023, when data compilation was completed.

Since data are obtained at both the time series and cross-sectional levels, a panel data model is adopted for analysis. While the basic static panel model is considered, the selection of other static panel models is also suggested based on the statistical significance of various diagnostic tests. The basic static panel model requires the choice of a fixed-effects model (FEP) over a random-effects model (REP) when the Hausman statistic (HST) is significant at a confidence level greater than 95%. It also necessitates opting for REP over pooled ordinary least squares regression (POLS) when the Breusch-Pagan Lagrangian multiplier test (LMT) is statistically significant at a p-value of less than 5%.

However, in the presence of concurrent statistical significance in tests for heteroscedasticity, serial correlation, and cross-sectional dependence, the panel corrected standard errors model (PCSE) is preferred. If the error structures in the panel model exhibit heteroscedasticity, serial autocorrelation, and cross-sectional dependence, choosing PCSE is advisable [45; 46]. This explains our application of three diagnostic tests: the likelihood ratio test for heteroscedasticity (HTR), the Breusch-Pagan Lagrangian multiplier test of independence in the panel model (LMTI), and the first-order serial correlation test (ACOR) for autocorrelation. The results of these tests are presented below the regression estimates in the relevant tables.

In addition to regression analysis for hypothesis testing, we use descriptive statistics for data summarization as well as correlation and variance inflation factor analysis to identify multicollinearity issues.

To test the study's four hypotheses, bank stability is modelled as a function of each pillar of the Heritage Foundation economic freedom index. As previously established [5; 23], bank stability is indicated by the Z-score. The Z-score summarises the number of standard deviations by which a bank's profitability must fall before eroding its capitalisation [47]. A higher Z-score value indicates greater bank stability/solvency/soundness [47] or a lower risk of insolvency or probability of failure [34]. Previous studies commonly measured the Z-score as follows:

$$Z - score_{it} = \frac{EYT_{it} + ETA_{it}}{\sigma EYT_{iT}}, \quad (1)$$

where EYT_{it} – earnings for the year; ETA_{it} – total equities of bank i for year t, both scaled by total assets; σEYT_{iT} – standard deviation of EYT of each bank over the entire sampled period.

After deriving the Z-score to measure bank stability, the following econometric models are specified to test each of the study's hypotheses:

$$Z - score_{it} = \propto_0 + \propto_1 RLW_{it} + \propto_2 CCAP_{it} + $$
$$+ \propto_3 TCAP_{it} + \propto_4 LVR_{it} + \propto_5 DIVF_{it} + $$
$$+ \propto_6 NPL_{it} + \propto_7 DEP_{it} + \propto_8 CIR_{it} + $$
$$+ \propto_9 RGDP_{it} + \propto_{10} IFL_{it} + \propto_{11} UEMP_{it} + E_{it}; \quad (2)$$

$$Z - score_{it} = \propto_0 + \propto_1 OPM_{it} + \propto_2 CCAP_{it} + $$
$$+ \propto_3 TCAP_{it} + \propto_4 LVR_{it} + \propto_5 DIVF_{it} + $$
$$+ \propto_6 NPL_{it} + \propto_7 DEP_{it} + \propto_8 CIR_{it} + $$
$$+ \propto_9 RGDP_{it} + \propto_{10} IFL_{it} + \propto_{11} UEMP_{it} + E_{it}; \quad (3)$$

$$Z - score_{it} = \propto_0 + \propto_1 REGE_{it} + \propto_2 CCAP_{it} + $$
$$+ \propto_3 TCAP_{it} + \propto_4 LVR_{it} + \propto_5 DIVF_{it} + $$
$$+ \propto_6 NPL_{it} + \propto_7 DEP_{it} + \propto_8 CIR_{it} + $$
$$+ \propto_9 RGDP_{it} + \propto_{10} IFL_{it} + \propto_{11} UEMP_{it} + E_{it}; \quad (4)$$

$$Z - score_{it} = \propto_0 + \propto_1 GVSZ_{it} + \propto_2 CCAP_{it} + $$
$$+ \propto_3 TCAP_{it} + \propto_4 LVR_{it} + \propto_5 DIVF_{it} + $$
$$+ \propto_6 NPL_{it} + \propto_7 DEP_{it} + \propto_8 CIR_{it} + $$
$$+ \propto_9 RGDP_{it} + \propto_{10} IFL_{it} + \propto_{11} UEMP_{it} + E_{it}. \quad (5)$$

Upon establishing the behaviour of each pillar in relation to bank stability, further analysis is performed using the overall economic freedom index (EFD) to ensure consistency. This is specified as:

$$Z - score_{it} = \propto_0 + \propto_1 EFD_{it} + \propto_2 CCAP_{it} + $$
$$+ \propto_3 TCAP_{it} + \propto_4 LVR_{it} + \propto_5 DIVF_{it} + $$
$$+ \propto_6 NPL_{it} + \propto_7 DEP_{it} + \propto_8 CIR_{it} + $$
$$+ \propto_9 RGDP_{it} + \propto_{10} IFL_{it} + \propto_{11} UEMP_{it} + E_{it}. \quad (6)$$

The inclusion of control variables, both bank-specific and macroeconomic, is based on findings from previous studies. At the bank level, capitalisation, diversification, and leverage ratio are considered among the factors that explain bank solvency in the relevant literature, though the statistical signs are mixed [23; 34]. Similarly, third-party funds or customer deposits, the cost-income ratio [36], and the ratio of non-performing loans to gross loans – an indicator of credit risk [47] – also feature in econometric models examining bank stability and economic freedom.

The rationale for including real GDP growth rate (RGDP), inflation rate (IFL), and unemployment rate (UEMP) in the relevant models is supported by the argument for a favourable relationship between economic growth and financial sector performance. This is complemented by the similar dynamics of high inflation rates and bank loan interest rates, which lead to higher interest margins, as well as the inverse relationship between unemployment and bank profitability due to low economic activity [5; 34; 42].

The variables used in equations 2–6 are described in Table 2.

Table 2. Definitions and Measurements of Variables

S/N	Variable	Variable Name	Definition/Measurements
1	Z-score	Bank stability	As defined in equation 1
2	RLW	Rule of law	A simple average of Heritage Foundation indexes of the three factors constituting the rule of law pillar of economic freedom
3	OPM	Open market system	A simple average of Heritage Foundation indexes of the three factors constituting the open market system pillar of economic freedom
4	REGE	Regulatory efficiency	A simple average of Heritage Foundation indexes of the three factors constituting the regulatory efficiency pillar of economic freedom
5	GVSZ	Government size	A simple average of Heritage Foundation indexes of the three factors constituting the government size pillar of economic freedom
6	EFD	Economic Freedom Index	Heritage Foundation annual overall economic freedom index measured in percent
7	CCAP	Bank core capital	Tier 1 capital scaled by total risk-weighted assets
8	TCAP	Total capital	$\dfrac{Tier\,1 + Tier\,2\,capital}{Total\,risk\,weighted\,assets}$
9	LVR	Leverage ratio	Ratio of gross loans to total assets
10	DIVF	Diversification	Non-interest income to gross income
11	NPL	Non-performing loans ratio	Non-performing loans to gross loans
12	DEP	Deposit ratio	Customer deposits to total assets
13	CIR	Cost-income ratio	Operating cost to operating income
14	RGDP	Real Gross Domestic Product rate	Annual GDP growth rate
15	IFL	Inflation	Consumer price index growth rate on an annual basis
16	UEMP	Unemployment	Annual unemployment rate

Source: Authors' compilation.

Results and Discussion

This section presents the results of data analysis. It consists of three sub-sections: summary statistics, correlation and multi-collinearity diagnostic analyses, and regression analysis for testing the study's hypotheses.

Summary Statistics

The descriptive statistics displaying the mean, standard deviation, and range of the study's variables are presented in Table 3. The Z-score summary statistics provide insight into the stability of banks in the sampled rich African economies, using both the mean and maximum values. However, the negative minimum value suggests that not all of these banks are solvent. This finding is also reflected in the capitalisation summary statistics. Although the average capital ratios – 15.7% for Tier 1 capital (CCAP) and 18.4% for total regulatory capital (TCAP) – exceed global benchmarks, the negative minimum values raise regulatory concerns.

The higher interest margin for the sampled banks is likely attributable to the proportion of their gross loans relative to total assets (LVR), which shows elevated maximum and mean values. However, this may also explain the high maximum value of non-performing loans (NPL) at 31%, indicating a significant level of customer default. Nevertheless, the mean NPL value of 5.2% remains within the global regulatory benchmark.

Since many of the sampled banks are parent companies in financial holding groups, the average value of 19% for the proportion of non-interest income to gross income (DIVF) indicates a reasonable level of income diversification. However, high operating costs relative to operating income, as reflected in the cost-income ratio (CIR), may account for the low profitability observed in these banks.

The higher deposit ratio, with a mean value of 0.65 (DEP), is favourable for depository institutions. However, a maximum value of 1.6 – indicating deposits exceeding total assets – poses a threat to bank stability, suggesting a scenario where total equity is negative.

In terms of economic freedom, while the maximum values for all four pillars exceed 70, which is encouraging, the low mean values cast doubt on the economic strength of the sampled countries, except for the government size pillar. A similar pattern is observed for the overall economic freedom index, which, in light of institutional theory, could have an inverse relationship with the stability of these banks.

The high inflation rate (IFL), with a mean (maximum) value of 14% (359%), could result in higher loan interest rates and potentially increased profitability. However, banks' failure to adjust their interest rates promptly due to unanticipated inflation may undermine this effect. Additionally, the higher unemployment rate (UEMP) and low real GDP growth rate (RGDP), as shown in Table 3, could further weaken bank stability.

Table 3. Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Z-score	532	25.9740	19.4857	-43.9423	122.7871
CCAP	532	0.1569	0.2032	-2.0159	1.0343
TCAP	532	0.1838	0.1879	-1.9856	1.0306
LVR	532	0.4815	0.1528	0.0556	0.7995
NPL	532	0.0521	0.0419	0.0002	0.3108
DIVF	532	0.1932	0.1382	0.0001	0.7569
DEP	532	0.6847	0.1544	0.0006	1.6121
CIR	532	0.5966	0.2353	0.1649	2.8436
RLW	532	38.0572	12.3779	4.8824	74.5881
GVSZ	532	73.4119	11.7025	44.9500	90.6000
REGE	532	63.9106	5.0841	27.8186	78.5667
OPM	532	55.5154	11.4656	5.0000	82.6333
EFD	532	56.9803	10.3100	0.0000	77.0000
RGDP	532	0.0325	0.0323	-0.1460	0.1187
IFL	532	0.1420	0.3058	-0.0102	3.5909
UEMP	532	0.0746	0.0677	0.0000	0.2981

Source: Authors' calculations using STATA version 15 outputs.

Correlation and Multi-Collinearity Analysis

Table 4 depicts the results of Pearson correlation analysis, while Table 5 shows the results of variance inflation factor and related diagnostics. As revealed in Table 4, two of the four components of economic freedom (GVSZ & REGE) have a positive relationship with the Z-score, while the remaining two (RLW & OPM) have a negative relationship. Only GVSZ is not significant.

Table 4. Correlation Matrix

Variable		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Z-score	**1**	1.00															
CCAP	**2**	0.22*	1.00														
		(0.00)															
TCAP	**3**	0.22*	0.97*	1.00													
		(0.00)	(0.00)														
LVR	**4**	0.22*	-0.05	-0.04	1.00												
		(0.00)	(0.25)	(0.31)													
NPL	**5**	-0.13*	0.05	0.05	-0.12*	1.00											
		(0.00)	(0.23)	(0.30)	(0.01)												
DIVF	**6**	0.08	0.06	0.07	-0.08	-0.15*	1.00										
		(0.07)	(0.18)	(0.12)	(0.06)	(0.00)											
DEP	**7**	0.05	-0.28*	-0.30*	0.12*	0.02	-0.33*	1.00									
		(0.22)	(0.00)	(0.00)	(0.00)	(0.62)	(0.00)										
CIR	**8**	-0.04	-0.37*	-0.37*	-0.07	0.07	0.05	0.09*	1.00								
		(0.36)	(0.00)	(0.00)	(0.12)	(0.13)	(0.29)	(0.03)									
RLW	**9**	-0.11*	0.01	0.01	0.08	0.17*	-0.16*	0.40*	-0.03	1.00							
		(0.01)	(0.90)	(0.78)	(0.06)	(0.00)	(0.00)	(0.00)	(0.50)								
GVSZ	**10**	0.03	-0.10*	-0.10*	-0.03	-0.26*	0.19*	-0.20*	0.16*	-0.37*	1.00						
		(0.43)	(0.03)	(0.03)	(0.46)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)							
REGE	**11**	0.15*	-0.08	-0.07	0.07*	-0.07	0.13	0.19	0.1	0.51*	0.14*	1.00					
		(0.00)	(0.05)	(0.10)	(0.13)	(0.13)	(0.00)	(0.00)	(0.03)	(0.00)	(0.00)						
OPM	**12**	-0.09*	-0.01	-0.01	-0.04	0.17*	-0.24*	0.44*	0.00	0.75*	-0.18*	0.20*	1.00				
		(0.04)	(0.85)	(0.81)	(0.42)	(0.00)	(0.00)	(0.00)	(0.95)	(0.00)	(0.00)	(0.00)					
EFD	**13**	0.03	-0.08	-0.07	-0.07	0.07	-0.02	0.37*	0.11*	0.68*	0.09*	0.30*	0.78*	1.00			
		(0.48)	(0.06)	(0.09)	(0.12)	(0.13)	(0.66)	(0.00)	(0.01)	(0.00)	(0.03)	(0.00)	(0.00)				
RGDP	**14**	-0.05	0.05	0.04	-0.03	0.05	-0.22*	0.17*	-0.01	0.06	-0.30*	-0.07	0.25*	0.00	1.00		
		(0.27)	(0.22)	(0.30)	(0.46)	(0.28)	(0.00)	(0.00)	(0.82)	(0.19)	(0.00)	(0.10)	(0.00)	(0.95)			
IFL	**15**	-0.13*	-0.01	0.01	-0.04	-0.08	0.16*	-0.20*	-0.14*	-0.22*	-0.07	-0.22*	-0.42*	-0.29*	-0.24*	1.00	
		(0.00)	(0.88)	(0.82)	(0.42)	(0.07)	(0.00)	(0.00)	(0.00)	(0.00)	(0.10)	(0.00)	(0.00)	(0.00)	(0.00)		
UEMP	**16**	0.02	0.03	0.04	0.31*	-0.09*	0.33*	-0.03	-0.13*	0.18*	-0.13*	0.02	-0.11*	-0.13*	-0.30*	0.20*	1.00
		(0.58)	(0.52)	(0.32)	(0.00)	(0.04)	(0.00)	(0.42)	(0.00)	(0.00)	(0.00)	(0.71)	(0.01)	(0.00)	(0.00)	(0.00)	

Note: Correlation coefficients are presented with the p-value in parentheses while * stands for statistical significance at the 95% confidence level.

Source: Authors' calculations.

Among the control variables, CCAP, TCAP and LVR have a significantly positive relationship with the Z-score, while the coefficients of NPL and IFL are significantly negative. For multi-collinearity analysis, there is no evidence of the multi-collinearity problem among any pair of variables except for CCAP and TCAP: only CCAP and TCAP have a correlation coefficient exceeding 0.8. The multi-collinearity problem between CCAP and TCAP is also confirmed by the VIF, tolerance and R-squared analyses: as Table 5 shows, only TCAP and CCAP have a VIF greater than 10, a tolerance of less 0.1 and R-squared over 0.9. This explains the separate specification of TCAP and CCAP in the study's regression models.

Table 5. Variance Inflation Factor

Variable	VIF	$\sqrt{VIF}$	Tolerance	R-Squared
RLW	4.56	2.14	0.2191	0.7809
GVSZ	1.95	1.40	0.5120	0.4880
REGE	2.28	1.51	0.4381	0.5619
OPM	5.07	2.25	0.1972	0.8028
EFD	5.34	2.31	0.1871	0.8129
CCAP	18.01	4.24	0.0555	0.9445
TCAP	18.10	4.25	0.0552	0.9448
LVR	1.23	1.11	0.8160	0.1840
NPL	1.18	1.09	0.8468	0.1532
DIVF	1.61	1.27	0.6227	0.3773
DEP	1.61	1.27	0.6202	0.3798
CIR	1.27	1.13	0.7881	0.2119
RGDP	1.48	1.22	0.6752	0.3248

Variable	VIF	$\sqrt{VIF}$	Tolerance	R-Squared
IFL	1.59	1.26	0.6290	0.3710
UEMP	1.88	1.37	0.5326	0.4674
Mean VIF	4.48			

Source: Authors' calculations using STATA version 15 outputs.

Regression Results and Discussion

The baseline results of the study's hypothesis tests are presented in Table 6, with further analysis and overall conclusions in Table 7. The findings show that the economic freedom index generally supports bank stability in the sampled banks, as all four pillars' regression coefficients exhibit a positive impact, except for the open market system (OPM), which has a negative coefficient. However, only the coefficient of the regulatory efficiency (REGE) pillar is statistically significant among the positive pillars. The OPM coefficient, which is negative, is also statistically significant. Although the rule of law (RLW) coefficient is positive, its lack of statistical significance prevents full acceptance of the first hypothesis. The insignificantly positive coefficient may be due to weak property rights protection, government integrity, and judicial effectiveness, as reflected by the low mean RLW score of 38, as shown in Table 3.

The significantly negative OPM coefficients suggest that increased economic openness correlates with reduced bank stability in the sampled countries. This indicates that the current levels of investment, trade, and financial freedom in these countries have yet to positively impact the stability of their banks. Potential reasons include a low OPM index, underdeveloped capital and financial markets, and substantial government intervention.

Table 6. Regression Results for the Four Pillars of the Economic Freedom Index

Var.	RLW	RLW	OPM	OPM	REGE	REGE	GVSZ	GVSZ
	1	2	3	4	5	6	7	8
RLW	0.02	0.02						
	(0.41)	(0.34)						
OPM			-0.23***	-0.23***				
			(-2.79)	(-2.88)				
REGE					0.22***	0.19**		
					(2.71)	(2.37)		
GVSZ							0.01	0.01
							(0.34)	(0.34)
CCAP	15.43***		15.82***		24.63***		16.05***	
	(7.02)		(7.21)		(9.75)		(7.28)	

Var.	RLW	RLW	OPM	OPM	REGE	REGE	GVSZ	GVSZ
	1	2	3	4	5	6	7	8
TCAP		17.26***		17.79***		27.46***		17.98***
		(7.04)		(7.28)		(8.96)		(7.32)
LVR	11.27***	11.38***	12.99***	13.05***	18.22***	17.67***	12.58***	12.66***
	(3.85)	(3.89)	(4.46)	(4.50)	(6.47)	(5.83)	(4.20)	(4.24)
DIVF	3.35	2.95	4.71	4.30	5.09**	4.55**	4.17	3.75
	(0.93)	(0.82)	(1.31)	(1.20)	(2.30)	(2.03)	(1.14)	(1.03)
NPL	8.12	8.59	7.07	7.39	-21.02**	-24.04***	6.69	7.07
	(0.95)	(1.01)	(0.84)	(0.88)	(-2.54)	(-2.76)	(0.78)	(0.82)
DEP	-5.92**	-5.52**	-4.70*	-4.26	5.36*	6.47**	-5.09*	-4.68*
	(-2.14)	(-1.98)	(-1.70)	(-1.53)	(1.85)	(1.99)	(-1.83)	(-1.67)
CIR	-2.97**	-2.57*	-2.92*	-2.52*	-4.01***	-3.85**	-2.86*	-2.46*
	(-1.97)	(-1.71)	(-1.93)	(-1.67)	(-3.22)	(-2.36)	(-1.89)	(-1.68)
RGDP	2.05	1.97	2.91	2.80	5.48	5.54	3.84	3.78
	(0.25)	(0.24)	(0.36)	(0.34)	(0.76)	(0.76)	(0.44)	(0.44)
IFL	0.61	0.47	0.56	0.41	-2.90*	-2.83*	0.48	0.32
	(0.59)	(0.45)	(0.55)	(0.40)	(-1.95)	(-1.89)	(0.45)	(0.30)
UEMP	-130.01***	-129.46***	-109.47***	-109.10***	-12.47**	-12.57**	-99.02***	-99.11***
	(-6.71)	(-6.69)	(-6.34)	(-6.38)	(-2.41)	(-2.41)	(-5.84)	(-5.85)
_cons	31.73***	30.57***	41.28***	40.44***	-3.59	-3.51	27.74***	26.47***
	(9.50)	(9.05)	(6.91)	(6.75)	(-0.60)	(-0.58)	(6.33)	(5.99)
R²	0.2939	0.2943	0.304	0.3053	0.6943	0.6902	0.2903	0.2908
F-Test	19.48***	19.52***						
Wald			190.34***	192.03***	295.16***	193.11***	181.61***	182.49***
HST	30.25***	30.14***	11.70	11.29	33.83***	33.35***	5.71	4.05
LMT			1657.07***	1663.10***			1746.04***	1753.88***
HTR	24155.4***	18264.5***	23045.9***	17965.2***	2477.59***	18414.84***	24613.7***	17876.6***
ACOR	0.86	0.95	1.17	0.99	38.18***	22.95***	1.23	1.18
LMTI	3.41	3.88	3.65	3.69	3013.07***	3021.87***	3.97	3.98
Model	FEP	FEP	REP	REP	PCSE	PCSE	REP	REP

Note: Regression estimates are presented with the t or z-statistic in parentheses. Only the statistics of the diagnostic tests are presented. *, ** and *** denote statistical significance at the 90%, 95% and 99% confidence levels, respectively.

Source: Authors' calculations using STATA version 15 outputs.

Contrary to the coefficients of OPM, those of REGE are positive and significant, confirming the third hypothesis that regulatory efficiency has a significantly positive influence on the stability of banks in rich African economies. The significantly positive REGE coefficients highlight how efficient regulation has improved the solvency of the sampled banks, reflected in greater business, labour, and monetary freedom. Notably, second only to GVSZ in terms of mean score (see Table 3), REGE has a substantial positive impact. This suggests that the regulatory and infrastructure environments in the sampled countries, measured by factors such as regulatory quality and women's economic participation (business freedom), labour productivity, associational rights, and labour force participation (labour freedom), and some degree of price stability despite government intervention (monetary freedom), have supported bank stability.

While the GVSZ coefficients are positive, they are more akin to RLW than to REGE in terms of statistical significance. This limits the full acceptance of the fourth hypothesis. The issue of a higher tax burden in African economies is debatable, but the adverse effects of excessive government spending and budget deficits cannot be ignored. Many African countries face weak fiscal health, evidenced by a high ratio of deficits and debt to GDP. Therefore, GVSZ's limited ability to enhance bank stability in the sampled rich African countries can be attributed to the low economic freedom score, especially in terms of fiscal health.

The findings of this study related to the linkage of each pillar of economic freedom to bank stability, as presented in Table 6, are comparable to the results of [5], showing positive coefficients for RLW (Rule of Law), REGE (Regulatory Efficiency), and GVSZ (Government Size), but not for OPM (Open Market System). However, the coefficients for RLW and GVSZ are not statistically significant. Our results align with the conclusion of F. Abbas et al. regarding the inverse relationship between bank risk-taking and effective rule of law, though not with its relationship to the open market system, government size, and efficient regulation [43]. Some agreements are observed with the coefficients for government size found by A. Shahabadi and H. Samari [30] and E. Mamatzakis [31], as well as regulatory quality noted by E. Mamatzakis [31], S. Ullah et al. [39], and S. Ghosh [40]. Our findings also bear similarities to the empirical results of N. Djebali regarding the coefficients for government effectiveness and regulatory quality [38] yet not for rule of law. The inverse relationships found by S. Ullah et al. [39] and B. M. Adam et al. [21] for RLW and all components of OPM with bank stability are in disagreement and agreement, respectively, with the findings of this study.

As shown in Table 7, the overall economic freedom index (EFD) is positively related to bank stability in the rich African economies. The coefficients of EFD in both regression estimates for the CCAP (Core Capital Adequacy) and TCAP (Total Capital Adequacy) models are positive. However, the lack of statistical significance for two of the three positive pillars and the significantly negative coefficient for one pillar

(OPM) contribute to the overall insignificance of the EFD coefficient. This could be due to the relatively low mean value of the EFD score, as shown in Table 3. Despite the statistical insignificance of EFD in this study, its positive coefficient aligns with several previous studies, including recent ones [5; 21; 36; 38], while contradicting others [23; 35].

Table 7. Regressions with the Overall Economic Freedom Index

Variable	EFD	EFD
	9	10
EFD	0.013	0.003
	(0.29)	(0.07)
CCAP	16.09***	
	(7.26)	
TCAP		18.01***
		(7.29)
LVR	12.88***	13.01***
	(4.30)	(4.42)
DIVF	4.31	3.96
	(1.18)	(1.08)
NPL	5.86	6.23
	(0.69)	(0.74)
DEP	-5.08*	-4.63*
	(-1.81)	(-1.67)
CIR	-2.85*	-2.44*
	(-1.87)	(-1.75)
RGDP	3.54	3.00
	(0.42)	(0.35)
IFL	0.25	0.17
	(0.23)	(0.15)
UEMP	-96.41***	-96.76***
	(-5.72)	(-5.74)
_cons	27.46***	26.71***
	6.24	6.04
R²	0.2893	0.2897
Wald	178.37***	179.24***
HST	7.62	1.40
LMT	1728.53***	1733.38***
HTR	23143.7***	18234.6***
ACOR	1.82	1.96
LMTI	3.83	3.85
Model	REP	REP

Note: Regression estimates are presented with the z-statistic in parentheses. Only the statistics of the diagnostic tests are presented. *, ** and *** denote statistical significance at the 90%, 95% and 99% confidence levels, respectively.

Source: Authors' calculations using STATA version 15 outputs.

For control variables, the coefficients of CCAP (Core Capital Adequacy), TCAP (Total Capital Adequacy), LVR (Loan-to-Value Ratio), DEP (Deposit-Asset Ratio), CIR (Cost-to-Income Ratio), and UEMP (Unemployment Rate) are statistically significant across all models in both Tables 6 and 7. This highlights the importance of stronger capitalisation (indicated by positive coefficients of CCAP and TCAP), credit growth (reflected by positive coefficients of LVR), and operating efficiency (shown by negative coefficients of CIR) in enhancing bank stability. The significantly negative coefficients of DEP across all models, except for REGE models, could be attributed to higher interest payments compared to those received on loans, given that the mean value of DEP is higher than that of LVR. The negative coefficients of UEMP align with the literature, which suggests an inverse relationship between bank performance and unemployment rate [5]. The positive coefficients of income diversification (DIVF), though statistically significant only in REGE models, underscore its relevance. Additionally, low non-performing assets (NPL) and inflation rates (IFL), indicated by significantly negative coefficients in REGE models, demonstrate their potential to strengthen bank stability.

Conclusions

This study investigates how the fundamental indices of economic liberalisation, specifically economic freedom, influence bank stability in the rich African economies. These key components, referred to as pillars, are examined in relation to bank stability, which is measured using the Z-score. Ten countries classified as "rich" by the World Population Review are sampled, based on the availability of bank-level data from annual audited financial statements. As revealed by panel fixed-effects, panel random-effects, and/or panel corrected standard errors regression analyses, three of the pillars – rule of law (RLW), regulatory efficiency (REGE), and government size (GVSZ) – show a positive relationship with bank stability, while the open market system (OPM) exhibits an inverse relationship. The estimates for REGE and OPM are statistically significant.

Overall, the economic freedom index (EFD) contributes to increased bank stability, although its effect is not strongly pronounced due to the statistical insignificance of EFD coefficients. This underscores that improved bank soundness is dependent on a country's EFD level, as the mean score of the sampled countries is relatively low. The findings also suggest that trade restrictions, investment capital limitations, and government interference in the financial sector – which hinder the effectiveness of the open market system – are detrimental to bank stability. Furthermore, the low mean value of RLW and its insignificant coefficients highlight concerns about judicial independence, government integrity, and property rights in the sampled countries, which are essential before business opportunities that drive demand for bank funding can be fully realised.

The study's results emphasize the need for substantial improvements across all indices of regulatory efficiency (REGE), the only EFD pillar that strongly correlates with bank stability in the sampled countries. To bring the components of the other pillars in line with REGE, comprehensive institutional reforms, along with attitudinal changes among policymakers and enforcement agencies, are essential in the rich African economies.

This study makes a valuable contribution to the literature on the nexus between bank stability and economic freedom by focusing on the basic pillars of the Economic Freedom Index (EFD), rather than selecting only a few components, as seen in previous regional studies. As a result, the evidence provided in this research is more comprehensive and representative. By concentrating on rich economies, the study aligns with the primary goal of the economic freedom score – serving as a benchmark for economic success and viability. This highlights that research on economic freedom and bank performance in cross-country studies yields more accurate results when banks in societies with similar economic potential are compared.

Furthermore, the study offers empirical insights for policymakers in rich African economies, encouraging them to enhance economic freedom to improve the ability of their banks to access cross-border funding, including global depository receipts, thereby strengthening their financial position.

Despite its value, the study is somewhat limited by its restricted access to bank-level data. Out of over 260 banks, data were available for only 54, highlighting that future research with broader access to data could expand upon the present findings and offer even more robust conclusions.

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Appendix

Table A1. Rich African economies ranked by World Population Review Indices

Rank	Overall GDP	GDP(Current PPP INT$)	GDP per capital	GNI per capital (Atlas method)
1	Nigeria	Egypt	Seychelles	Seychelles
2	South Africa	Nigeria	Mauritius	Mauritius
3	Egypt	South Africa	Gabon	Libya
4	Algeria	Algeria	Equatorial Guinea	South Africa
5	Morocco	Morocco	South Africa	Gabon
6	Ethiopia	Ethiopia	Botswana	Botswana
7	Kenya	Kenya	Libya	Equatorial Guinea
8	Ghana	Angola	Namibia	Namibia
9	Ivory Coast	Ghana	Eswatini	Algeria
10	Tanzania	Sudan	Tunisia	Eswatini

Source: Authors' compilation.

Table A2. Number of banks in the rich African economies

S/N	Country	Number of Banks
1	Nigeria	27
2	South Africa	28
3	Egypt	32
4	Algeria	21
5	Morocco	32
6	Ethiopia	26
7	Kenya	39
8	Ghana	23
9	Ivory Coast	16
10	Tanzania	35
11	Angola	22
12	Sudan	14
13	Seychelles	6
14	Mauritius	18
15	Gabon	17
16	Equatorial Guinea	4
17	Libya	20
18	Botswana	9
19	Namibia	8
20	Eswatini	7
21	Tunisia	22
	TOTAL	426

Source: Authors' compilation using *Global Brands Magazine* and data from the countries' central banks.

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