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Intermediation, Interrupted? Bank-Level Analysis of Interest Spreads in Montenegro

Serhan Cevik and Amit Kara

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Prepared by Serhan Cevik and Amit Kara*

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ABSTRACT: Financial intermediation in Montenegro has been on a declining trend since independence, with domestic credit to the private sector decreasing from a peak of 86.5 percent of GDP in 2008 to 46.4 percent in 2024. Net interest margin (NIM)—a common indicator of intermediation costs—has remained elevated, ranking among the highest in the Western Balkans. This paper analyzes the determinants of NIMs using a unique bank-level dataset comprising quarterly observations on all commercial banks in Montenegro during the period 2013–25. The empirical analysis reveals three key findings, each with important policy implications. First, larger banks tend to exhibit lower NIMs, reflecting economies of scale, diversification, and stronger market power. Second, higher asset quality is associated with narrower margins, underscoring the role of effective credit risk management. Third, greater operational efficiency correlates with lower NIMs, highlighting the importance of cost control and managerial effectiveness. Taken together, these results underscore the need for policy initiatives that support banking sector consolidation, reinforce credit risk management practices, and promote operational efficiency improvements.

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WORKING PAPERS

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Contents

I. Introduction **3**

II. A Brief Review of the Literature **5**

III. Structure and Dynamics of the Banking System in Montenegro **6**

IV. Data Overview **9**

V. Empirical Strategy and Results **11**

VI. Concluding Remarks **18**

Appendix I. **20**

References **22**

FIGURES

1. State of Financial Intermediation 4
2. Banking System Indicators 8
3. Bank-Level Interest Rates and NIMs 9

TABLES

1. Summary Statistics 11
2. Determinants of Bank-Level NIMs: Baseline Estimations 13
3. Determinants of Bank-Level NIMs: Granular Estimations 16

I. Introduction

Montenegro has experienced a marked decline in financial intermediation, with domestic credit to the private sector contracting from a peak of 86.5 percent of GDP in 2008 to 46.4 percent by 2024—a multifaceted trend unfolded across the Western Balkans following their independence, reflecting broader regional economic and institutional challenges.[1] Net interest rate margin (NIM)—the difference between lending and deposit rates—have remained persistently elevated relative to regional peers, signaling structural inefficiencies within the financial sector in Montenegro. Such inefficiencies are commonly attributed to concentrated market structure, elevated operational costs, and underdeveloped institutional and regulatory frameworks, as extensively documented in the seminal literature on financial intermediation (Goldsmith, 1969; McKinnon, 1973; Shaw, 1973). In this context, credit rationing may emerge, whereby even creditworthy borrowers—particularly among households and small and medium-sized enterprises (SMEs)—face limited access to affordable financing. Capital constraints can discourage investment, hinder innovation, and slow productivity growth, thereby reducing overall economic efficiency and constraining the country's long-term development potential (Bencivenga and Smith, 1991; Levine and Zervos, 1998; Calderón and Liu, 2003; Levine, 2005; Beck, Demirgüç-Kunt, and Levine, 2007; Demirgüç-Kunt and Levine, 2009; Cevik, 2024).

As illustrated in the left-hand panel of Figure 1, the average lending rate of commercial banks in Montenegro's unilaterally euroized economy generally moves in tandem with the European Central Bank (ECB) policy rate. In contrast, deposit rates demonstrate a markedly weaker responsiveness to fluctuations in the ECB's monetary policy rate—particularly during periods of policy tightening—suggesting asymmetric interest rate pass-through between lending and deposit markets at the aggregate level.[2] The resulting gap between lending and deposit rates may reflect several structural and market-related factors, including low market contestability, stringent regulatory capital requirements, strong loan demand, and elevated credit risk. A nuanced understanding of banks' interest rate-setting behavior is therefore essential for policymakers, as persistently high lending rates and large intermediation spreads can constrain credit expansion, discourage productive investment, and ultimately hinder overall economic performance.

This paper investigates the determinants of NIMs across commercial banks in Montenegro—a small, open economy characterized by the highest interest rate spreads in the Western Balkans. To uncover the key drivers of NIMs, we utilize a novel bank-level panel dataset comprising quarterly observations from eleven commercial banks operating in Montenegro over the period 2013–25. This timeframe captures varying monetary policy phases, including both easing and tightening cycles, enabling a nuanced assessment of how bank-specific characteristics and macroeconomic conditions jointly influence the costs of financial intermediation. In addition to analyzing average NIMs at the bank level, we disaggregate margins by borrower segments—households, non-financial corporations, and legal persons—providing a granular perspective on how intermediation costs vary across different client categories. This detailed approach is particularly salient in Montenegro, where bank

[1] The determinants of cross-country differences in financial intermediation lie beyond the scope of the present study, which focuses specifically on the bank-level determinants of interest margins in Montenegro. Moder and Bonifai (2017) provide a comprehensive analysis of access-to-finance constraints in the Western Balkans region, offering valuable insights into the broader context within which Montenegrin banks operate.

[2] Using the Vector Error Correction Model (VECM), we analyze the relationship between the average lending and deposit rates in Montenegro and the monetary policy rate set by the ECB and find a stable long-run relationship for lending and deposit rates at the aggregate level as a broader point of reference. On average, the lending rate is responsive to its own lags, the policy rate and the deposit rate in the short run. The deposit rate, on the other hand, is unresponsive to the lending rate or the monetary policy rate in the short run.

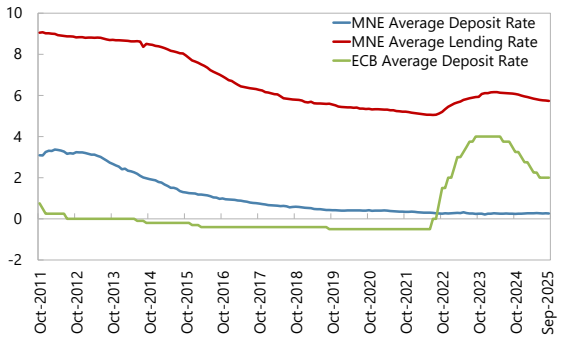
lending remains the predominant source of financing, and aligning the financial sector with European Union (EU) standards remains a strategic policy imperative.

Our empirical analysis reveals three main findings with important policy implications. First, bank size exhibits a robust inverse relationship with NIMs across all borrower segments, indicating that larger banks benefit from economies of scale, enhanced diversification, and greater market power, which collectively enable more competitive pricing and lower margins. Second, credit risk—proxied by loan loss provisions relative to total loans and loan-to-deposit ratios—emerges as a significant determinant of NIMs; banks with stronger asset quality tend to maintain narrower interest margins. This underscores the critical role of sound credit risk assessment and lending practices in promoting financial stability and facilitating efficient loan pricing. Third, operational efficiency strongly correlates with lower NIMs, highlighting that banks with disciplined cost management and higher management quality can sustain profitability without resorting to wider margins, thereby enhancing sector resilience.

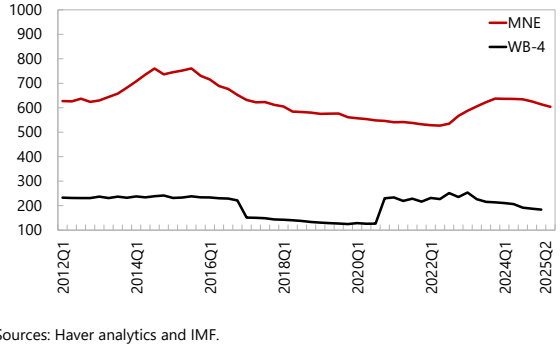
From a policy standpoint, these results underscore the need for a regulatory framework that encourages efficiency-enhancing consolidation in Montenegro's fragmented banking sector, where smaller banks may face structural disadvantages. Strengthening credit risk management through improved supervision, expanded credit information infrastructure, and risk-sensitive capital requirements is equally vital to support prudent lending practices and reduce costly risk premia. Finally, fostering investments in technology, workforce skills, and process innovation is essential to boost operational efficiency, ultimately enhancing the competitiveness and stability of the banking sector as Montenegro continues its alignment with EU financial standards.

The remainder of the paper is organized as follows. Section II provides a brief review of the relevant literature. Section III describes the structure and recent dynamics of the banking system in Montenegro. Section IV presents the dataset and variables used in the empirical analysis. Section V outlines the econometric methodology and discusses the main empirical findings. Finally, Section VI concludes with a summary of the results and key policy implications.

Figure 1. Montenegro: State of Financial Intermediation



Sources: Haver Analytics.



Sources: Haver analytics and IMF.
Note: WB-4 includes Albania, Bosnia/Herzegovina, Kosovo, and North Macedonia.

II. A Brief Review of the Literature

Understanding the determinants of interest spreads has long been a central concern in financial economics, particularly in developing and transition economies. NIMs serve as a key indicator of banking sector efficiency, competitiveness, and the overall cost of financial intermediation. Foundational studies emphasize the critical roles of market structure, regulatory quality, and institutional development (Ho and Saunders, 1981; McShane and Sharpe, 1985; Allen, 1988; King and Levine, 1993; Angbazo, 1997; Demirgüç-Kunt and Huizinga, 1999; Maudos and Fernández de Guevara, 2004; Beck and Hesse, 2009). These works find that limited competition, high operating costs, and weak legal frameworks tend to widen interest spreads—particularly in low- and middle-income economies with underdeveloped financial systems. Nonetheless, the literature remains divided on the causal relationships between bank-specific characteristics, macroeconomic conditions, and the evolution of NIMs across commercial banks and over time.

In the context of transition economies, scholars such as Gorton and Winton (1998), Randall (1998), and Harper and McNulty (2008) underscore the importance of underdeveloped financial infrastructure and elevated credit risk as key contributors to persistently high spreads. More recent micro-level analyses (e.g., Martínez Pería and Mody, 2004; Agapova and McNulty, 2016; Agoraki and Kouretas, 2019; Calice, 2025) highlight the influence of bank-specific factors—such as size, capitalization, and risk exposure—on NIMs. Similarly, Nuhiu, Aliu, and Hoti (2024) examine interest rate spreads in six Western Balkan countries, including Montenegro, and find that both macroeconomic variables (e.g., income per capita, unemployment) and bank-level factors (e.g., market concentration, credit portfolio quality) significantly shape financial intermediation costs.

The literature on interest rate pass-through and bank behavior in highly euroized and currency-board economies highlights the constraints these regimes place on monetary transmission and pricing strategies. In such settings, domestic interest rates are heavily influenced by external interest rates due to limited monetary policy autonomy and widespread use of foreign currency–denominated assets and liabilities (Cottarelli and Kourelis, 1994). As a result, pass-through from policy or market rates to retail lending and deposit rates tends to be partial, slow, and often asymmetric, reflecting institutional rigidities and banks' efforts to manage foreign exchange and liquidity risks (Havrylchyk and Jurzyk, 2011). Currency board regimes, with fixed exchange rate pegs and passive monetary policies, further restrict domestic interest rate flexibility. Banks in these economies primarily adjust rates in response to external shocks and funding conditions, leading to incomplete pass-through, partly due to imperfect competition and risk management (Chen et al., 2025). Overall, interest rate pass-through is reduced in these contexts, with bank behavior and credit cycles driven more by external financial conditions than by domestic policy.

The literature also provides mixed evidence on whether ownership structure—foreign versus domestic—systematically affects NIMs. Early cross-country evidence by Demirgüç-Kunt and Huizinga (1999) suggests that foreign banks tend to exhibit higher NIMs in developing economies but lower NIMs in advanced markets, reflecting differences in efficiency, competition, and risk exposure. Subsequent studies (e.g., Claessens, Demirgüç-Kunt, and Huizinga, 2001) confirm that while foreign banks are generally more efficient, their performance depends critically on host-country conditions. In emerging markets, Martínez Pería and Mody (2004) and López-Espinosa et al. (2012) find that foreign banks often maintain higher interest margins, possibly to compensate for information asymmetries and market entry costs. In contrast, studies focusing on advanced economies (e.g., Williams, 2007; Albertazzi and Gambacorta, 2009) report that foreign banks operate with thinner margins owing to greater efficiency and stronger competitive pressures. However, other studies

emphasize that once factors such as bank size, cost efficiency, funding structure, and market concentration are controlled for, ownership effects on NIMs become statistically insignificant—suggesting that structural and macroeconomic conditions largely explain the observed differences (e.g., Claeys and Vander Vennet, 2008; Haas and Van Lelyveld, 2010).

A growing body of research also highlights the influence of macroeconomic stability, global interest rate trends, and technological innovation on deposit behavior and liquidity risk (Brock and Rojas-Suarez, 2000; Demirgüç-Kunt, Laeven, and Levine, 2004; Gelos, 2006; Claeys and Vander Vennet, 2008; Poghosyan, 2013; Borio, Gambacorta, and Hofmann, 2017; Molyneux, Reghezza, and Xie, 2019; FSB, 2024). These studies demonstrate that macroeconomic volatility and weak institutional environments exacerbate liquidity pressures, while digitalization enhances depositor responsiveness to interest rate differentials and facilitates rapid reallocation of funds across institutions.

Taken together, these dynamics have important implications for interest rate spreads, bank funding structures, and financial stability—particularly in small, open economies such as Montenegro. In such settings, external shocks—whether financial, macroeconomic, or technological—can transmit rapidly through the banking system. As global monetary conditions evolve and digital adoption accelerates, commercial banks face heightened volatility in deposit flows, posing challenges to liquidity management, profitability, and systemic resilience. Against this backdrop, we present the first bank-level analysis of NIMs in Montenegro—a small developing economy on its path toward EU accession—offering novel insights into the structural and institutional drivers of financial intermediation costs.

III. Structure and Dynamics of the Banking System in Montenegro

Montenegro's financial system is overwhelmingly dominated by commercial banks, which exhibit substantial heterogeneity in size, ownership structure, and business models. As of 2025, Montenegro's banking sector consists of 11 operating commercial banks, down from 15 in 2018 due to a process of consolidation. Despite the country's relatively small population of approximately 623,000, this configuration positions Montenegro as one of the most intensely banked economies in the Western Balkans (Figure 2). The number of people per commercial bank, for example, stands at 56,684 in Montenegro, which is considerably lower than 140,335 in North Macedonia, and 144,145 in Kosovo, and substantially below Serbia, where there are about 330,000 people per commercial bank.

Eight of these institutions are either wholly or majority foreign-owned, reflecting the high degree of financial openness and integration with European markets.[3] Collectively, the banking sector's assets total €7.3 billion, equivalent to roughly 95 percent of GDP, underscoring its systemic dominance and central role in financial intermediation. In contrast, non-bank financial institutions remain underdeveloped. The insurance sector accounts for about 4.4 percent of GDP in assets, while microfinance institutions hold roughly 1.6 percent of GDP. Although total stock market capitalization reached approximately 48 percent of GDP in 2024, market

[3] Data constraints preclude estimating the empirical model separately for domestic and foreign banks. Nonetheless, available descriptive evidence does not suggest substantial differences in NIM behavior across ownership types. Although foreign banks—typically larger in size—exhibit marginally higher average NIMs, their movements closely track those of domestic banks, which are generally smaller. This pattern indicates that ownership structure is unlikely to be a major source of systematic variation in NIMs over the sample period.

liquidity remains extremely limited, with an annual turnover of just about 0.1 percent of GDP. As a result, Montenegro's financial sector relies heavily on banks as the primary channel for savings mobilization and credit allocation, with other financial subsectors playing only a marginal role.

The structure of the financial system in Montenegro underscores critical concerns regarding the financing patterns of domestic firms, particularly in light of persistent constraints in access to bank credit—an issue also observed across the Western Balkans (Moder and Bonifai, 2017). A plausible explanation is a shift toward alternative and more affordable funding sources—such as internal resources, increased intercompany lending, borrowing from foreign banks, or capital market access. Given the underdeveloped state of domestic capital markets, over 80 percent of non-financial firm investment in Montenegro is financed internally, compared to an average of 60 percent among peer economies (EBRD, 2023; World Bank, 2024). Intercompany debt, accounting for approximately 30 percent of foreign direct investment flows, also represents a significant channel. This substitution likely reflects a pattern whereby more productive firms successfully diversify financing sources, while less productive firms remain dependent on domestic banks with higher lending rates.

On the asset side of bank balance sheets, loans to households and non-financial corporations constitute the largest share, followed by holdings of securities and placements with the central bank. On the liabilities side, deposits represent the predominant funding source, with more than 80 percent held in sight or demand accounts—an indication of the high liquidity preference among depositors. The household sector accounts for roughly 39 percent of total deposits, non-financial corporations contribute around 29 percent, and non-resident deposits—ranging between 18 and 28 percent over the past decade—remain an important source of funding.

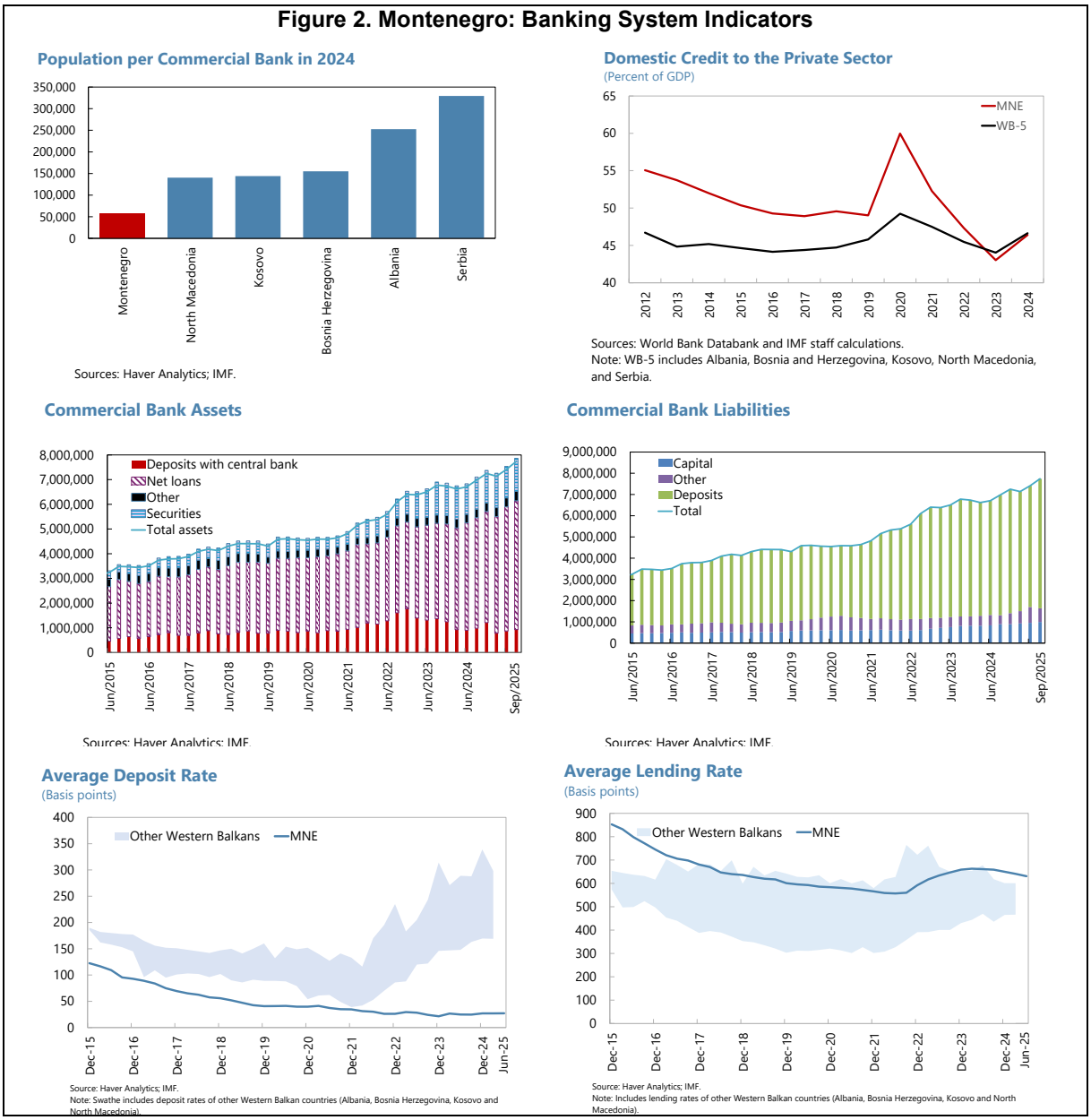
Following the COVID-19 pandemic, Montenegro's banking sector witnessed a marked surge in deposit inflows, particularly in 2021, partly fueled by increased immigration. The ratio of deposits to total assets climbed from 72.9 percent in 2020 to 80.6 percent by 2024, while the share of liquid assets nearly doubled from 10.5 to 18.9 percent over the same period. The bulk of these liquid assets comprised short-term, euro-denominated government securities. Rather than translating this deposit growth into expanded domestic credit, banks predominantly invested in low-risk sovereign instruments, reflecting a cautious lending stance amid ongoing macroeconomic uncertainties and tepid investment demand. However, lending activity began to adjust in early 2024 as banks responded to the government's *Europe Now* programs—encompassing a substantial minimum wage hike, reductions in informal employment, the elimination of healthcare contributions, and cuts to pension and disability insurance contributions.

While lending rates in Montenegro generally align with those of neighboring Western Balkan economies, they tend to reside at the upper end of the regional spectrum. In contrast, average deposit rates have persistently lagged behind regional peers since 2015. This sustained divergence—characterized by relatively high lending rates and comparatively low deposit rates—has contributed to structurally elevated NIMs, underpinning robust banking sector profitability. In 2024, total banking profits reached approximately €158 million (around 2.1 percent of GDP), with core income components—net interest and fee income—accounting for nearly 69 percent of total revenue (CBCG, 2025). The sector's average return on equity (ROE) stood at a notable 18.5 percent, and return on assets (ROA) at 2.8 percent, significantly outperforming regional Western Balkan averages of approximately 8–9 percent ROE and 1.3 percent ROA. Meanwhile, the average nonperforming loan (NPL) ratio declined to roughly 2.9 percent by mid-2025, well below regional benchmarks, reflecting improved asset quality and prudent provisioning. Collectively, these trends—strong profitability, contained credit risk, and rising operational efficiency—paint a favorable medium-term outlook for Montenegro's banking system. Nonetheless, profitability remains susceptible to cyclical fluctuations, and the sector's heavy reliance

on a narrow income base combined with persistently high NIMs exposes potential vulnerabilities, particularly amid evolving monetary policies, depositor behavior, and regulatory frameworks.

From both a policy and analytical perspective, the persistence of elevated NIMs raises critical questions about the underlying drivers of bank profitability, pricing strategies, and the efficiency of financial intermediation in Montenegro. The small market size, dominance of foreign-owned banks, and prevalence of liquid, low-risk balance sheets underscore the importance of unpacking the determinants of NIMs to better understand competitive dynamics and the transmission mechanisms of monetary and financial conditions. In this context, the paper empirically investigates the bank-specific and macroeconomic factors shaping variations in NIMs across Montenegrin banks, employing a panel data approach that accounts for unobserved heterogeneity across institutions and over time.

Figure 2. Montenegro: Banking System Indicators

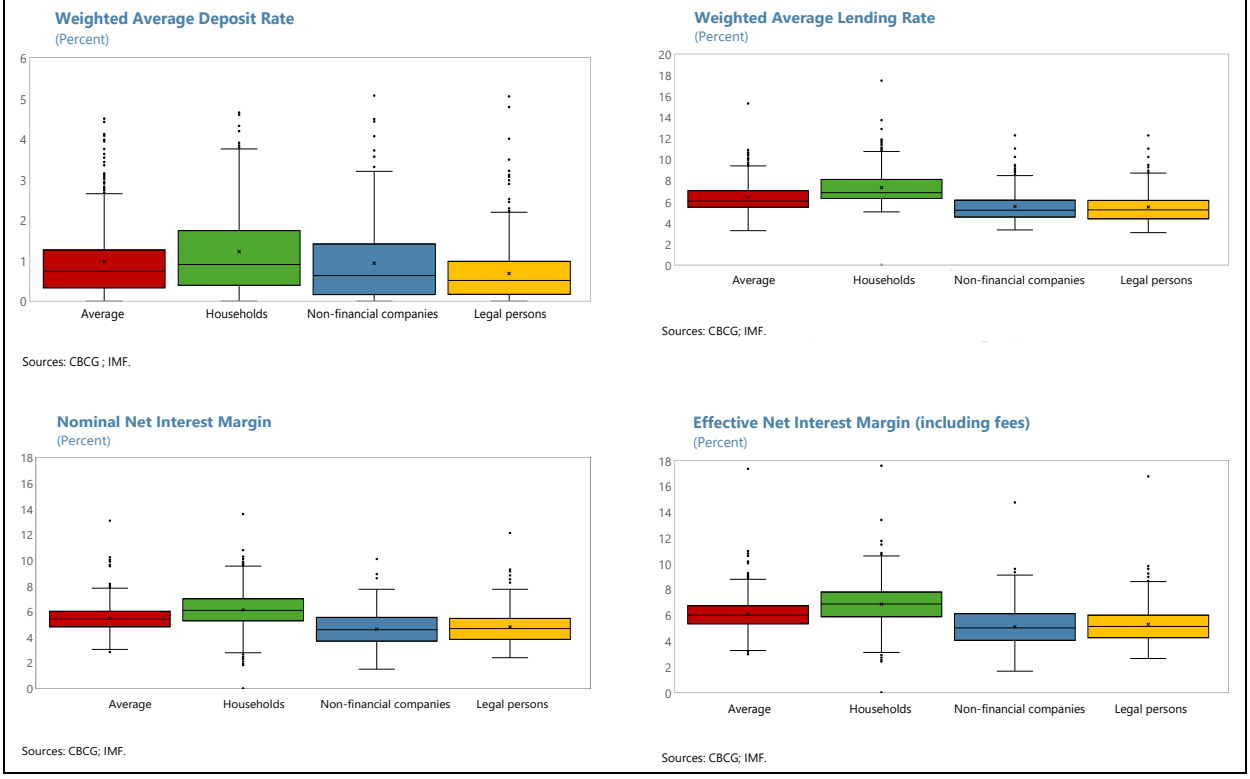


IV. Data Overview

The empirical analysis utilizes a unique bank-level panel dataset comprising quarterly observations for eleven commercial banks currently operating in Montenegro from the first quarter of 2013 to the first quarter of 2025, obtained from the Central Bank of Montenegro (CBCG).[4] The dataset includes key financial indicators reported by banks to the CBCG. These bank-level data are complemented with macroeconomic variables sourced from the Statistical Office of Montenegro (MONSTAT), the ECB, and the International Monetary Fund (IMF).

The dependent variable is the NIM, defined as the difference between the average interest rate charged on loans and the average interest rate paid on deposits by each bank in a given quarter. We employ two alternative bank-level measures of the NIM. The first is the nominal NIM excluding fees, which reflects the contractual interest rate specified in loan agreements. The second is the effective NIM, which incorporates all associated fees and charges and therefore captures the actual annualized cost of borrowing over a given period. Using both measures allows us to distinguish between the pure interest margin and the overall revenue banks derive from lending activities. The distributions of these measures are presented in Figure 3.

Figure 3. Montenegro: Bank-Level Interest Rates and NIMs



[4] The dataset employed in this analysis encompasses all commercial banks operating in Montenegro since 2013, with the exception of institutions involved in mergers or acquisitions, whose activities are incorporated under the corresponding consolidated entities, and two banks that ceased to operate.

To enhance the granularity of our analysis, we calculate both nominal and effective NIMs separately for three distinct borrower segments: (i) households; (ii) non-financial corporations; and (iii) legal persons—a broader category encompassing corporate entities, government institutions, private banks, domestic non-profit organizations, non-resident banks, and other financial or depository institutions. This disaggregated approach provides a nuanced understanding of how intermediation costs and pricing dynamics vary across different borrower types.

Our empirical model incorporates a comprehensive set of bank-specific variables to identify the determinants of NIMs. These include bank size (logarithm of total assets), capital adequacy (ratio of total capital to total assets), credit risk (measured by the ratio of loans to deposits and loan loss provisions to total loans), liquidity risk (ratio of liquid assets to total assets), operational efficiency (ratio of operating expenses to operating income), and market power (bank's share of total banking sector assets). Collectively, these variables capture critical dimensions of bank performance—size, capitalization, risk exposure, cost management, and competitive positioning. Complementing these are macroeconomic controls such as real GDP growth, consumer price inflation, and the ECB's monetary policy rate, which account for broader economic conditions shaping NIM dynamics.

Table 1 provides a detailed overview of the variables used in the empirical analysis. The data reveal substantial heterogeneity in NIMs across Montenegrin banks, underscoring the important role of bank-specific characteristics in shaping financial intermediation costs. On average, nominal and effective NIMs amount to 5.4 percent and 6.1 percent, respectively, with considerable variation across banks and over time. Nominal NIMs range from 2.8 to 13.1 percent, while effective NIMs span 3.0 to 17.4 percent. A similar pattern emerges when NIMs are disaggregated by borrower segment: households consistently face the highest margins, followed by non-financial corporations and legal persons. These differences likely reflect heterogeneity in borrower credit risk, as well as variation in banks' business models, asset–liability management practices, risk appetites, and funding structures.

Other bank-level indicators also display wide dispersion, highlighting the structural complexity and operational fragmentation of Montenegro's banking sector. Accounting for this heterogeneity is therefore essential to avoid biased or misleading empirical results. Moreover, the pronounced variation in bank characteristics shapes how institutions respond to macroeconomic conditions and regulatory reforms. Understanding this heterogeneity is thus critical not only for interpreting the econometric findings but also for informing the design of effective regulatory and supervisory policies tailored to the sector's diverse risk profiles and vulnerabilities.

Table 1. Summary Statistics

Variable	Observations	Mean	Std. dev.	Minimum	Maximum
Bank-level variables					
Net interest margin					
Average					
Nominal	487	5.44	1.29	2.84	13.08
Effective	487	6.08	1.48	2.97	17.36
Households					
Nominal	499	6.12	1.55	1.81	13.60
Effective	499	6.87	1.70	2.41	17.60
Non-financial companies					
Nominal	498	4.61	1.44	1.49	10.09
Effective	498	5.10	1.64	1.65	14.75
Legal persons					
Nominal	487	4.80	1.23	2.39	12.11
Effective	487	5.29	1.45	2.64	16.77
Total assets (log)	501	12.50	1.04	9.07	14.46
Capital adequacy ratio	501	14.57	13.35	1.19	100.00
Liquidity ratio	501	24.56	10.99	4.02	91.92
Credit risk	496	4.85	3.47	0.03	18.68
Management efficiency	467	63.83	69.53	28.30	1012.21
Market share	501	8.40	6.05	0.27	28.44
Macroeconomic variables					
Real GDP growth	544	1.53	3.36	-13.20	14.90
Consumer price inflation	540	2.39	2.75	-0.35	11.00
Monetary policy rate	544	0.82	1.49	0.00	4.50

Source: CBCG; MONSTAT; ECB; IMF; author's calculations.

V. Empirical Strategy and Results

The objective of this paper is to empirically examine the bank-specific determinants of the NIM in Montenegro within a panel data framework. The analysis employs standard econometric techniques for panel estimation and explicitly controls for unobserved heterogeneity across commercial banks and over time. Following the literature (e.g., Allen, 1988; Brock and Rojas Suarez, 2000; Maudos and Fernandez de Guevara, 2004; Claeys and Vander Vennet, 2008; Beck and Hesse, 2009; Agoraki and Kouretas, 2019; Calice, 2025), the baseline specification is expressed as follows:

$$nim_{it} = \alpha + \beta' \boldsymbol{B}_{it} + \gamma \boldsymbol{X}_t + \eta_i + \mu_t + \varepsilon_{it}$$

where $nim_{i,t}$ represents a measure of NIM for bank *i* and time *t*; $\boldsymbol{B}_{it}$ is a vector of bank-level variables, including the logarithm of total assets, the ratio of total capital to total assets, the loan loss provisions to total loans, the ratio of liquid assets to total assets, the ratio of operating expenses to operating income, and a bank's share of total bank assets. $\boldsymbol{X}_t$ denotes a vector of macroeconomic indicators, including real GDP growth, consumer price inflation, and the monetary policy rate, which are incorporated in an alternative specification to account for the influence of macroeconomic conditions on the NIM. The η_i and μ_t coefficients denote the time-invariant bank-specific effects and the time effects controlling for common shocks that may affect interest rate spreads across all banks in a given quarter, respectively. ε_{it} is the idiosyncratic error term. Robust standard errors are clustered at bank-level and used to correct for potential heteroskedasticity and serial correlation. We estimate

the model using the Prais–Winsten regression with panel-corrected standard errors (PCSE), which provides efficient and unbiased coefficient estimates in panel data by correcting for serial correlation within panels and adjusting standard errors for heteroskedasticity and cross-sectional dependence (Prais and Winsten, 1954; Beck and Katz, 1995).[5]

Table 2 presents the baseline estimations investigating the determinants of the average NIM for all commercial banks in Montenegro during the period 2013–25. Columns (1) and (2) report results for the nominal NIM and effective NIM, respectively, based on model specifications that exclude macroeconomic controls and instead focus exclusively on bank-specific characteristics. This modeling strategy offers a foundational analysis of how internal bank factors—such as balance sheet composition, funding structure, and operational efficiency—affect interest margins. By isolating these bank-level variables initially, the analysis establishes a benchmark for understanding the core drivers of NIMs prior to the incorporation of broader macro-financial influences, which are introduced in subsequent model specifications.

The coefficient on bank size, measured by the logarithm of total assets, is negative and statistically significant at the 1 percent level, indicating that larger banks tend to operate with lower NIMs. This finding is consistent with the hypothesis that bank size confers operational and financial advantages that compress interest spreads. Larger banks in Montenegro likely benefit from economies of scale, allowing them to spread fixed costs—such as administrative, technological, and compliance expenditures—over a broader asset base.[6] This efficiency gain enables large banks to offer more competitive pricing on loans and deposits, thereby reducing their average interest margins. In addition, size-related funding advantages play a key role. Larger banks generally have more diversified and stable funding structures, including greater access to wholesale, interbank, and foreign sources of finance, often at lower costs. They are also perceived as safer counterparties, which may lower their risk premia and reduce the need to maintain high NIMs to compensate for credit or liquidity risks.

The result that the magnitude of this effect is more pronounced for the effective NIM than for the nominal NIM suggests that larger banks achieve additional efficiencies beyond simple pricing effects. These may arise from superior liability management, greater sophistication in asset- liability matching, or more active use of off-balance-sheet instruments to optimize funding costs. The evidence also implies that larger institutions are better positioned to absorb fluctuations in market interest rates without fully passing them on to borrowers or depositors, reflecting a more flexible and resilient balance-sheet structure. Overall, the inverse relationship between bank size and NIM underscores the role of scale economies and market access in shaping banking sector competitiveness. This finding is broadly consistent with earlier cross-country evidence (e.g., Demirgüç-Kunt and Huizinga, 1999; Maudos and Fernández de Guevara, 2004; Claeys and Vander Vennet, 2008), which shows that larger banks tend to operate with thinner margins due to cost advantages, improved efficiency, and more diversified income sources.

[5] To ensure the robustness of our findings, we re-estimate the model using Driscoll–Kraay (1998) standard errors, which correct for potential heteroskedasticity, autocorrelation, and cross-sectional dependence. The results, reported in Appendix Table A1, remain qualitatively consistent with the baseline estimates.

[6] It is important to note that larger banks tend to have greater exposure to credit markets characterized by larger loan sizes and relatively lower fees and commission rates. Moreover, a higher market share may enable these banks to realize greater efficiency gains, particularly given the limited overall size of the market.

Table 2. Determinants of Bank-Level NIMs: Baseline Estimations

	[1]	[2]	[3]	[4]
	Nominal	Effective	Nominal	Effective
Total assets (log)	-0.988***	-1.037***	-0.988***	-1.037***
	[0.127]	[0.132]	[0.129]	[0.132]
Capital adequacy ratio	-0.010***	-0.009***	-0.010***	-0.009***
	[0.003]	[0.003]	[0.003]	[0.003]
Liquidity ratio	0.028***	0.027***	0.028***	0.027***
	[0.006]	[0.006]	[0.006]	[0.006]
Credit risk	0.070***	0.060***	0.070***	0.060***
	[0.015]	[0.016]	[0.017]	[0.016]
Management efficiency	-0.002**	-0.003***	-0.002**	-0.003***
	[0.001]	[0.008]	[0.001]	[0.007]
Market share	-0.037	-0.032	-0.037	-0.032
	[0.017]	[0.017]	[0.017]	[0.017]
Real GDP growth			0.065	0.013
			[0.049]	[0.076]
Inflation			0.171	0.065
			[0.079]	[0.084]
Monetary policy rate			0.092***	0.069***
			[0.019]	[0.020]
Number of observations	455	455	455	455
Number of banks	11	11	11	11
Bank FE	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	No	No
R^2	0.61	0.65	0.63	0.67

Note: The dependent variable is a measure of the bank-levek net interest margin. Robust standard errors are reported in brackets. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Source: Author's estimations.

Capital adequacy, measured by the ratio of total capital to total assets, exhibits a statistically significant negative effect at the 1 percent level on both measures of the NIM. This finding suggests that better-capitalized banks in Montenegro tend to operate with narrower interest margins. Several complementary mechanisms may explain this relationship. First, higher capitalization is often associated with lower risk perceptions among creditors and depositors, which in turn reduces banks' funding costs and the need to maintain wide interest spreads as a risk premium. Second, well-capitalized banks generally have stronger balance sheets and greater access to diversified and stable funding sources, allowing them to rely less on interest income as the primary source of profitability. Third, institutions with higher capitalization are typically more efficient and better positioned to expand into fee-based or non-interest income activities, which further lowers their dependence on high lending-deposit spreads.

From a broader financial stability perspective, the negative relationship between capital adequacy and NIMs is consistent with the view that stronger capitalization enhances confidence in the banking system and promotes more competitive pricing of financial intermediation. However, it may also suggest that smaller or less-capitalized banks compensate for higher risk or limited diversification by maintaining wider margins. This heterogeneity underscores the importance of continued supervisory focus on ensuring adequate capitalization across institutions while fostering competition and efficiency within the banking sector.

Liquidity risk, measured by the ratio of liquid assets to total assets, serves as a key indicator of a bank's risk appetite and balance-sheet strategy. The positive and statistically significant coefficient—at the 1 percent level—suggests that banks with higher liquidity buffers tend to maintain wider nominal and effective NIMs. This finding aligns with theoretical expectations: holding a larger share of liquid assets, which typically earn lower returns, imposes an opportunity cost on banks. To compensate for this cost and preserve profitability, banks may increase their lending spreads by charging higher loan rates or maintaining lower deposit rates.[7] In this sense, the positive relationship between liquidity and NIMs reflects a rational pricing response to the trade-off between safety and return. Moreover, this result may also indicate that banks with higher liquidity positions possess stronger market power or pricing flexibility, allowing them to sustain wider margins without significant loss of market share. Conversely, banks operating with lower liquidity buffers—potentially due to greater risk-taking or funding constraints—might rely more heavily on volume-based profitability rather than spread-based returns.

Credit risk, measured by the ratio of loan loss provisions to total loans, constitutes a fundamental determinant of banks' pricing behavior and overall intermediation margins. The coefficient on the credit risk variable is positive and statistically significant at the 1 percent level, suggesting that higher credit (default) risk is associated with wider nominal and effective NIMs. This relationship reflects the standard risk–return tradeoff in banking: as loan portfolios become riskier, banks raise lending rates to compensate for expected losses and to preserve profitability amid heightened uncertainty. In the context of Montenegro, this finding likely mirrors the cautious pricing behavior of banks operating in a relatively small and concentrated market, where limited diversification opportunities amplify the impact of individual borrower defaults.

A similar pattern emerges when credit risk is proxied by the ratio of loans to deposits, which enters the regression with a negative and statistically significant coefficient. This result indicates that banks with higher loan-to-deposit ratios—often reflecting tighter liquidity conditions or a more aggressive lending stance—tend to operate with lower NIMs. One possible interpretation is that such banks face higher funding costs due to increased competition for deposits or a greater reliance on external financing, which compresses interest margins. Alternatively, this may capture risk-adjusted pricing discipline, whereby banks under liquidity pressure prioritize maintaining market share over profitability. Together, these results underscore the dual role of credit risk and funding structure in shaping intermediation spreads: while higher default risk leads to risk premia embedded in lending rates, excessive balance-sheet leverage or liquidity strain may erode margins through higher funding costs and intensified competition.

Management efficiency (or quality), measured by the ratio of operating expenses to operating income, serves as a key indicator of operational productivity and cost management within commercial banks. The estimated coefficient on this variable is negative and statistically significant—particularly in the case of the effective NIM—implying that banks with higher operational efficiency tend to maintain lower net interest margins. This relationship underscores the fundamental role of cost structures in determining intermediation spreads: when banks are able to contain administrative and operational expenses, they can afford to narrow the lending–deposit spread without compromising profitability.

Against the backdrop of Montenegro's banking sector, this result likely reflects efficiency differentials among banks of varying size and ownership. Larger or more technologically advanced banks may benefit from

[7] It should also be noted that this may reflect risk-averse banks maintaining higher buffers and exercising greater pricing power. In this context, it is important to highlight that credit risk and liquidity risk capture different dimensions of liquidity: credit risk reflects funding tightness, while liquidity risk relates to liquidity hoarding.

economies of scale, digitalization, and superior risk management systems, which together reduce per-unit operating costs. These banks can then translate cost savings into more competitive pricing, thereby gaining market share and reinforcing competitive pressures across the sector. Conversely, banks with weaker cost control or outdated operational frameworks may need to maintain wider interest margins to offset inefficiencies and sustain returns.

Overall, the negative relationship between management efficiency and NIMs is consistent with the efficiency–competitiveness hypothesis in banking literature (Berger and Mester, 1997; Maudos and Fernández de Guevara, 2004), which posits that greater operational efficiency enhances competition, improves allocative efficiency, and ultimately lowers the cost of financial intermediation. The findings therefore suggest that further improvements in cost management, digital transformation, and process optimization could help reduce intermediation spreads in Montenegro, enhancing both competitiveness and financial sector depth.

Market power, proxied by each bank's share of total banking sector assets, serves as an indicator of a bank's relative competitive position within Montenegro's financial system. In our baseline model, the estimated coefficient on market share is negative but statistically insignificant, suggesting that variations in market concentration across banks do not exert a strong or consistent influence on NIMs. This implies that interbank competition is shaped more by structural market factors—such as overall market size, regulatory constraints, and operational efficiencies—rather than by the strategic pricing behavior associated with market dominance. Put differently, observed differences in NIMs primarily reflect common cost structures, risk management practices, and efficiency levels rather than the degree of market concentration.

Interestingly, when bank size is excluded from the regression, the coefficient on market share becomes significantly negative at the 1 percent level. This points to a close relationship—and potential multicollinearity—between bank size and market power. Larger banks naturally command greater market shares, and their combined effects on NIMs may partially offset one another in multivariate specifications. The significance of market share in the absence of size suggests that market power might influence interest margins, but this effect is entangled with the benefits of economies of scale associated with larger institutions.[8] Across these measures, once bank size is controlled for, the relationship between market power and NIMs remains negative or statistically insignificant. This reinforces the conclusion that economies of scale, rather than market dominance, are the primary drivers of variation in bank interest margins.

Taken together, these results indicate that larger banks in Montenegro leverage operational and funding scale efficiencies to offer more competitive interest margins while maintaining profitability. Their advantage likely derives from access to lower-cost funding, diversified revenue streams, and superior risk management capabilities. Consequently, market concentration alone does not appear to confer excessive pricing power or elevate margins, highlighting a banking environment where cost efficiency and scale economies outweigh monopolistic tendencies as determinants of profitability.

Our baseline estimations remain robust in both economic magnitude and statistical significance upon the inclusion of key macroeconomic control variables, as presented in columns [3] and [4]. Specifically, real GDP growth and inflation—standard indicators reflecting the overall economic environment—exhibit positive coefficients, suggesting a potential positive relationship with NIMs. However, these coefficients are statistically insignificant at conventional confidence levels, implying that short-term fluctuations in economic growth and

[8] Robustness checks employing alternative proxies for market power—including banks' shares of total loans or deposits and aggregate concentration metrics such as the Herfindahl–Hirschman Index—produce consistent findings.

price levels do not have a discernible direct impact on bank interest margins in Montenegro within the sample period.[9]

In contrast, the monetary policy rate set by the ECB demonstrates a positive and highly statistically significant effect at the 1 percent level. This finding underscores the critical role of external monetary policy in shaping bank lending behavior and profitability in Montenegro's unilaterally euroized financial system. Since Montenegro does not have an independent monetary policy and effectively imports the ECB's policy stance, increases in the ECB's short-term interest rates translate into higher funding costs for banks, which are then passed on to borrowers in the form of wider interest margins. This dynamic highlights the vulnerability of Montenegro's banking sector to external monetary conditions and underscores the importance of the ECB's policy environment in influencing domestic financial intermediation costs.

Moreover, these extended model specifications reveal that while bank-specific characteristics remain the primary determinants of NIM variation, incorporating macroeconomic variables enhances the overall explanatory power of the model. Specifically, the inclusion of real GDP growth, inflation, and the ECB policy rate raises the adjusted R-squared by approximately 3.3 percentage points. This incremental increase signifies that macroeconomic factors, though secondary to bank-level drivers, provide meaningful additional insights into the fluctuations of NIMs, reflecting broader economic and monetary influences beyond individual bank behavior.

For a more granular understanding of the determinants of NIMs, we estimate the NIM model separately across three distinct borrower segments: (i) households; (ii) non-financial corporations; and (iii) legal persons. The results, summarized in Table 3, broadly align with the findings obtained from the overall nominal and effective

Table 3. Determinants of Bank-Level NIMs: Granular Estimations

	[1]	[2]	[3]	[4]	[5]	[6]
	Households		Non-financial companies		Legal persons	
	Nominal	Effective	Nominal	Effective	Nominal	Effective
Total assets (log)	-0.199***	-0.245***	-0.130***	-0.084***	-0.610***	-0.585***
	[0.027]	[0.032]	[0.012]	[0.008]	[0.104]	[0.106]
Capital adequacy ratio	-0.021***	-0.020***	-0.001***	-0.002***	-0.004	-0.001
	[0.004]	[0.004]	[0.000]	[0.000]	[0.003]	[0.003]
Liquidity ratio	0.009	0.007	0.013***	0.013***	0.030***	0.030***
	[0.009]	[0.009]	[0.004]	[0.004]	[0.004]	[0.004]
Credit risk	0.040***	0.032***	0.029**	0.010***	0.029**	0.011
	[0.012]	[0.010]	[0.009]	[0.003]	[0.010]	[0.012]
Management efficiency	-0.002**	-0.002**	-0.002***	-0.002***	-0.002***	-0.003***
	[0.001]	[0.001]	[0.000]	[0.000]	[0.001]	[0.001]
Market share	-0.114***	-0.094***	-0.058***	-0.062***	-0.013	-0.017
	[0.013]	[0.012]	[0.015]	[0.015]	[0.022]	[0.021]
Number of observations	467	467	467	467	456	456
Number of banks	11	11	11	11	11	11
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.57	0.57	0.83	0.84	0.77	0.79

Note: The dependent variable is a measure of the bank-levek net interest margin. Robust standard errors are reported in brackets. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Source: Author's estimations.

[9] Higher economic growth may be associated with increased credit demand, which can in turn lead to higher interest margins. Although Montenegro operates under unilateral euroization and therefore lacks an independent monetary policy, higher inflation would still be expected to raise borrowing costs, reflecting heightened macroeconomic uncertainty and risk premia.

average NIM models, yet reveal important differences in terms of both economic magnitude and statistical significance across these segments.

Consistent with the aggregate analysis, key bank-specific factors such as bank size, credit risk, and management efficiency exhibit robust and statistically significant effects across all borrower categories. These variables appear to be fundamental drivers influencing banks' pricing behavior irrespective of the borrower type. However, other variables, notably capital adequacy, liquidity ratio, and market share, demonstrate greater heterogeneity in their influence. For example, capital adequacy and market share lose statistical significance when explaining NIM variations for legal persons, suggesting that these banks may not price risk or market power factors in the same manner for this segment. In contrast, both capital adequacy and market share remain significant determinants for the household and non-financial corporate segments, indicating differential sensitivities and pricing strategies across borrower types.[10]

Finally, while the static panel estimations provide valuable insights into the determinants of NIMs, they do not explicitly account for the persistence of bank profitability over time. As indicated in the descriptive statistics, NIMs in Montenegro exhibit a high degree of persistence, suggesting that current margins may be influenced by their past values. To capture this dynamic behavior and address potential endogeneity concerns—particularly with respect to bank-specific variables such as capitalization and liquidity—we extend the analysis by estimating a dynamic panel model using the system Generalized Method of Moments (GMM) proposed by Arellano and Bond (1995) and Blundell and Bond (1998). This approach allows us to test for the presence of persistence in NIMs, control for unobserved heterogeneity, and mitigate potential biases arising from reverse causality and simultaneity between profitability and bank-specific characteristics.

The use of all available lagged levels of the variables in the system GMM estimation leads to a proliferation in the number of instruments, which reduces the efficiency of the estimator in finite samples, and potentially leads to over-fitting. A further issue is that the use of a large number of instruments significantly weakens the Hansen J-test of over-identifying restrictions, and so the detection of over-identification is hardest when it is most needed. Conversely, however, restricting the instrument set too much results in a loss of information that leads to imprecisely estimated coefficients. Estimation of such models therefore involves a delicate balance between maximizing the information extracted from the data on the one hand and guarding against over-identification on the other. We follow the strategy suggested by Roodman (2009) to deal with the problem of weak and excessively numerous instruments. The system GMM identification assumptions are also validated by applying a second-order serial correlation test for the residuals and the Hansen *J*-test for the overidentifying restrictions. The values reported for AR(1) and AR(2) are the *p*-values for first- and second-order autocorrelated disturbances in the first-differenced equation. As expected, we find that there is high first-order autocorrelation, but no evidence for significant second-order autocorrelation. Similarly, the Hansen *J*-test result indicate the validity of internal instruments used in the dynamic model estimated via the system GMM approach.

The results from the dynamic estimations, presented in Appendix Table A2, confirm the persistence of NIMs in Montenegro, as indicated by the positive and statistically significant coefficient on the lagged dependent variable. This finding suggests that banks' pricing behavior exhibits a high degree of inertia. Importantly, the inclusion of the lagged NIM does not materially alter the sign or significance of the main explanatory variables, thereby reinforcing the robustness of the baseline results. Albeit with varying degrees of magnitude and

[10] The inclusion of these macroeconomic controls for each borrower segment yields results consistent with those in Table 3 and the baseline estimations reported in Table 2, reinforcing the robustness of our core findings across different borrower groups and model specifications.

significance, bank-specific characteristics—such as capitalization, liquidity, and credit risk—remain the primary determinants of interest margins, while macro-financial variables continue to exert consistent effects across model specifications. The dynamic estimation also helps mitigate potential endogeneity concerns, particularly those arising from the bidirectional relationship between NIMs and financial strength and management characteristics. Overall, this persistence underscores the importance of regulatory and structural reforms—such as fostering competition, strengthening financial infrastructure, and promoting digital transformation—to alleviate rigidities in bank pricing behavior and enhance the efficiency, competitiveness, and resilience of the banking system.

VI. Concluding Remarks

This paper provides a comprehensive analysis of financial intermediation dynamics in Montenegro, focusing on the determinants of bank-level NIMs within the framework of a small, open economy marked by persistently elevated interest rate spreads. Since Montenegro's independence in 2006, the banking sector has experienced a notable contraction in private credit provision, compounded by structural inefficiencies that have sustained high lending rates and wide intermediation margins. Leveraging a novel bank-level panel dataset with quarterly observations spanning 2013–25, our empirical investigation demonstrates that both bank-specific factors and macroeconomic conditions play critical roles in shaping NIMs.

Three principal findings emerge. First, larger banks consistently exhibit lower NIMs, reflecting the benefits of economies of scale, greater portfolio diversification, and enhanced market power that enable cost efficiencies and competitive pricing. Second, superior asset quality—as evidenced by lower nonperforming loan ratios—is strongly linked to narrower interest margins, underscoring the centrality of prudent credit risk management in fostering sustainable profitability. Third, higher operational efficiency allows banks to maintain profitability without resorting to wider interest spreads, highlighting the importance of internal cost discipline and effective management practices.

These results resonate with recent survey data indicating that consumer dissatisfaction in Montenegro substantially increases switching behavior (Jovović et al., 2023), signaling a competitive banking environment rather than market complacency. This competitive landscape is further bolstered by the CBCG's progressive alignment with EU regulatory standards, particularly reforms enhancing account portability and fee transparency. Such measures are gradually lowering switching costs, intensifying competition—especially among digitally savvy retail clients—and thereby exerting downward pressure on intermediation costs.[11] Further progress hinges on the continued modernization of financial infrastructure and payment systems. Notably, Montenegro's integration into the Single Euro Payments Area (SEPA) promises to deepen competition by reducing transaction costs, facilitating account switching, and promoting digital efficiencies. SEPA participation is poised to improve price transparency, ultimately compressing both lending and deposit rate spreads.

Our findings highlight several actionable policy priorities to bolster the efficiency and resilience of Montenegro's banking sector. First, policymakers should encourage efficiency-enhancing consolidation within the fragmented banking landscape to realize scale economies and strengthen financial stability. Second, regulatory frameworks must be reinforced to enhance credit risk management through improved supervisory practices and expanded information-sharing mechanisms, thereby mitigating systemic vulnerabilities in credit allocation.

[11] Competition from alternative savings products, such as government-issued retail bonds, may encourage banks to offer more attractive deposit rates to customers.

Third, human capital development, digital transformation, and operational modernization can drive substantial gains in cost efficiency and competitive positioning across the sector. By advancing these initiatives, Montenegro can reduce structural inefficiencies in financial intermediation, enhance the effectiveness of monetary policy transmission, and support its broader economic ambitions—particularly its convergence with EU regulatory and market standards and the pursuit of inclusive, sustainable growth.

Appendix I.

Appendix Table 1. Determinants of Bank-Level NIMs: DK Estimations

	[1]	[2]
	Nominal	Effective
Total assets (log)	-0.830*	-1.089**
	[0.261]	[0.307]
Capital adequacy ratio	-0.009**	-0.009**
	[0.003]	[0.003]
Liquidity ratio	0.022	0.021
	[0.012]	[0.013]
Credit risk	0.107***	0.113***
	[0.015]	[0.019]
Management efficiency	-0.002	-0.003
	[0.001]	[0.001]
Market share	-0.037	-0.006
	[0.016]	[0.018]
Number of observations	455	455
Number of banks	11	11
Bank FE	Yes	Yes
Time FE	Yes	Yes
R^2	0.30	0.32

Note: The dependent variable is a measure of the bank-levek net interest margin. Robust standard errors are reported in brackets. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.
Source: Author's estimations.

Appendix Table 2. Determinants of Bank-Level NIMs: Dynamic Estimations

	[1]	[2]
	Nominal	Effective
Lagged NIM	-0.899***	-0.882***
	[0.013]	[0.012]
Total assets (log)	-0.239	-0.245
	[0.128]	[0.121]
Capital adequacy ratio	-0.002**	-0.002**
	[0.001]	[0.001]
Liquidity ratio	0.004***	0.004***
	[0.001]	[0.001]
Credit risk	0.019	0.027
	[0.011]	[0.012]
Management efficiency	-0.001	-0.001
	[0.000]	[0.000]
Market share	-0.023	-0.024
	[0.012]	[0.012]
Number of observations	454	454
Number of banks	11	11
Bank FE	Yes	Yes
Time FE	Yes	Yes
Spefication tests (*p* values)		
AR(1)	0.010	0.007
AR(2)	0.369	0.672
Hansen J-test	0.358	0.340

Note: The dependent variable is a measure of the bank-levek net interest margin. Robust standard errors are reported in brackets. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.
Source: Author's estimations.

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