

# Market Structure and Performance of Microfinance in the Western Economic and Monetary Union (WAEMU)

Drissa Silué, Eric Kokola Kouadio, Vadoua Bamba

Laboratory for Analysis and Research in Economics and Management (LAREG), Jean Lorougnon Guédé University, Daloa, Ivory Coast

Email: drissas543@gmail.com, silue-drissa@ujlg.edu.ci, kokolaeric1975@gmail.com, julicevadoua52@hotmail.com

**How to cite this paper:** Silué, D., Kouadio, E. K., & Bamba, V. (2024). Market Structure and Performance of Microfinance in the Western Economic and Monetary Union (WAEMU). *Journal of Financial Risk Management*, 13, 674-688.  
<https://doi.org/10.4236/jfrm.2024.134032>

**Received:** August 29, 2024

**Accepted:** December 7, 2024

**Published:** December 10, 2024

Copyright © 2024 by author(s) and Scientific Research Publishing Inc. This work is licensed under the Creative Commons Attribution International License (CC BY 4.0).

<http://creativecommons.org/licenses/by/4.0/>



Open Access

## Abstract

The microfinance institution (MFI) sector in the WAEMU, although growing rapidly and crucial for financial inclusion and poverty reduction, remains marked by complex dynamics. The main objective of this study is to analyse the effect of market structure on the performance of microfinance institutions in WAEMU countries. It focuses on seven WAEMU countries (Benin, Burkina Faso, Côte d'Ivoire, Mali, Niger, Senegal and Togo) over the period from 2016 to 2022. We apply generalised least squares (GLS) methods and quantile regression to panel data from the BCEAO database for the year 2023. The GCM results show that there is a positive and significant relationship between market concentration and MFI performance. On the other hand, the quantile regression method also indicates that concentration has a greater influence on the performance of MFIs when they are already very efficient. Furthermore, credit, liquidity and penetration ratios also have a significant and positive impact on performance, while the rate of portfolio deterioration has a negative influence. The authorities need to strengthen regulation and supervision to limit the risk of over-indebtedness, while improving the financial education of borrowers. It is also crucial to diversify MFI lending to better meet the needs of different sectors and regions.

## Keywords

Market Structure, Performance, GCM, Quantile Regression, UEMOA

## 1. Introduction

The Microfinance Institutions (MFI) sector plays a vital role in developing

countries, particularly in terms of poverty reduction and financial inclusion. The importance of this sector is reflected in its vitality and growth. In 2018, 139.9 million borrowers benefited from the services of MFIs, compared with just 98 million in 2009 (Faye & Ratsimalahelo, 2019). Of these, 80% were women and 65% were rural borrowers, proportions that have remained stable over the past ten years, despite the increase in the number of borrowers.

In 2013, there were 759 microfinance institutions in the UEMOA region, 61 of which were large institutions with total assets of more than 2 billion CFA francs (Imam & Kolerus, 2013). In 2016, more than 943,358 billion CFA francs were raised and loans worth 105242.1 billion CFA francs were disbursed through more than 4071 points of service (BCEAO, 2023). In 2022, the sector had 4551 points of service. These microfinance institutions have managed to accumulate deposits of more than 207,432 billion CFA francs and have issued loans totalling 2,141,293 billion CFA francs (BCEAO, 2023). However, despite this vitality and growth, the MFI sector is also facing major challenges, including a significant number of bankruptcies. According to BCEAO (2023), the number of MFIs has fallen from 622 in 2016 to 492 in 2022 across the WAEMU. This situation is indicative of a lack of performance in the sector, which is why some authors such as Kablan (2012) have taken an interest in the determinants of MFI performance in the literature. For Wondirad (2020). One of the main determinants that is the subject of much discussion is market structure.

The literature presents two contradictory theories to explain the link between market structure and MFI performance. The Structure-Behaviour-Performance (SBP) theory maintains that performance is essentially the result of market structure (number of players) and the strategy (behaviour) adopted by MFIs. The efficient structure (ES) theory, on the other hand, suggests that the performance of MFIs explains the structure of the market insofar as MFIs that perform well will end up concentrating a large share of the market. While the various arguments put forward at the theoretical level appear to be antagonistic, there is also a lack of consensus in the empirical literature. Indeed, Wondirad (2020) and Deb & Sinha (2022) have shown in their study that competition has a positive influence on the financial and social performance of MFIs.

The leaders of the UEMOA zone, aware of the importance of the microfinance institutions (MFI) sector, have undertaken several reforms to support it. Two major initiatives have been put in place: the PARAMEC support programme, which aims to support the development of microenterprises in WAEMU communities by strengthening the capacity of microenterprises and their access to financing for growth. And the PASMEC support programme, which supports solidarity-based microenterprises in WAEMU communities through solidarity mechanisms and the economic empowerment of disadvantaged populations.

In 2017, the Herfindahl-Hirschman Index (HHI), which measures the level of concentration, was 2211, while performance was 10%. This indicates that an increase in concentration is accompanied by poor performance. In 2019, the HHI

rose to 2732 and performance jumped to 200.1%. This shows that an increase in concentration is accompanied by a significant rise in performance.

*In the light of these findings, the aim of this article is to examine the effect of market structure on the performance of MFIs in the WAEMU zone. More specifically, the aim is to determine the extent to which market concentration influences the financial and social performance of MFIs.* Indeed, understanding the influence of market structure on the performance of MFIs in the UEMOA is of great importance as it will improve knowledge of the financial sector and strengthen the economic and financial stability of the UEMOA, as well as financial inclusion. We can therefore formulate the following hypotheses:

**H1:** Market concentration has a positive influence on the performance of MFIs.

**H2:** Concentration has a greater influence on the profitability of the best-performing MFIs.

In order to achieve our objective and test our hypotheses, the study will use the generalized least squares (GLS) method and the quantile regression method. GCMs are very effective in correcting for autocorrelation and heteroscedasticity errors. However, since our study is also interested in the impact of different levels of performance on the variables, taking into account the diversity of characteristics between the variables. In addition, we will opt for the quantile regression method. Quantile regression is a useful statistical method for tackling certain common problems in econometrics, such as extreme values, endogeneity, autocorrelation and heteroscedasticity. Quantile regression reduces the impact of extreme values on the results by focusing on a certain quantile of the dependent variable. These methods are applied to a database consisting of 7 countries in the West African Economic and Monetary Union over a period from 2016 to 2022. The study is structured around three sections: the first concerns the theoretical and empirical review, the second focuses on the methodology and the third section is limited to the results and discussions.

## 2. Theoretical and Empirical Review of the Relationship between Market Structure and Institutional Performance

### 2.1. Theoretical Review

The theoretical literature on the relationship between market structure and performance is based on two contradictory approaches: the structure-behaviour-performance (SBP) paradigm, the efficient structure (ES) hypothesis and the contestable market theory.

The first, developed by [Mason \(1939\)](#) and [Bain \(1956\)](#), implies that behaviour and performance in a market are determined by the structures of that market. This results in rates that are higher than those in the competitive market. This situation reduces the incentive for financial institutions to make their activities more efficient, as any increase in costs can easily be covered by an increase in lending rates and/or a decrease in deposit rates ([Lapteacru & Nys, 2011](#)). According to ([Dietsch 1992](#)), the SCP model focuses on two essential elements that determine

the degree of competition: entry conditions and prices. With the presence of high barriers to entry, the market power induced by concentration in favour of large firms leads to excessive profits, despite the low level of efficiency (“quiet life hypotheses” of Hicks (1935)). SCP theory postulates that the more concentrated the market, the lower the degree of competition (Tregenna, 2009) and the higher the economic rent (Samad, 2008).

In addition to the structuralist current, a second paradigm of the SCP model is known as the “*efficient structure theory*”. According to the authors, it is the performance of companies that explains market structure. Demsetz (1973) and Peltzman (1977) attempted to propose new tools for theoretical analysis in which competition was no longer seen as a static mechanism, but as a process of dynamic selection of the most efficient firms. This is why Hien & Hanch (2013) argue that firms with a high market share are the most efficient because of the advantages of economies of scale. They argue that a high-performing firm tends to improve its performance and increase its market share. Berger & Hannan (1989), Hannan (1991) and Cyrnak & Hannan (1999) emphasise that market concentration can act as a catalyst in increasing the performance of MFIs. By dominating the market, large financial institutions benefit from significant economies of scale. This enables them to reduce their production costs, which in turn enables them to offer more competitive rates to their customers. This in turn attracts more customers, who are price-sensitive and seek to minimise their expenditure when choosing a financial institution.

The second theory, known as “*contestable markets*”, was developed by Baumol, Panzar, & Willig (1982). It emerged in the context of a revival of economic and political liberalism. The fundamental idea of this theory is that competition is governed by the conditions of entry and exit from the industry, not by the number of firms, as is the case in the Structure-Behaviour-Performance model. Baumol et al. (1982) pointed out that firms with few competitors are competitive when they operate in markets with low barriers to entry. In markets with low barriers to entry, new MFIs can easily enter the market and compete with existing MFIs. This means that MFIs must continually improve their performance in order to remain competitive. They also need to develop innovative solutions to reach the unbanked and rural areas. Liberto (2022) argues that low-level businesses become competitive when they operate in markets with low barriers to entry. The theory posits that even in a monopoly or oligopoly, incumbents will act competitively in the absence of barriers such as government regulation and high entry costs, will do whatever it takes to deter new entrants and eventually put them out of business.

## 2.2. Empirical Review

Numerous studies conducted throughout the world have supported the validity of the theory (SCP). Wondirad (2020), applying generalised methods of moments (GMM) on a sample of 183 Indian MFIs between 2005 and 2014, finds that

competition positively moderates the relationship between the social and financial performance of MFIs. [Deb & Sinha \(2022\)](#) in a study devoted to analysing the effect of competition on the efficiency of MFIs in India and Bangladesh, on 75 MFIs, from 2009 to 2016 shows that the increase in the level of competition is more pronounced in India than in Bangladesh, and that competition has a positive influence on the financial and social efficiency of MFIs.

[Kar & Swain \(2014\)](#) use a dynamic panel model to show that competition improves the performance and quality of the loan portfolio. [Baquero et al. \(2012\)](#) use the concentration indicator (HHI) and the DEA method to analyse the effect of concentration on the efficiency of 379 MFIs in 69 countries between 2002 and 2008. They conclude that increased concentration has a positive influence on the efficiency of MFIs. In contrast, [Kar & Bali \(2018\)](#) using the Boone indicator as a measure of competition and the Generalized Method of Moments (GMM) estimation technique show that increased competition leads to higher performance.

[Hossain & Shahadat \(2020\)](#) study how competition affects the efficiency of MFIs. Using the DEA method, and on a sample of 4576 observations of MFIs in 59 countries, between 2005-2014 show that competition has a negative effect on the economic sustainability of MFIs, however, it improves the depth of outreach of MFIs. According to [Dannon et al. \(2019\)](#), competition negatively affects the level of efficiency of MFIs, thus confirming [Demsetz \(1973\)](#)'s theory of efficient structures.

[Hermès et al. \(2013\)](#) examine the relationship between competition and the efficiency of Microfinance Institutions (MFIs). They measure competition by constructing a Lerner index. Using the DEA method for 362 MFIs in 73 countries over the period 1995-2008, they conclude that competition between MFIs is negatively associated with their efficiency. Finally, [Faye & Ratsimalahelo \(2022\)](#) conducted an in-depth study of 798 MFIs over a 12-year period, from 2003 to 2015. The study used the method of generalised moments in a system (GMM-SYSTEME). The study was limited to selected developing countries in five geographical regions: Africa, the Middle East, Latin America and the Caribbean, Eastern Europe and Central and South Asia. The results indicate that the performance of MFIs is negatively affected by competition.

This empirical review shows divergent opinions on the question. Some researchers support the theory (SCP), while others advocate the theory (ES). Using an adopted methodology, we will attempt to examine the effect of market structure on the performance of MFIs in the WAEMU zone.

### 3. Methodological Approach

Two methods can be used to determine the effect of market structure on the performance of MFIs in the WAEMU zone. The generalised least squares (GLS) method and the quantile regression method. We first present the data and variables of the study.

### 3.1. Study Data and Description of Variables

The data used in this study comes from the database of BCEAO (2023). The analysis covers a sample of 49 MFIs from 07 WAEMU countries (Benin, Burkina Faso, Côte d'Ivoire, Mali, Niger, Senegal and Togo) over the period from 2016 to 2022.

The variables used are of two types: Dependent variable Return on assets (ROA)

Independent variables: Herfindahl-Hirschman Index (HHI), capitalisation ratio (CAR), liquidity ratio (ratio\_liq); credit ratio (ratio\_cred); portfolio deterioration rate (taux\_degrad); geographical penetration rate (penetr\_geo)

### 3.2. Presentation of the Generalised Least Squares (GLS) Method and Quantile Regressions

#### • Generalised least squares (GLS) method

Developed by Aitken (1926), the generalised least squares (GLS) method or Aitken estimator is an extension of the ordinary least squares method. It estimates the parameters of a mathematical model by minimising the sum of the squares of the differences between the observed values and the predicted values. This method offers a robust statistical approach for analysing non-linear data or data with measurement errors. Moreover, autocorrelation and heteroscedasticity are a frequent problem in economic studies, where the variables of interest are often influenced by other unobserved factors. This can lead to biases in the estimates of causal relationships and distort the results. To solve this problem, our study proposes to use the GCM (Generalised Method of Moments) test to correct for autocorrelation and heteroscedasticity errors.

The empirical form of the generalized least squares method is as follows:

$$\begin{aligned} perf_{it} = & \alpha_{it} + \beta_1 ihh_{it} + \beta_2 car_{it} + \beta_3 ratio\_liq_{it} + \beta_4 ratio\_cred_{it} \\ & + \beta_5 penetr\_geo_{it} + \beta_6 T\_degra_{it} + \varepsilon_{it} \end{aligned} \quad (1)$$

In this equation,

- *Perf*: represents performance (the dependent variable)
- *ihh* (Herfindahl-Hirschman Index): the market concentration index
- *because*: the capitalisation ratio
- *ratio-liq*: the liquidity ratio
- *ratio\_cred*: the credit ratio
- *taux\_degra*: the Portfolio at Risk
- *penetr\_geo*: the translates the penetration rate
- $\beta_6 T\_degra$ : the portfolio deterioration rate
- $\beta$  represents the parameters to be estimated ( $\beta_1$  to  $\beta_6$ )
- $\varepsilon_{it}$  is the error term
- $\alpha$  represents the constant
- $i$  observations
- $t$  is the time index (number of years)

#### • Quantile regression method

Quantile regression was first proposed by Koenker & Bassett (1978) and is

defined as the continuity of linear regression used when linear regression conditions are not taken into account. Unlike ordinary least squares (OLS), which estimates the conditional mean of the response variable at the values of the predictor variables, quantile regression is the conditional median of the response variable. In other words, it can provide a more accurate description than traditional linear regression, because it focuses on the entire distribution of the dependent variable, not just its mean. However, quantile regression offers the possibility of obtaining precise estimates of the coefficients in different levels of the distribution. By analysing the data across several quantile points, it captures the variations specific to each segment of the distribution, providing a more complete and nuanced view of the relationships between the variables. It contributes to a better understanding of the causal relationships between variables (D'Haultfoeuille & Givord, 2014).

Quantile regression is a useful statistical method for tackling some common problems in econometrics, notably extreme values, endogeneity, autocorrelation and heteroscedasticity. It reduces the impact of extreme values on the results by focusing on a certain quantile of the dependent variable. This results in more robust estimates. However, it does not completely eliminate endogeneity, but in some cases, by focusing on different points in the distribution of the dependent variable, it makes it possible to obtain less biased estimates than ordinary regression. With regard to autocorrelation, quantile regression is not specifically designed to handle autocorrelation, but some versions of the method (such as panel quantile regression) can help to alleviate this problem. Heteroscedasticity can also bias estimates and lead to inappropriate standard errors. Quantile regression can provide more robust estimates in the face of heteroscedasticity because it does not rely on the assumption of a constant variance of the residuals. The empirical form of the quantile regression model can be formulated as follows:

$$q(\text{perf}_{it}) = \alpha_{it} + \beta_1 \text{ihh}_{it} + \beta_2 \text{car}_{it} + \beta_3 \text{ratio\_liq}_{it} + \beta_4 \text{ratio\_cred}_{it} + \beta_5 \text{penetr\_geo}_{it} + \beta_6 \text{taux\_degrad}_{it} + \varepsilon_{it} \quad (2)$$

Where

$q(\text{Perf}_{it})$  is the conditional quantile of the performance of the MFI sector.

### 3.3. Model Estimation

- Descriptive statistics

**Table 1** presents the descriptive statistics of data and analysis of correlation between variables.

**Table 1.** Descriptive statistics for variables.

Variables	Observation	Average	Standarddeviation	Min	Max
Car	49	-10.593	66.855	-277.5	82.3
ihh	49	2097.801	279.068	1884.772	2732.276
car	49	20.235	15.319	2	114.3

**Continued**

ratio_liq	49	458.470	731.958	0	2971.136
ratio_cred	49	123.957	284.647	49.481	2049.136
Penetr_geo	49	379.987	338.74	10.5	999
taux_degrad	49	712.857	689.912	150	3350

**Source:** Authors, based on data of BCEAO (2023).

- Analysis of correlation between variables.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
roa (1)	1						
ihh (2)	0.233	1					
car (3)	0.036	-0.006	1				
ratio_liq (4)	0.243	0.296*	-0.043	1			
ratio_cred (5)	0.114	0.353*	-0.021	0.301*	1		
Penetr_geo (6)	0.129	0.003	-0.018	0.304	-0.120	1	
taux_degrad (7)	-0.641*	-0.146	-0.115	-0.097	-0.057	-0.134	(1)

**Source:** Authors, based on data of BCEAO (2023). *Note:* (\*) represents levels of significance at the 1% threshold.

On analysis, the variables in the sample are correlated with each other.

## 4. Results of Econometric Tests and Discussion

The results of the econometric tests in this study are essentially composed of homogeneity tests, the inter-individual specification test of the model, the autocorrelation test and the heteroscedasticity test.

### 4.1. Model Homogeneity and Inter-Individual Specification Tests

- Presentation of the results of the homogeneity and Hausman tests

The results of the homogeneity test are shown in **Table 2** below.

**Table 2.** Results of the homogeneity test.

F (6.42) = 5.81**
Prob > F = 0.000

**Source:** Authors, based on data of BCEAO (2023). *Note:* (\*\*) represents the significance level of 5%.

The results of this test reject the null hypothesis at the 5% threshold. The panel is heterogeneous, so there is a specific individual effect. To check whether this specific effect is random or fixed, we performed the fixed-effect, random-effect and Hausman tests. The results are shown in **Table 3**.

**Table 3.** Hausman test results

Hausman test
$\text{Chi2}(5) = (b - B)'[(V_b - V_B)^{-1}](b - B) = 0.63^{***}$
Prob > chi2 = 0.986

**Source:** Authors, based on data of BCEAO (2023). *Note:* (\*\*\*) denotes the 10% significance level.

In the Hausman test we note the presence of a random effect, as the associated p-value is greater than the 10% threshold. Since there is a random effect, we will use the between estimator because it allows us to control for random effects and focus on systematic differences. However, given that the between estimator is ineffective in the presence of autocorrelation and heteroscedasticity, it is important to test for their presence in the sample in order to confirm the choice of estimator.

- **Model validation tests**

In order to verify the presence of autocorrelation or heteroscedasticity, we present the results of the tests in **Table 4** below.

**Table 4.** Results of the woodbridge autocorrelation and breusch pagan and cook weinberg heteroscedasticity tests.

Autocorrelation test	Heteroscedasticity tests
F (1,6) = 8.883**	Chi2(1) = 33.09**
Prob > F = 0.024	Prob > chi2 = 0.000

**Source:** Author, based on data of BCEAO (2023). *Note:* (\*\*) represents the significance level of 5%.

The results show that the null hypothesis of no autocorrelation is rejected at the 5% threshold. Since the probabilities are below the 5% threshold, we conclude that the errors are autocorrelated. The p-value associated with the heteroskedasticity test is also below the 5% threshold, so the null hypothesis of no heteroskedasticity is rejected. Heteroscedasticity is therefore present.

This test of the model's validity indicates the presence of autocorrelation and heteroscedasticity errors. The between estimator is no longer valid because it does not correct for these errors. On the other hand, the GCM estimator is more appropriate for our study because it corrects for autocorrelation and heteroscedasticity errors.

## 4.2. Presentation of Model Estimation Results

- **Results of the GCM model**

**Table 5.** Estimation results using the GCM method.

roa	Coef	Err. Stand	T-stat	P-value
ihh	0.016**	0.010	1.66	0.096

## Continued

because	0.269	0.394	0.68	0.495
ratio_liq	0.011*	0.001	7.06	0.000
ratio_cred	0.011*	0.004	2.43	0.015
penetr_geo	0.025*	0.011	2.22	0.026
grad_rate	-0.041*	0.008	-4.81	0.000
Cons	-30.271	20.803	-1.46	0.146

**Source:** Authors, based on data of BCEAO (2023). *Note: the coefficient is significant at the 5% (\*) and 10% (\*\*) thresholds.*

The results in **Table 5** show that market concentration has a positive and statistically significant effect on MFI performance at the 10% threshold. The variables “*liquidity*”, “*credit*” and “*geographical penetration*” have a positive and statistically significant effect on performance at the 5% threshold. On the other hand, the portfolio “*deterioration rate*” has a negative and statistically significant effect on MFI performance at the 5% threshold.

These results show that increased concentration improves performance. Our results corroborate those of (Deb & Sinha, 2022). They show that MFIs with greater market power are more effective at reducing costs. Indeed, lower costs allow MFIs to provide financial services to their customers at more affordable prices. As a result, this can attract more potential clients and promote access to financial services among the unbanked. Where the microfinance market is concentrated, MFIs can benefit from economies of scale by streamlining their operations and sharing fixed costs such as IT systems, infrastructure and staff. This can reduce costs and improve operational efficiency, leading to stronger financial performance. In addition to lower costs, where MFIs have market power, they may be motivated to develop long-term relationships with customers, which can improve performance through customer loyalty (Rajan & Petersen, 1994).

- **Results of quantile regression model**

The results of the quantile regression (see **Table 6**)

**Table 6.** Results of quantile regression model.

Variables	Quantile				
	Q10	Q25	Q50	Q75	Q90
ihh	0.012 (0.739)	0.030 (0.219)	0.004 (0.797)	0.037** (0.038)	0.061* (0.010)
car	0.229 (0.888)	0.207 (0.817)	-0.022 (0.976)	0.159 (0.784)	0.243 (0.581)
ratio_liq	0.017 (0.484)	0.016** (0.023)	0.015*** (0.000)	0.012 (0.178)	0.010 (0.407)
ratio_cred	0.012 (0.962)	0.004 (0.973)	0.010 (0.888)	0.002 (0.988)	-0.005 (0.970)

## Continued

penetr_geo	0.034	0.046*	0.023	0.016	0.027
	(0.696)	(0.062)	(0.121)	(0.304)	(0.230)
taux_degrad	-0.083	-0.083	-0.047	-0.016	-0.002
	(0.329)	(0.141)	(0.141)	(0.484)	(0.880)
cons	-30.338	-62.859	0.367*	-70.025	-120.355
	(0.803)	(0.274)	(0.992)	(0.12)	(0.006)

**Source:** Author, based on data of BCEAO (2023). *Note:* (\*), (\*\*) represent significance levels of 1% and 5% respectively (*P*-value).

The quantile regression results indicate that market concentration has a positive and significant effect on MFIs that are already performing at the 1% and 5% thresholds. These results are identical to those of (Faye & Ratsimalahelo, 2022). This indicates that market concentration can be beneficial for successful MFIs. It allows them to attract investors and lenders by enabling them to access additional financial resources, finance their activities and meet the needs of their customers. It also helps them to position themselves in specific market segments, enabling them to maximise their revenues and improve their performance. In addition, market concentration encourages the sharing of best practice between already successful MFIs. This enables them to collaborate and exchange knowledge on risk management, governance, innovation, etc., which can translate into improved performance.

**The liquidity ratio “ratio\_liq”** has a positive influence on performance at the 5% threshold. This means that an increase in the liquidity ratio improves performance. This result is similar to that of (Trad et al., 2017) who show that institutions with high liquidity ratios efficiently meet their financial obligations. Our results also corroborate with those of (Elouali & Oubdi, 2020) who argue that financial institutions with high liquidity are better able to obtain additional funding if needed. Lenders prefer to extend credit to institutions that are better equipped to meet customers’ needs.

**The “ratio\_cred” credit ratio** has a significant and positive influence on performance at the 5% threshold. This means that a high credit ratio contributes to improving MFI performance. Our results are identical to those of (Berger & Udell, 2002) who find that a high credit ratio broadens their client base and increases their activities. Brickley et al. (2003) find similar results. According to them, when MFIs have higher credit ratios, they are able to diversify their loan portfolio by making loans to different types of clients or in different economic sectors. This reduces credit risk and makes them more resilient to potential defaults by a single borrower or a specific sector (Honlonkou, 2006).

**The geographical penetration “penetr\_geo”** has a positive and significant influence on the performance of MFIs at the 5% threshold. A high penetration rate leads to an increase in deposits and loans granted, which contributes to the growth of the institutions’ assets. It can also lead to a greater number of customers

(Jégourel, 2008). An increase in the number of customers means an increase in the income generated by the interest on the loans granted by the MFI. This can help to improve the MFI's profit margins and profitability. In addition, the risk of default is reduced, as the risks are spread over a larger number of borrowers. In this way, a higher penetration rate can improve asset quality and reduce losses linked to non-performing loans. It also helps to reduce the operating costs of microfinance institutions. This result is similar to those of Creusot & Poursat (2009).

The portfolio *degradation rate* has a negative impact on MFI performance at the 5% threshold. This implies that an increase in the degradation rate reduces MFI performance. According to Abebaw (2014) and Solhi & Mohamed (2014), when borrowers fail to repay interest and late fees to microfinance institutions (MFIs), this creates a domino effect that negatively affects their income. MFIs operate by lending money to low-income borrowers, often without collateral. Abdula & Devi (2016) arrive at the same result. They show that a high degradation rate is the result of poor risk management on the part of the MFI. Clients and investors may be deterred from doing a bad deal with the MFI because of these high risks. As a result, deposit levels will fall and have a negative impact on the MFI's performance.

Two hypotheses were put forward in this study. The first was that market concentration has a positive influence on MFI performance. This hypothesis was verified as the results showed a positive effect of concentration on performance. The second hypothesis was that market concentration had a greater influence on the performance of fairly efficient MFIs than on that of less efficient MFIs. It was also verified because when MFIs have a high level of performance, the effect of market concentration on their performance is significant.

## 5. Conclusion and Recommendation

The general objective of this study is to analyse the effect of market structure on performance in the WAEMU zone. We used the econometric model in cylindrical panel data of 7 WAEMU countries, namely Benin, Benin, Burkina-Faso, Cote d'Ivoire, Mali, Niger, Senegal, Togo, over the period 2016 - 2022. The data comes from the BCEAO (2023)'s financial statements. GCM estimation methods were used because of their ability to correct for endogeneity, autocorrelation and heteroscedasticity errors, as well as quantile regression models, which also allow for autocorrelation, heteroscedasticity and extreme value errors. This model also offers the possibility of obtaining precise estimates of the coefficients in different levels of the distribution.

The results of the estimations show that market concentration has a positive influence on the performance of MFIs in the WAEMU, and that it also has a positive influence on the performance of MFIs that are already performing well. These results confirm the structure-behaviour-efficiency (SBE) theory. On the other hand, the results show that the liquidity ratio, the credit ratio and the

penetration rate have a positive and significant influence on the performance of MFIs. On the other hand, the deterioration rate has a negative and significant influence on the performance of MFIs.

These results could lead governments to strengthen their regulation and supervision to limit the risks of overindebtedness and default. Similarly, financial education for borrowers and the implementation of solid monitoring and evaluation mechanisms are key elements in preventing overindebtedness and ensuring responsible financial management. Finally, MFIs must ensure that they diversify their loan portfolio by offering products adapted to different sectors and geographical areas.

### Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

### References

- Abdula, A., & Devi, S. (2016). Risk Management in Microfinance: Lessons from High Portfolio Degradation. *Microfinance Review*, *14*, 89-103.
- Abebaw, D. (2014). Impact of Portfolio Deterioration on the Performance of Microfinance Institutions. *Journal of Microfinance Studies*, *12*, 45-67.
- Aitken, A. C. (1926). A Generalized Least Squares Approach. *Statistical Methods for Research*, *8*, 24-29.
- Bain, J. S. (1956). Advantages of the Large Firm: Production, Distribution, and Sales Promotion. *Journal of Marketing*, *20*, 336-346. <https://doi.org/10.1177/002224295602000402>
- Baquero, G., Hamadi, M., & Heinen, A. (2012). Market Structure and Performance in Microfinance Institutions: The Role of Concentration. *Finance Research Letters*, *9*, 191-199.
- Baumol, W. et al. (1982). Contestable Markets: An Uprising in Industry Structure Theory. *American Economic Review*, *72*, 1-15.
- BCEAO (2023). Central Bank of West African States. <https://www.bceao.int/index.php/en>
- Berger, A. N., & Hannan, T. H. (1989). The Price-Concentration Relationship in Banking. *The Review of Economics and Statistics*, *71*, 291-299. <https://doi.org/10.2307/1926975>
- Berger, A. N., & Udell, G. F. (2002). The Institutional Memory Hypothesis and the Pro-cyclicality of Bank Lending Behavior. *Journal of Financial Intermediation*, *11*, 16-37.
- Brickley, J. A., Coles, J. L., & Terry, R. L. (2003). Managerial Incentives and Corporate Financial Performance. *Journal of Applied Corporate Finance*, *15*, 99-111.
- Creusot, A., & Poursat, C. (2009). Pour une meilleure inclusion financière: Renforcer les institutions Intermédiaires. *Revue Tiers Monde*, *197*, 17-36. <https://doi.org/10.3917/rtm.197.0017>
- Cyrnak, A. W., & Hannan, T. H. (1999). Is the Cluster Still Valid in Defining Banking Markets? Evidence from a New Data Source. *The Antitrust Bulletin*, *44*, 313-331. <https://doi.org/10.1177/0003603x9904400203>
- D'Haultfoeuille, X., & Givord, P. (2014). La régression quantile en pratique. *Economie et statistique*, *471*, 85-111. <https://doi.org/10.3406/estat.2014.10484>
- Dannon, H., Bangaké, C., & Eggoh, J. (2019). Structure de marché et performance économique des institutions de microfinance dans l'UEMOA : cas du Bénin et du Togo. *Mondes en développement*, *185*, 29-44. <https://doi.org/10.3917/med.185.0029>

- Deb, S., & Sinha, T. (2022). Competition and Efficiency in Microfinance Institutions: Evidence from India and Bangladesh. *Economic and Political Weekly*, 57, 33-40.
- Demsetz, H. (1973). Industry Structure, Market Rivalry, and Public Policy. *The Journal of Law and Economics*, 16, 1-9. <https://doi.org/10.1086/466752>
- Dietsch, M. (1992). Market Structure, Efficiency, and Performance in Banking. *Journal of Banking and Finance*, 16, 313-330.
- Elouali, R., & Oubdi, L. (2020). The Role of Liquidity in the Financial Performance of Microfinance Institutions. *Journal of Financial Economics*, 28, 59-75.
- Faye, D., & Ratsimalahelo, Z. (2019). Les déterminants des taux d'intérêt des institutions de microfinance selon l'ancienneté et la taille. *Revue d'économie du développement*, 27, 67-99. <https://doi.org/10.3917/edd.333.0067>
- Faye, I., & Ratsimalahelo, Z. (2022). Analyzing the Impact of Competition on Microfinance Institutions' Performance: A GMM-SYSTEM Approach. *Journal of Microfinance and Development*, 22, 78-95.
- Hannan, T. H. (1991). Foundations of the Structure-Conduct-Performance Paradigm in Banking. *Journal of Money, Credit and Banking*, 23, 68-84. <https://doi.org/10.2307/1992764>
- Hermès, N., Lensink, R., & Meesters, A. (2013). Competition and the Outreach of Microfinance Institutions. *World Development*, 37, 779-790.
- Hicks, J. R. (1935). Wages and Interest: The Dynamic Problem. *The Economic Journal*, 45, 456. <https://doi.org/10.2307/2224968>
- Hien, T., & Hanch, M. (2013). Market Efficiency and Structure in Microfinance. *International Journal of Economics and Finance*, 5, 45-56.
- Honlonkou, A. N., Acclassato, D. H., & Quenum, C. V. C. (2006). Déterminants de la Performance de Remboursement Dans Les Institutions de MicroFinance au Bénin. *Annals of Public and Cooperative Economics*, 77, 53-81. <https://doi.org/10.1111/j.1370-4788.2006.00297.x>
- Hossain, M., & Shahadat, K. (2020). The Role of Competition in the Sustainability of Microfinance Institutions. *Journal of Financial Services Research*, 47, 59-75.
- Imam, P. A., & Kolerus, C. (2013). *The Financial Inclusion Index: A New Measure of Financial Access* (pp. 1-26). IMF Working Papers, WP/13/22.
- Jégourel, Y. (2008). La microfinance : entre performance sociale et performance financière. *Regards croisés sur l'économie*, 3, 197-205. <https://doi.org/10.3917/rce.003.0197>
- Kablan, S. (2012). Effectiveness of Microfinance Institutions in UEMOA: An Outreach-Financial Intermediation Approach. *Revue d'économie politique*, 128, 667-689.
- Kar, A., & Bali, R. (2018). The Boone Indicator and Competition in Microfinance: Cross-Country Evidence. *Economic Modelling*, 76, 15-25.
- Kar, A., & Swain, R. B. (2014). Competition in Microfinance: A Dynamic Panel Analysis. *Journal of Financial Stability*, 15, 37-49.
- Koenker, R., & Bassett, G. (1978). Regression Quantiles. *Econometrica*, 46, 33-50. <https://doi.org/10.2307/1913643>
- Lapteacru, I., & Nys, E. (2011). Competition and Market Structure in the European Banking Sector: A Review of the Empirical Literature. *Journal of Banking and Finance*, 35, 1-12.
- Liberto, G. (2022). Contestable Markets and Microfinance in Developing Economies. *Economic Policy Review*, 16, 105-120.
- Mason, E. S. (1939). Price and Production Policies of Large-Scale Enterprises. *American Economic Review*, 29, 61-74.

- Peltzman, S. (1977). The Gains and Losses from Industrial Concentration. *The Journal of Law and Economics*, 20, 229-263. <https://doi.org/10.1086/466902>
- Rajan, R. G., & Petersen, M. A. (1994). The Benefits of Lending Relationships: Evidence from Small Business Data. *The Journal of Finance*, 49, 3-37. <https://doi.org/10.1111/j.1540-6261.1994.tb04418.x>
- Samad, A. (2008). Market Structure and Performance: The Case of U.S. Commercial Banks. *Journal of Business and Economic Research*, 6, 13-22.
- Solhi, F., & Mohamed, R. (2014). Portfolio Quality and Financial Performance in Microfinance: The Role of Debt Overhang. *Journal of Financial Management*, 11, 112-124.
- Trad, N., Gohar, R., & Abbas, A. (2017). Liquidity Management in Microfinance: A Comparative Study. *Microfinance and Development Journal*, 19, 66-89.
- Tregenna, F. (2009). The Fat Years: The Structure and Profitability of the US Banking Sector in the Pre-Crisis Period. *Cambridge Journal of Economics*, 33, 609-632. <https://doi.org/10.1093/cje/bep025>
- Wondirad, T. (2020). Financial and Social Performance in Microfinance: The Role of Competition. *Journal of Microfinance Innovation*, 12, 42-58.