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Effects of Credit Risk and Political Risk on Bank Profitability in the WAEMU

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Abstract

Despite the extensive research on the determinants of bank profitability, certain key factors—such as credit risk and political risk—deserve specific attention within the context of the WAEMU. The objective of this paper is to analyze the effects of these two factors on bank profitability in the WAEMU. Using the Pool Mean Group estimator and the Fully Modified Ordinary Least Squares estimator on aggregate data from WAEMU countries covering the period 2005-2023, we show that credit risk and political risk have negative long-term effects on bank profitability in this region. We therefore suggest improving information management and the quality of political governance in the WAEMU.

Keywords

Credit Risk, Political Risk, Bank Profitability, WAEMU

1. Introduction

The banking sector of the West African Economic and Monetary Union (WAEMU) experienced a systemic crisis during the 1980s. In response to this crisis, the Union's monetary authorities adopted a policy of financial liberalization. This policy was based on the teachings of the "school of financial liberalization", which originally encompassed the work of McKinnon (1973) and Shaw (1973). According to them, financial liberalization should replace the financial repression implemented in many developing countries, particularly those in the WAEMU. However, financial liberalization has produced mixed results for banking activity worldwide. In WAEMU countries, bank performance has improved since the 1989 financial liberalization (Ary Tanimoune, 2003; Dem, 2003). Nevertheless, bank profitability has declined relatively over time. From 2005 to 2023, bank margins gradually declined in WAEMU countries (see **Appendix 1**). Similarly, these bank margins

showed disparities among WAEMU countries (see **Appendix 1**). Purely liberal financial reforms have therefore yielded insufficient results regarding bank profitability in the WAEMU. However, liberal financial policies have been more successful in improving bank performance in Southeast Asian countries such as China, Malaysia, and South Korea.

Three main theories help identify the determinants of bank profitability. These are the Structure-Conduct-Performance (SCP) theory (Clark, 1986; Smirlock, 1985; Klein, 1971; Bain, 1951), the Structure-Efficiency theory [ES (Peltzman, 1977; Demsetz, 1973; Mason, 1939)], and the Real Business Cycle theory [TCR (Backus, Kehoe, & Kydland, 1992; King & Plosser, 1984)]. According to SCP theory, bank profitability is explained by the structure of the banking market in terms of banking concentration and market share. According to ES theory, bank profitability is instead explained by the structure of X-efficiency and/or allocative efficiency. The TCR, for its part, finds its true foundations in the work of Kydland & Prescott (1982) and Long Jr. & Plosser (1983). This theory emphasizes real shocks and, above all, supply shocks to explain bank profitability. Unlike the previous theories, the TCR is rarely mentioned in explanations of bank profitability. Yet economic activity, particularly in the banking sector, is constantly subject to exogenous shocks and crises in Sub-Saharan Africa. Among the exogenous factors influencing bank profitability are credit risk and the quality of political governance. Following this logic, disruptions in the real sector (due to these factors) are likely to influence the returns of firms and banks. Debtors' solvency risks (Bryant, 1980; Fisher, 1911) can lead to liquidity risks (Chen, 1997; Diamond & Dybvig, 1983; Niehans, 1978; Tobin, 1965; Patinkin, 1965; Thornton, 1802) or even profit losses and bank failures.

Empirical studies across countries and regions have identified factors explaining bank profitability in line with SCP theory (Boutin-Dufresne, Peña, Williams, & Zawisza, 2013; Kiyota, 2009; Flamini, McDonald, & Schumacher, 2009), the ES theory (Ahokpossi, 2013; Gammadigbé, 2012; Ary Tanimoune, 2003, 2009), or both theories (Osuagwu, 2014; Ani, Ugwunta, Ezeudu, & Ugwuanyi, 2012). A few empirical studies have examined the explanatory factors related to TCR (Osuagwu, 2014).

Studies have highlighted the role of credit risk in this regard (Akm & Hongzhen, 2019; Chantal, Namusonge, & Shukla, 2018; Kemei & Kerongo, 2014; Huang & Kuo, 2014; Isik & Hassan, 2003; Brock & Suarez, 2000; Resti, 1997). The literature has also documented the influence of political governance factors on bank profitability (Yao, Haris, & Tariq, 2018; Banerjee & Majumdar, 2018; Şanlısoy et al., 2017; Yahya, Akhtar, & Tabash, 2017; Erdogan & Aksoy, 2016; Arshad & Rizvi, 2013; Mongid & Tahir, 2011; Aburime, 2009; Anayiotos & Toroyan, 2009; Shen & Chang, 2005).

However, very few studies have analyzed the effects of credit risk and political risk on bank profitability in the context of the WAEMU. We therefore pose the following question: What are the effects of credit risk and political risk on bank

profitability in the WAEMU? This study aims to analyze the effects of these two factors on bank profitability in the WAEMU. We hypothesize that credit risk and political risk have negative effects on bank profitability in the WAEMU. The remainder of this article is structured around four (04) main sections: the first section is devoted to a review of the literature on the subject. In the second section, we describe the study's methodological approach. The presentation and discussion of the various results form the basis of the third section. The final section presents the study's conclusions, followed by economic policy implications.

2. Literature Review

There is a wealth of theoretical literature on the factors explaining bank profitability. The basic SCP theory establishes that market structure determines bank profitability (Clark, 1986; Klein, 1971; Stigler, 1964; Bain, 1951). The structure of the banking market is described in terms of banking concentration (Stigler, 1964) and/or market shares (Smirlock, 1985). In basic ES theory (Peltzman, 1977; Demsetz, 1973; Mason, 1939), bank profitability is attributable to their efficiency. This theory operates through the power of bank management, which leads to allocative efficiency. Consequently, for banks with the same technology, differences in performance may stem from efficiency X resulting from managerial power. The TCR theory emphasizes real shocks, particularly supply shocks. Thus, fluctuations in output generate fluctuations in the supply of money, which is assumed to be endogenous. Consequently, an increase in output following real shocks leads to an increase in the demand for money (Mankiw, 2010). While the ES theory and the SCP theory have frequently been the subject of empirical tests in the literature, the TCR theory deserves to be further utilized to analyze certain exogenous factors affecting bank profitability.

According to the literature, a significant number of studies have been devoted to the determinants of bank profitability. In some of these studies, bank loans, deposits, overhead costs, reserves, inflation, the discount rate, non-performing loans, and the economic growth rate are identified as factors explaining bank profitability (Ary Tanimoune, 2003, 2009). In other studies, banking concentration plays a decisive role in bank profitability (Ouédraogo, 2010, 2011; Diagne, 2010; Nubukpo, 2007; Kablan, 2007; Joseph, 2002). Dem's (2003) work highlighted the role of economies of scale on bank profitability in the WAEMU. Factors such as equity capital, bank liquidity, loans, banking concentration, and staff-to-customer ratios are likely to influence bank profitability (Igue, 2011). In addition, a set of indicators of the political and macroeconomic environment can influence the level of bank productivity. Thus, GDP growth rates, interest rate volatility, unexpected depreciation of the national currency, general price level volatility, uncertainty, the extent of non-performing loans, and a deterioration in the terms of trade can negatively affect bank profitability (Mishkin, 1991). The work of Hanson and Rocha (1986) has shown that implicit taxes and fees play a positive role in increasing bank margins. According to Demirgüç-Kunt and Huizinga (1999),

bank capitalization, the level of reserves, the banking concentration ratio, inflation, and the real lending rate determine bank profitability. Furthermore, various banking regulatory mechanisms have an impact on bank profitability (Saunders & Schumacher, 2000).

In addition to this research, studies have examined the effects of information asymmetry on banking development (Svetlana et al., 2011; Demetriades & Fielding, 2009). According to this research, information asymmetry in the credit market leads to credit defaults characterized by non-performing loans, particularly substandard and non-performing loans. Information asymmetry is therefore likely to affect bank profitability. These non-performing loans pose a risk to banks. Studies have documented a negative effect of credit risk on bank profitability (Akm & Hongzhen, 2019; Chantal, Namusonge, & Shukla, 2018; Kemei & Kerongo, 2014; Huang & Kuo, 2014; Brock & Suarez, 2000). In their study of banks in Latin American countries, Brock and Suarez (2000) found that non-performing loans have a negative impact on the banking intermediation margin. Huang and Kuo (2014) also analyzed the impact of information asymmetry and customer credit on the performance of bank loans in Taiwan region. According to them, banks without massive losses from non-performing loans have high loan performance. Conversely, banks with heavy losses due to non-performing loans are those with low. Kemei and Kerongo (2014) also found a negative effect of information asymmetry on bank performance. Chantal, Namusonge, and Shukla (2018), for their part, found a significant correlation between information asymmetry and the performance of commercial banks in Rwanda. Akm and Hongzhen (2019) studied the impact of risk and competition on bank profitability in Bangladesh. They found a relationship between risk-taking and bank profitability. Credit risk would therefore affect bank profitability in the WAEMU.

Research has also highlighted the influence of political governance factors on bank profitability. Some of these studies have documented a negative effect of political governance factors on bank profitability (Yao, Haris, and Tariq, 2018; Şanlısoy et al., 2017; Anayiotos & Toroyan, 2009; Shen & Chang, 2005). Shen and Chang (2005) demonstrated that restrictions on commercial banks' ability to engage in securities and insurance transactions, as well as restrictions on the mixing of banking and commercial services, reduce bank profits. Anayiotos and Toroyan (2009) found that institutional factors affect asset quality and bank profitability in the Middle East and North Africa (MENA). Şanlısoy et al. (2017) found a negative effect of political risk on bank profitability in Turkey. Yao, Haris and Tariq (2018) found a negative effect of government change on bank profitability. Another set of studies has documented a positive effect of political governance factors on bank profitability (Banerjee & Majumdar, 2018; Yahya, Akhtar, & Tabash, 2017; Arshad & Rizvi, 2013; Mongid & Tahir, 2011; Aburime, 2009). Using panel data from 10 Islamic banks, Arshad and Rizvi (2013) found a positive and significant impact of corruption on bank profitability. Corruption has a significant positive impact on bank profitability in Nigeria (Aburime, 2009). Mongid and Tahir (2011) also found

a positive effect of corruption on bank profitability in Southeast Asia. Yahya, Akhtar, and Tabash (2017), meanwhile, found a positive impact of political instability on the profitability of Yemeni banks. According to Banerjee and Majumdar (2018), financial regulation improves banks' performance and safety. Political risk can therefore influence bank profitability in the WAEMU. This literature review highlights the abundance of empirical studies on the determinants of bank profitability. However, very few of these studies have focused on the effects of credit risk and political risk on bank profitability in the WAEMU.

3. Study Methodology

3.1. Model Specification, Choice of Variables, and Data Sources

The identification of factors explaining bank profitability has been the subject of modeling in the literature. However, given the differences in the contexts of these studies, not all of these models are appropriate for explaining bank profitability in the WAEMU. The specification of our model is based on the work of Demirgüç-Kunt & Huizinga (1999) and Ary Tanimoune (2003). Building on the study by Demirgüç-Kunt & Huizinga (1999), Ary Tanimoune (2003) specified the following model of bank profitability:

$$\begin{aligned} \mathrm{MI}_{nt} = {} & \alpha_n + \beta_{1nt}\mathrm{CCTA}_{nt} + \beta_{2nt}\mathrm{DCTA}_{nt} + \beta_{3nt}\mathrm{FGTA}_{nt} \\ & + \beta_{4nt}\mathrm{CDTA}_{nt} + \beta_{5nt}\mathrm{TEMR}_{nt} + \beta_{jnt}X_{jnt} + €_{nt} \end{aligned}$$

where, MI_{nt} is the banking intermediation margin; α_n is the constant term; j = {IPF, TPIBR, INFL, and RESTA}.

In this specification, **CCTA** refers to the ratio of customer loans to total assets on banks' balance sheets; **DCTA** refers to the ratio of customer deposits to total assets on banks' balance sheets; **FGTA** refers to the ratio of operating expenses to total assets on banks' balance sheets; **CDTA** refers to the ratio of non-performing loans to total assets on banks' balance sheets; **TEMR** denotes the real average discount rate; **IPF** denotes the financial policy index; **TPIBR** denotes the real per capita gross domestic product growth rate; **INFL** denotes the inflation rate; and **RESTA** denotes the ratio of reserves to total balance sheet assets (Ary Tanimoune, 2003).

This specification of the bank profitability model pertained to the WAEMU. We therefore adjust the previous model to the context of our study by taking into account credit risk and political risk. We arrive at the following bank profitability model:

$$\begin{aligned} \mathrm{MGO}_{jt} = {} & \alpha_j + \beta_1\mathrm{CRISK}_{jt} + \beta_2\mathrm{PRISK}_{jt} + \beta_3\mathrm{CCTA}_{jt} + \beta_4\mathrm{DCTA}_{jt} \\ & + \beta_5\mathrm{FGTA}_{jt} + \beta_6\mathrm{RESTA}_{jt} + \beta_7\mathrm{TPIBR}_{jt} + \beta_8\mathrm{INFL}_{jt} + u_{jt} \end{aligned} \quad (1)$$

where, MGO_{jt} is the aggregate margin of banks in country j at time t; CRISK_{jt} is a measure of credit risk; PRISK_{jt} is a weighted index of political risk; α_j is the constant term; and u_{jt} are the residuals.

3.2. Description of Model Variables

The WAEMU countries included in our study are: Burkina Faso, Côte d'Ivoire, Guinea-Bissau, Mali, Niger, Senegal, and Togo. Only Benin is not included in the sample due to a lack of data, particularly regarding political risk. However, the exclusion of Benin does not limit the study's results. The study uses national-level panel data. We defined the study period (2005-2023) based on data availability. Since Benin does not present a particularly heterogeneous case with regard to the subject of our study, these seven countries are representative of all WAEMU countries (Table 1).

Table 1. Description of the variables in Model 1.

Variables	Labels	Definitions	Source	Expected signs
		Dependent variable		
MGO	Total banking margin	Refers to the overall banking margin. It is a measure of banking profitability (see Demirgüç-Kunt & Huizinga, 1999; Ary Tanimoune, 2003). It is obtained by taking the return on bank loans minus the banks' cost of capital. It is calculated for all UEMOA countries and is available in the appendices of the UEMOA Banking Commission reports.	Reports of the UEMOA Banking Commission (2005-2024)	
		Model variables of interest		
CRISK	Credit risk	This is a measure of credit risk in the credit market. It is approximated by the bank credit default rate (Ouédraogo et al., 2026; Svetlana et al., 2011; Demetriades & Fielding, 2009). This rate is the ratio of non-performing loans across all banks to the total loans of those banks. The use of this variable in the model is supported by the literature (Akm & Hongzhen, 2019; Chantal, Namusonge, & Shukla, 2018; Kemei & Kerongo, 2014; Huang & Kuo, 2014; Isik & Hassan, 2003; Brock & Suarez, 2000; Resti, 1997).	reports of the UMOA Banking Commission (2005-2024)	(-)
PRISK	Political risk	This is a measure of political risk, assessed using a weighted index. To calculate the weighted PRISK index, we considered the 12 components of political risk from the ICRG database and their respective weights. Some components each have a weight of 12. These are: Government Stability, Socioeconomic Conditions, Investment Profile, Internal Conflict, and External Conflict. Other components each have a weight of 6. These are: Corruption, Military in Politics, Law and Order, Democratic Accountability, Religious Tensions, and Ethnic Tensions. Bureaucracy Quality, meanwhile, has a weight of 4. The political risk index is constructed using the twelve components of the ICRG database. In accordance with the official methodology, since the variables are already weighted by their respective maximum scores, the overall index is obtained by simple aggregation, ranging from 0 to 100. A high value of this index (→ 100) implies low political risk, and a low value (→ 0) implies high political risk. The use of this variable in the model is also supported by the literature (Banerjee & Majumdar, 2018; Yao, Haris, & Tariq, 2018; Yahya, Akhtar, & Tabash, 2017; Şanlısoy et al., 2017; Erdogan & Aksoy, 2016; Arshad & Rizvi, 2013; Mongid & Tahir, 2011; Aburime, 2009; Anayiotos & Toroyan, 2009; Shen & Chang, 2005)	ICRG, 2024	(-)

Continued

Other explanatory variables in the model				
CCTA	bank credit ratio	This variable measures loans granted by banks to businesses, the government, and individuals relative to the total assets on banks' balance sheets	reports from the UMOA Banking Commission (2005-2024)	(+)
DCTA	bank deposit ratio	This variable measures customer deposits (businesses, the government, and individuals) relative to total assets on banks' balance sheets	Reports of the UMOA Banking Commission (2005-2024)	(-)
FGTA	bank overhead ratio	This variable measures banks' overhead expenses as a percentage of total assets on their balance sheets	Reports from the UMOA Banking Commission (2005-2024)	(-)
RESTA	Bank reserve ratio	This variable measures UMOA banking reserves as a percentage of total bank balance sheet assets	Reports of the UMOA Banking Commission (2005-2024)	(-)
TPIBR	Real GDP growth rate	This variable measures the annual change in the level of real economic activity (annual %).	BCEAO 2024	(+)
INFL	Inflation rate	This variable refers to inflation, consumer prices (annual %)	BCEAO 2024	(-)

Source: Author.

3.3. Estimation of the Bank Profitability Model

In this section, we conducted alternative unit root and cointegration tests to examine the stationarity of the various variables in the model and to identify the appropriate estimator for this study.

In this study, we conducted the LLC unit root tests by Levin, Lin and Chu (2002); the IPS tests by Im, Pesaran and Shin (2003); and the test by Hadri (2000). These tests are robust and frequently used in the literature. The panel unit root test by Levin, Lin, & Chu (2002) assumes a homogeneous autoregressive unit root, whereas that by Im, Pesaran and Shin (2003) assumes a heterogeneous unit root.

We have summarized the results of these various unit root tests at the level and first-difference levels in **Appendix 2** and **Appendix 3**, respectively. These results from the panel unit root tests are consistent and show that all variables are integrated of order 1. Indeed, based on the IPS unit root tests, all variables in the model are first-order integrated. However, based on the results of the IPS tests and LLC unit root tests, all variables are integrated of order 1 except the RESTA variable. According to Hadri's (2000) tests, the TPIBR, INFL, and RESTA variables are not stationary in first differences.

Given the small sample size (N = 7; T = 19) and the potential heterogeneity among WAEMU countries, the IPS tests appear to be the most appropriate among first-generation tests. This test allows for heterogeneous dynamics among panel

units and exhibits better properties in small samples compared to the LLC test. The Hadri test is used as a complementary robustness check. We therefore gave priority to the results of this test.

Based on the results of the previous unit root tests, we conducted alternative panel cointegration tests. In principle, to test for the existence of cointegration vectors among the variables under consideration, the traditional approach of Pedroni (1999, 2004) appears to be the best option. However, given the small size of our sample, we opted for Kao's (1999) continuity test. Indeed, using Monte Carlo simulations, Gutierrez (2003) showed that the smaller the sample size, the more Kao's tests outperform those of Pedroni. In the specific case of our research, Kao's cointegration tests are therefore more appropriate. We have summarized the results of these cointegration tests in the appendix (see **Appendix 4**). The various results of Kao's cointegration tests reject the null hypothesis of non-cointegration of the variables in the different models. We therefore consider the different series to be cointegrated.

The previously specified bank profitability model uses macroeconomic variables. Consequently, certain variables in the model may be jointly determined and lead to potential endogeneity issues. As a result, estimating the model using the Ordinary Least Squares method may yield biased results. Given these concerns and the results of the cointegration tests, estimating our model using the Pooled Mean Group (PMG) method by Pesaran, Shin and Smith (1999) or the Fully Modified Ordinary Least Squares method by Pedroni (2000) is more appropriate. We chose the PMG model because it allows us to reconcile the assumption of a common long-run relationship among the panel units with the existence of differentiated short-run adjustments. Unlike the MG model, it improves the efficiency of the estimates by requiring homogeneity of the long-run coefficients, while remaining more flexible than the DFE model, which assumes complete homogeneity of the coefficients.

The PMG method allows for reconciling, within a single specification, the routine approach that imposes fixed coefficients and the approach that assumes country-specific coefficients. This implies that the long-run relationship between the variables is identical for all countries, but that each country follows its own dynamics to converge toward this common relationship. This approach appears to be the most appropriate in the case of the WAEMU countries.

According to Pesaran, Shin and Smith (1999), model (1) can be viewed as an autoregressive model with lagged variables (ARDL) of the form:

$$y_{it} = \sum_{j=1}^{m} \lambda_{ij}\, y_{it-j} + \sum_{j=0}^{n} \delta_{ij}^{'}\, x_{it-j} + \mu_i + \gamma d_{it} + \varepsilon_{it} \qquad (2)$$

where X_{it} is the vector of explanatory variables, and μ_i represents the fixed effect (country). If the variables are cointegrated, then the error term ε_{it} is a stationary process. In this case, the model can be re-specified as an error correction model in which the short-run dynamics are influenced by the deviation from the long-run relationship:

$$\Delta y_{it} = \phi_i\left(y_{it-1} - \theta_i^{'} x_{it}\right) + \sum_{j=1}^{m-1} \lambda_{ij}^{*} \Delta y_{it-j} + \sum_{j=0}^{n-1} \delta_{ij}^{*'} \Delta x_{it-j} + \mu_i + \gamma d_{it} + \varepsilon_{it} \quad (3)$$

where θ_i is the vector of long-term coefficients and Δ is the operator of change between two successive dates. The adjustment coefficient, ϕ_i, and the long-run coefficients, θ_i, constitute the parameters of interest.

One of the advantages of ARDL models is that the short-run and long-run multipliers are estimated jointly. Furthermore, these models allow for the presence of variables that may be integrated of different orders, namely I(0) and I(1), or cointegrated (Pesaran, Shin, & Smith, 1999).

3.4. Robustness Tests on the Model

The coefficient of the error correction term (COINTEQ01) is negative and statistically significant (−0.744716; p-value = 0.0000), confirming the existence of a long-run relationship between the variables. This coefficient indicates that approximately 74.47% of the imbalance observed in the previous period is corrected in each period, reflecting a rapid rate of adjustment toward long-run equilibrium. In this study, we conducted three alternative unit root tests on the data. These are the tests by Levin, Lin and Chu (2002), Im, Pesaran and Shin (2003), and Hadri (2000). These alternative tests allowed us to verify the robustness of the stationarity analysis results for the series. We also conducted two alternative cointegration tests on the study data. These are the cointegration tests by Kao (1999) and Pedroni (2000). These cointegration tests allowed us to verify the existence of a long-run relationship between the variables in our bank profitability model. Following these various unit root and cointegration tests, we alternatively used two estimation techniques: the PMG estimator (Pesaran, Shin, & Smith, 1999) and the FMOLS estimator (Pedroni, 2000). These two estimation approaches allowed us to verify the stability of the estimated coefficients and the robustness of the estimation results. We used the FMOLS estimator as a robustness test for the PMG. Although FMOLS does not systematically address potential cross-country autocorrelation, it is widely used in macroeconomic, financial, banking, and economic growth studies. Indeed, in a context similar to that of the WAEMU, it corrects for endogeneity issues, autocorrelation of the residuals, and improves the accuracy of long-run estimates. It is highly effective for small samples (Pedroni, 2000) and when the variables are first-order integrated.

4. Study Results and Discussions

4.1. Effects of Credit Risk and Political Risk on Bank Profitability

The estimated coefficients of the "CRISK" variable are significant and negative in all estimates. Credit risk, therefore, has a negative long-term effect on bank profitability in the WAEMU. Indeed, in the WAEMU, credit risk not only leads to difficulties in loan recovery but also causes banks to distance themselves (mistrust) from borrowers. It consequently increases banks' cost of capital, thereby reducing bank margins. Brock and Suarez (2000) found a similar result regarding bank profitability in the case of certain Latin American countries. This result also corroborates the findings of Huang and Kuo (2014) in the context of Taiwan region.

The estimated coefficients for the "PRISK" variable are significant and negative in all estimates. In accordance with the methodology, the interpretation of the estimated PRISK coefficient differs from the coding of PRISK values (scores). Indeed, a high score PRISK reflects a low political risk, and a low score reflects a high political risk.

However, in econometric models, a positive coefficient for this index indicates a positive effect, and a negative coefficient indicates a negative effect. Political risk, therefore, has a negative long-term effect on bank profitability in the WAEMU. Indeed, WAEMU countries are exposed to high political risks that constrain banking activity and undermine bank profitability in this region. Studies on bank profitability have found similar results. Indeed, in Turkey, political risk has a negative effect on bank profitability (Şanlısoy et al., 2017). Yao, Haris and Tariq (2018) also found that a change in government harms bank profitability in Pakistan. Yahya, Akhtar and Tabash (2017), on the other hand, found that political instability has a positive and significant impact on the profitability of Yemeni banks (**Table 2**).

Table 2. Results of model estimates using the PMG method.

Dependent Variable: D(LOGMGO)

Method: ARDL

Date: 05/09/26 Time: 14:29

Sample: 2006 2023

Included observations: 126

Dependent lags: 1 (Fixed)

Dynamic regressors (1 lag, fixed): LOGCCTA LOGDCTA LOGFGTA LOGRESTA LOGCRISK LOGPRISK TPIBR INFL

Fixed regressors: C

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
Long Run Equation				
LOGCCTA	0.112106	0.006325	17.72494	0.0000
LOGDCTA	−0.305839	0.032232	−9.488798	0.0000
LOGFGTA	0.472611	0.011359	41.60607	0.0000
LOGRESTA	0.055956	0.003830	14.61182	0.0000
LOGCRISK	−0.054616	0.001718	−31.79971	0.0000
LOGPRISK	−0.149094	0.003633	−41.03612	0.0000
TPIBR	−0.006485	0.000759	−8.549691	0.0000
INFL	0.003366	0.000158	21.34699	0.0000
Short Run Equation				
COINTEQ01	−0.744716	0.142914	−5.210953	0.0000
D (LOGCCTA)	0.179214	0.238414	0.751692	0.4559

Continued

D (LOGDCTA)	0.185923	0.274285	0.677848	0.5011
D (LOGFGTA)	−0.221857	0.244642	−0.906862	0.3690
D (LOGRESTA)	−0.011735	0.081546	−0.143912	0.8862
D (LOGCRISK)	−0.012209	0.043733	−0.279167	0.7813
D (LOGPRISK)	−0.076747	0.443997	−0.172855	0.8635
D (TPIBR)	0.000738	0.001533	0.481381	0.6324
D (INFL)	−0.002695	0.000667	−4.043525	0.0002
C	0.153694	0.024817	6.193199	0.0000
@TREND	−0.004639	0.002353	−1.971347	0.0545
Mean dependent var	−0.006816	S.D. dependent var		0.058831
S.E. of regression	0.047741	Akaike info criterion		−7.262011
Sum squared resid	0.109403	Schwarz criterion		−5.414796
Log likelihood	567.9237	Hannan-Quinn criter.		−6.511373

*Note: *p*-values and any subsequent tests do not account for the model selection.

When estimating our bank profitability model using the FMOLS method, we obtain results similar to the previous ones, particularly regarding interest rate variables. The estimated coefficients for credit risk (CRISK) and political risk (PRISK) are significant and negative. These variables have negative long-term effects on bank profitability in the WAEMU. Table 3 below provides the results of this method. However, the results of the PMG approach are more robust compared to those of the FMOLS approach.

Table 3. Results of model estimates using the FMOLS method.

Dependent Variable: LOGMGO
Method: Panel Fully Modified Least Squares (FMOLS)
Date: 05/09/26 Time: 14:52
Sample (adjusted): 2006 2023
Periods included: 18
Cross-sections included: 7
Total panel (balanced) observations: 126
Panel method: Pooled estimation
Cointegrating equation deterministic: C @TREND
Regressor equations estimated using differences
First-stage residuals use heterogeneous long-run coefficients
Coefficient covariance computed using the default method
Long-run covariance estimates (Bartlett kernel, Newey-West fixed bandwidth)

Continued

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOGCCTA	0.066654	0.046289	1.439945	0.1529
LOGDCTA	−0.220904	0.071164	−3.104139	0.0025
LOGFGTA	0.377130	0.049465	7.624214	0.0000
LOGRESTA	−0.024606	0.014472	−1.700291	0.0921
LOGCRISK	−0.026237	0.010151	−2.584592	0.0111
LOGPRISK	−0.290430	0.058512	−4.963615	0.0000
TPIBR	0.001192	0.000757	1.573831	0.1186
INFL	0.001122	0.000671	1.670865	0.0978
R-squared	0.823054	Mean dependent var		−1.176446
Adjusted R-squared	0.787325	S.D. dependent var		0.102302
S.E. of regression	0.047178	Sum squared resid		0.231483
Long-run variance	0.000358			

4.2. Effects of Other Variables in the Bank Profitability Model

According to various estimates using the PMG technique, loans, deposits, reserves, and bank overhead costs significantly affect bank profitability in the WAEMU.

The estimated coefficients for the **"CCTA"** variable (customer loans) are significant and positive. Bank credit, therefore, has a positive effect on bank profitability in the WAEMU. This result is consistent with economic theory. However, Demirgüç-Kunt & Huizinga (1999) found a negative effect of bank credit in their analysis of bank profitability across 80 countries. The same is true for Ary Tanimoune (2003). According to him, this seemingly paradoxical result can be explained in this monetary zone. He argues that banks have not passed on the decline in the discount rate to lending rates. The estimated coefficients of the customer deposits variable **"DCTA"** are significant and negative. This result can be explained by the high costs of managing bank deposits due to the segmentation of the financial system in the WAEMU. An increase in these costs reduces the bank's margin. The findings of Demirgüç-Kunt & Huizinga (1999) and Ary Tanimoune (2003) corroborate this result. The coefficients of the variable measuring bank reserves **"RESTA"** are significant and positive. This result is contrary to our expectations. Banks pass on the costs associated with reserve requirements to their margins. The coefficients of the variable measuring overhead costs **"FGTA"** are significant and positive. This result is also contrary to our expectations. However, it is consistent with other empirical studies on this subject (Ary Tanimoune, 2003; Demirgüç-Kunt & Huizinga, 1999). Banks incorporate their overhead costs into the pricing of financial services. Indeed, the results for RESTA and FGTA can be explained by the fact that, in WAEMU countries, banks have pricing power. They therefore pass on the various costs of credit in their pricing. Similarly, the seg-

mentation of the credit market allows banks to tailor their lending terms (rates, collateral, durations) to risk profiles.

The coefficients for the **"TPIBR"** economic growth rate are significant and negative. This result is similar to that of Ary Tanimoune (2003). This finding may reflect one of the consequences of financial system segmentation in the WAEMU. Indeed, only a minority of the population has access to banking services in the WAEMU. The growth rate would therefore tend not to be a major factor in determining the bank margin.

The inflation rate **"INFL"** appears with significant and positive coefficients. Beyond inflation's impact on banks' interest rate risk, rising prices can be viewed as a factor of macroeconomic instability—that is, a key determinant of country risk. Consequently, a positive and significant coefficient suggests that inflation-related costs were less significant than the revenues generated by banks in the WAEMU. Brock and Suarez (2000) also found a positive and significant coefficient for inflation on bank profitability. Petersen (1986), however, found a significant and negative coefficient in determining the banking margin in the United States.

5. Conclusion and Implications for Economic Policy

Despite the research dedicated to the determinants of bank profitability in the WAEMU, improving this profitability remains a major concern for ensuring the development of the banking sector in this region. This study aimed to analyze the effects of credit risk and political risk on bank profitability in the WAEMU. By estimating a banking profitability model using the PMG method (Pesaran, Shin, & Smith, 1999) and the FMOLS method (Pedroni, 2000), we obtained the following main results: credit risk has a negative long-term effect on banking profitability in the WAEMU. Similarly, political risk hampers bank profitability in this region.

Beyond credit risk and political risk, we also found evidence indicating that bank loans, deposits, reserves, and overhead costs significantly affect bank profitability in the WAEMU.

Furthermore, model estimation that accounts for inflation and economic growth rates also yields significant coefficients.

In light of these results, it is important to combine financial development policies with a policy to reduce credit risk and a policy to reduce political risk.

About credit risk, it is important to address the factors that influence it. According to the findings of Boyd and Nicolo (2005) and Loaba and Zahonogo (2018), an increase in the interest rate on loans leads to greater opportunism among borrowers and a higher risk of default. A policy of lowering interest rates reduces this risk of default and boosts bank profitability in the WAEMU. Similarly, other measures to reduce credit risk can be considered. These include: 1) ensuring the provision of financial information through the creation of optimal contracts between managers and investors, 2) issuing regulations requiring managers to provide private parties with comprehensive information on actions taken,

and 3) employing financial intermediaries to obtain internal information. It is also necessary to encourage the development of large banks through the reinvestment of bank profits or the entry of new shareholders. These banks have the capacity to reduce credit risk and increase financing for the economy.

Concerning political risk, it is important to implement institutional reforms aimed at improving the quality of political governance.

Furthermore, the results imply other economic policy measures, including minimizing bank deposit costs, bank overheads, and bank reserves within the WAEMU.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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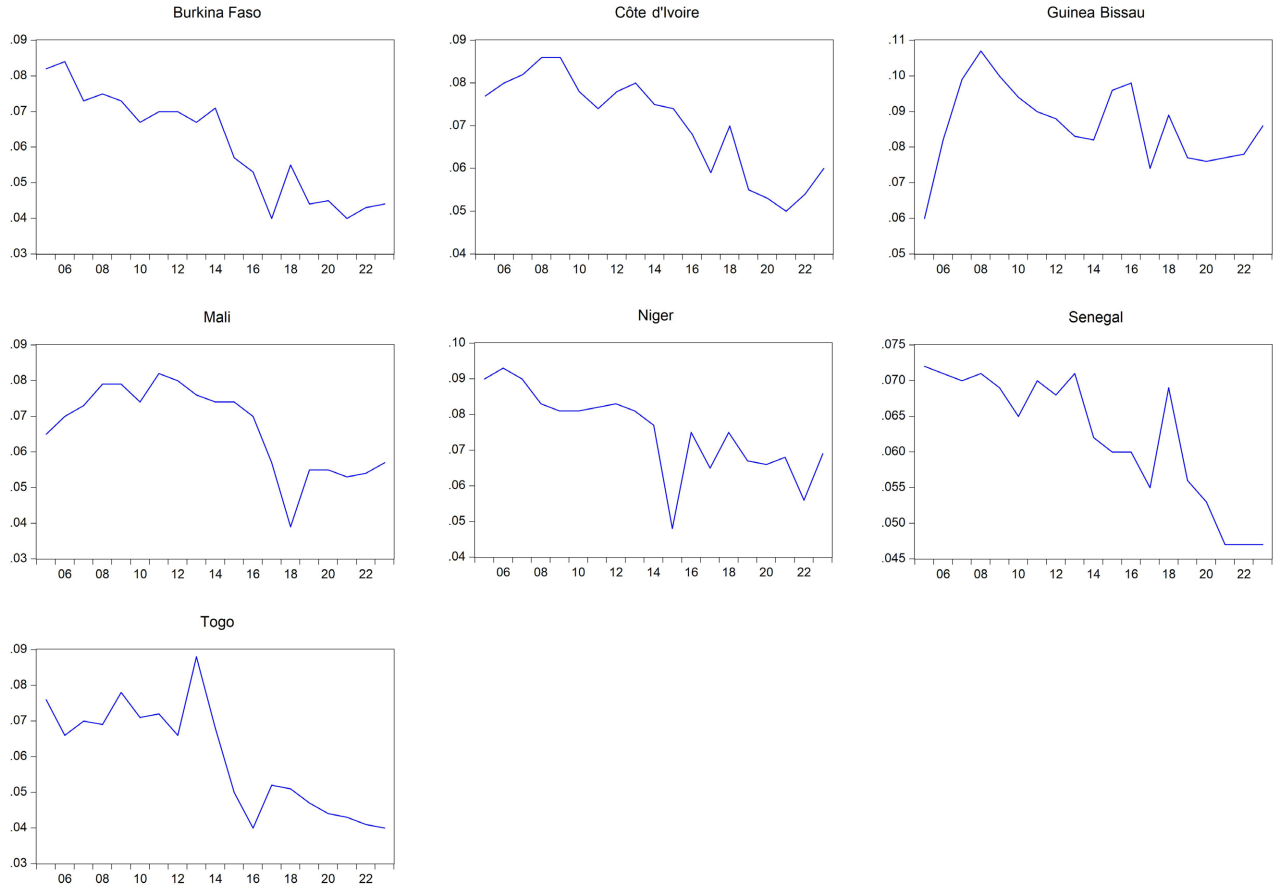
Appendices

Appendix 1. Evolution of Bank Margins in WAEMU Countries



Appendix 2. Results of Unit Root Tests

Variables	IPS H0: non-stationary		LLC H0: non-stationary		Hadri H0: stationary	
	Constant	Constant + Trend	Constant	Constant + Trend	Constant	Constant + Trend
LogMGO	0.0197	0.0001	0.0734	0.0000	0.0000	0.0053
LogPRISK	0.8688	0.0078	0.1846	0.0000	0.0000	0.0000
LogCCTA	0.9865	0.1191	0.0003	0.0583	0.0000	0.0000
LogCRISK	0.1616	0.0397	0.0000	0.0000	0.0000	0.0084
LogDCTA	0.9997	0.0014	0.2269	0.0001	0.0000	0.0000
LogFGTA	0.8365	0.0044	0.0042	0.0012	0.0000	0.0005
LogRESTA	0.2540	0.0018	0.9698	0.9998	0.0000	0.0000
TPIBR	0.0000	0.0000	0.0055	0.0096	0.0000	0.4780
INFL	0.0000	0.0000	0.0000	0.0000	0.6753	0.1327

The figures correspond to the probabilities p. For $p > 0.1$, the null hypothesis of non-stationarity cannot be rejected according to the LLC and IPS tests. However, for $p < 0.1$, the null hypothesis of stationarity is rejected according to the Hadri test.

Appendix 3. Results of Unit Root Tests on First Differences

Variables	IPS H0: non-stationary		LLC H0: non-stationary		Hadri H0: stationary	
	Constant	Constant + trend	Constant	Constant + Trend	Constant	Constant + Trend
LogMGO	0.0000	0.0000	0.0000	0.0000	0.9711	0.9751
LogPRISK	0.0000	0.0000	0.0000	0.0000	0.4166	0.1274
LogCCTA	0.0000	0.0000	0.0000	0.0000	0.3668	0.9870
LogCRISK	0.0001	0.0000	0.0000	0.0000	0.9221	0.3005
LogDCTA	0.0000	0.0000	0.0000	0.0000	0.9450	0.9875
LogFGTA	0.0000	0.0000	0.0000	0.0000	0.9736	0.9912
LogRESTA	0.0000	0.0000	1.0000	1.0000	0.0000	0.2172
TPIBR	0.0000	0.0000	0.0000	0.0000	0.9865	0.9857
INFL	0.0000	0.0000	0.0000	0.0000	0.9833	0.9948

The figures correspond to the probabilities *p*. For $p > 0.1$, the null hypothesis of non-stationarity cannot be rejected according to the LLC and IPS tests. However, for $p < 0.1$, the null hypothesis of stationarity is rejected according to the Hadri test.

Appendix 4. Results of Kao's (1999) Cointegration Tests on the Bank Profitability Model

	t-Statistic
ADF	-2.2696**
	(0.0116)

The values in parentheses are the *p*-values. (*), (**), and (***) indicate rejection of the null hypothesis of non-cointegration at the 10%, 5%, and 1% significance levels, respectively.