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FOREIGN OWNERSHIP, MARKET CONCENTRATION AND PROFITABILITY OF THE SERBIAN BANKING SECTOR

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Abstract

This paper examines the relationship between foreign ownership, market concentration and profitability in the Serbian banking sector using 85 quarterly observations covering Q4 2004-Q4 2025. Profitability is measured by ROA and ROE, concentration by the Herfindahl-Hirschman Index, and foreign presence by the share of banking sector assets held by banks in majority foreign ownership. The autoregressive distributed lag approach (ARDL) estimates short-run and long-run relationships. Long-run results show positive associations of market concentration, foreign presence and capital adequacy with both profitability measures, while the global financial crisis and the COVID-19 pandemic are negatively associated with profitability. In the short run, market concentration is negatively and marginally associated with both measures at the 10% level, whereas foreign presence is positively associated with both measures and statistically significant at the 5% level. The findings suggest that regulators should monitor ownership and concentration developments while preserving competition, banking sector resilience and financial stability.

Key words: banking sector profitability, Serbia, foreign ownership, market concentration

JEL classification: G21, G32, L11, C22

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1. Introduction

The profitability of the banking sector is an important indicator of financial sector performance, stability and resilience, especially when the financial sector is bank-centric as in the case of Serbia. However, excessive profitability may also reflect market power and reduced competition, which makes the relationship between profitability, ownership structure and market concentration particularly important.

The Serbian banking sector provides a relevant context for analysing this relationship. Since the beginning of the 2000s, the sector has undergone significant structural changes, including restructuring, privatisation, the entry of foreign capital, mergers and acquisitions, and a gradual reduction in the number of banks. Following the first wave of privatisation between 2003 and 2007, the ownership structure of the Serbian banking sector changed substantially. At the beginning of the transition process, approximately 65% of banks were state-owned, 21% were privately owned, and only 4% were foreign-owned, but since 2007, banks in majority foreign ownership have accounted for around 78% of total banking sector assets (Ćorić 2020). In 2007, the Serbian banking sector comprised 38 banks in Q1 and 35 banks in Q4, while by the end of 2025, this number had declined to 19, reflecting the consolidation process observed during the analysed period. These developments changed the ownership structure of the sector and influenced the level of market concentration. In such circumstances, it is important to examine whether the increased presence of banks in majority foreign ownership and changes in market concentration were associated with higher profitability, or whether other macro-financial and regulatory factors primarily shaped profitability.

Foreign ownership is particularly important in transition and post-transition banking systems. Banks in majority foreign ownership may contribute to the modernisation of banking operations through improved corporate governance, better risk management practices, access to international sources of finance, knowledge transfer and technological development. These factors can improve efficiency and profitability. At the same time, foreign bank entry may intensify competition and reduce profit margins, especially for domestic banks. Therefore, the effect of foreign ownership on profitability is not theoretically unambiguous and requires empirical examination.

Market concentration is another important determinant of bank profitability. According to the market-power hypothesis, a more concentrated banking sector may allow banks to exercise greater market power, maintain higher margins and achieve higher profitability. In contrast, the efficient-structure hypothesis suggests that the positive relationship between concentration and profitability may result from the higher efficiency of larger banks rather than from market power. In banking sectors that have experienced consolidation and changes in the number of market participants, both explanations are relevant. This makes the empirical assessment of concentration-profitability links particularly important.

This paper analyses the relationship between foreign ownership, market concentration and profitability in the Serbian banking sector using quarterly data from Q4 2004 to Q4 2025. The relevance of this topic for Serbia is strong in the current period. The Serbian financial system remains predominantly bank-based, so banking sector profitability, ownership structure and market concentration have important implications for credit supply, monetary policy transmission and financial stability. The sample covers a sequence of distinct structural and monetary-policy environments: privatisation and large-scale foreign bank entry, banking sector consolidation, the global financial crisis, the relatively accommodative monetary conditions preceding and accompanying the COVID-19 pandemic, and the subsequent post-pandemic tightening of monetary conditions. Examining this extended period makes it possible to assess whether the relationships of foreign presence and market concentration with profitability were confined to episodes or persisted across short-run and long-run horizons.

Existing research on Serbia has examined internal determinants of bank profitability (Domanović, Todorović, and Savović 2018) and external

profitability factors over a substantially shorter period (Đuranović and Filipović 2025), while regional research has analysed the relationship between ownership structure and profitability across several South-East European banking systems (Košak and Čok 2008). The study extends the literature by placing foreign bank presence and market concentration, two structural features central to the transformation of the Serbian banking sector, within the same empirical specification. Its contribution lies in combining a long quarterly sector-level time series, two complementary profitability measures (ROA and ROE), and an ARDL framework that distinguishes short-run dynamics from long-run relationships, while controlling for market growth, the reference interest rate, capital adequacy, and the global financial crisis and COVID-19 shocks. This integrated design provides a broader and more up-to-date assessment of how ownership structure and market concentration are related to Serbian banking sector profitability across changing structural and monetary conditions.

The paper is structured as follows. The next section presents the theoretical background and literature review. The third section describes the data, variables and methodology. The fourth section presents empirical findings and their interpretation. The final section concludes the paper and discusses the main implications of the results.

2. Literature review

Previous studies on bank profitability generally distinguish between internal and external determinants of profitability (Kohlscheen, Murcia Pabón, and Contreras 2018; Laporšek et al. 2025; Petria, Capraru, and Ihnatov 2015; Athanasoglou, Brissimis, and Delis 2008; Pasiouras and Kosmidou 2007). Market concentration represents an important external determinant of bank profitability (Athanasoglou, Brissimis, and Delis 2008; Petria, Capraru, and Ihnatov 2015; Korytowski 2018; Fidanoski et al. 2018; Djalilov and Piesse 2016). According to the structure-conduct-performance (SCP) paradigm (Mason 1939; Bain 1951), a higher degree of concentration may lead to higher profitability, as banks with larger market shares may achieve greater market power, more stable revenues and more favourable interest margins. On the other hand, the efficient-structure hypothesis (ES) emphasises that the positive relationship between concentration and profitability does not necessarily arise from market power, but may result from the greater efficiency of banks that increase their market shares over time (Demsetz 1973; Peltzman 1977). Therefore, the relationship between concentration and profitability remains an empirical question, particularly in banking sectors that have undergone processes of consolidation, mergers and acquisitions (Berger 1995).

Foreign ownership is particularly important for the banking sectors of transition and post-transition economies (Demirgüç-Kunt and Huizinga 1999; Naaborg and Lensink 2008; Košak and Čok 2008). The entry of foreign banks may contribute to the modernisation of banking operations, the development of risk management systems, the application of modern technologies, improvements in corporate governance and increased competition (Cull, Martinez Peria, and Verrier 2017). However, the effect of foreign ownership is not unambiguous. A stronger presence of foreign banks may improve sector efficiency, but it may also intensify competition and reduce the profit margins of domestic banks (Claessens, Demirgüç-Kunt, and Huizinga 2001; Pasiouras and Kosmidou 2007). Therefore, it is important to empirically examine whether the presence of banks in majority foreign ownership in Serbia is associated with banking sector profitability.

In addition to the key explanatory variables, the literature emphasises the importance of other variables such as market growth, reference interest rate, and capital adequacy that may affect bank profitability (Rebić, Paunović, and Popović 2022; Seemule, Sinha, and Ndlovu 2017; Domanović, Todorović, and Savović 2018; Đuranović and Filipović 2025). The reference interest rate affects the cost of funding, interest income and bank interest margins. Capital adequacy reflects the ability of the banking sector to absorb risks and preserve stability, but at the same time, it may also influence

return on equity. Rebić, Paunović, and Popović (2022) used the capital adequacy ratio as a bank-specific determinant of profitability and found a non-significant effect on ROA. Seemule, Sinha, and Ndlovu (2017) found that the capital adequacy ratio is positively related to profitability, while Domanović, Todorović, and Savović (2018) found a negative relationship. Đuranović and Filipović (2025) found a positive impact of the capital adequacy ratio in the long term, but a negative impact in the short term in the Serbian banking sector from 2019 to Q3 2024. Crisis periods, such as the global financial crisis and the COVID-19 pandemic, may negatively affect profitability through increased credit risk, higher loan-loss provisions, lower demand for loans and changes in the business behaviour of banks and clients (Dietrich and Wanzenried 2011; Rebić, Paunović, and Popović 2022; Hladika 2021). Augeraud-Véron and Boungou (2023) found a negative impact of the COVID-19 pandemic on bank profitability in 23 OECD countries.

3. Data and methodology

The specification of the empirical model follows the standard approach in the banking profitability literature, where a combination of bank-specific, industry-specific and macroeconomic determinants explains profitability. Athanasoglou, Brissimis, and Delis (2008) classify the determinants of bank profitability into bank-specific, industry-specific and macroeconomic factors. This framework justifies the use of ROA and ROE as dependent variables, as well as the inclusion of explanatory variables that capture market structure, ownership structure, capital strength and macro-financial conditions.

Therefore, the empirical model is specified using a general dependent variable Y_t, where Y_t denotes either return on assets (ROA) or return on equity (ROE). The baseline long-run relationship can be written as follows:

$$Yt = \alpha_0 + \alpha_1 HHI_t + \alpha_2 FP_t + \alpha_3 MG_t + \alpha_4 COVID19_t + \alpha_5 GFC_t + \alpha_6 RIR_t + \alpha_7 CAR_t + \varepsilon_t \quad (1)$$

where Y_t represents banking sector profitability measured alternatively by ROA and ROE, HHI_t denotes market concentration, FP_t denotes foreign presence, MG_t denotes market growth, $COVID19_t$ and GFC_t are crisis dummy variables, RIR_t is the reference interest rate, CAR_t is the capital adequacy ratio, and ε_t is the error term, *t = Q4 2004,..., Q4 2025*.

To estimate both short-run and long-run relationships, the ARDL model can be represented in the following general error-correction form:

$$\Delta Y_t = \mu + \rho Y_{t-1} + \theta' X_{t-1} + \sum_{i=1}^{p-1} \lambda_i \Delta Y_{t-i} + \sum_{m=1}^{K} \sum_{j=0}^{\varphi m-1} \delta_{mj} \Delta X_{m,t-j} + u_t \quad (2)$$

where $X_{m,t}$ denotes the m-th explanatory variable included in the vector X_t, K is the number of explanatory variables, and q_m is the selected lag length for each explanatory variable according to the Akaike Information Criterion.

The coefficients on the lagged level variables, represented by ρ and θ, are used to derive the long-run relationships, while the coefficients on the first-differenced variables, represented by λ and δ, capture short-run effects. The adjustment coefficient, captured by ρ, indicates the speed at which short-run deviations adjust toward the long-run equilibrium.

Quarterly data from Q4 2004 to Q4 2025 (n = 85) were retrieved from official publications and databases of the National Bank of Serbia (National Bank of Serbia 2004–2025). From 2004 to 2019, the data (HHI, FP, ROA, ROE, RIR, CAR) were collected from the publicly available quarterly reports of the Bank Supervision Department of the National Bank of Serbia. For the period 2020-2025, the corresponding data were retrieved from the publicly available databases of the National Bank of Serbia. Where an indicator was not reported directly (for example, market growth (MG)), it was calculated by the authors using the underlying NBS data. The definitions, measurement, and calculation procedures for the variables used in the empirical analysis are explained in detail below. Variables and their explanations are given in Table 1.

Table 1. Variable explanations

Variable	Explanation
ROA	Return on assets
ROE	Return on equity
HHI	Herfindahl-Hirschman Index
FP	Foreign presence, measured as the share of assets of banks in majority foreign ownership, i.e. banks with more than 50% foreign ownership, in total banking sector assets
MG	Market growth (total assets growth of the banking sector)
COVID19	COVID-19 pandemic (dummy variable: 1 if COVID-19 occurs (2020Q1-2021Q4), 0 otherwise)
GFC	Global financial crisis (dummy variable: 1 if the crisis occurs (2007Q3-2009Q4), 0 otherwise)
RIR	Reference interest rate
CAR	Capital adequacy ratio

Source: Authors' elaboration

Two dependent variables are used as proxies for banking sector profitability: ROA and ROE. Return on assets (ROA) is calculated as the ratio of net profit to total assets:

$$ROA_t = (\text{Net profit}_t / \text{Total assets}_t) \times 100 \quad (3)$$

This indicator measures the ability of the banking sector to generate profit from available assets. A higher ROA value indicates more efficient use of assets, that is, a greater ability of banks to generate profit relative to the size of their balance sheet assets.

Return on equity (ROE) is calculated as the ratio of net profit to total equity:

$$ROE_t = (\text{Net profit}_t / \text{Total equity}_t) \times 100 \quad (4)$$

ROE shows the rate of return that the banking sector generates on employed equity. Unlike ROA, which measures the efficiency of using total assets, ROE is more focused on profitability from the perspective of equity owners. Therefore, both indicators are used in this paper, as together they provide a more complete assessment of banking sector profitability: ROA measures the efficiency of asset utilisation, while ROE measures the return on equity.

Market concentration is included in the model because the banking literature links concentration and profitability through the market-power and efficient-structure hypotheses. Berger (1995) argues that the relationship between market structure and profitability may reflect either the exercise of market power or the superior efficiency of banks with larger market shares. Herfindahl-Hirschman Index (HHI) is used as an independent variable and a measure of market concentration. This index is calculated as the sum of the squares of banks' market shares in the Serbian banking market using the following formula:

$$HHI_t = \Sigma_{i=1}^{N} s_{it}^2 \quad (5)$$

where s_{it} represents the market share of the i-th bank in total banking sector assets in quarter t.

To determine market concentration level, the following scale was used: HHI below 1,000 indicates low concentration, 1,000-1,800 moderate, 1,800-2,600 high, 2,600-10,000 very high, and 10,000 indicates a monopoly market (Kostić 2008).

Foreign presence, the second independent variable, is included because foreign bank entry may affect domestic banking markets through changes in competition, efficiency, risk management, corporate governance and access to international sources of finance. This is consistent with studies showing that the effects of foreign banks differ across banking systems and depend on market and macroeconomic conditions (Claessens, Demirgüç-Kunt, and Huizinga 2001; Pasiouras and Kosmidou 2007). In methodological terms, foreign presence in this paper does not refer to branches of foreign banks, but to banks operating in the Republic of Serbia that are in majority foreign ownership.

According to the Law on Banks (Republic of Serbia 2025; RS Official Gazette, Nos 107/2005, 91/2010, 14/2015 and 19/2025), a foreign bank is a legal entity headquartered outside the Republic of Serbia, established and registered in its home country as a bank, that is, as a credit institution, licensed by the competent regulatory authority and engaged in deposit-taking and lending activities. However, in its banking sector reports, when analysing the ownership structure of banks in Serbia, the NBS uses the category of banks in majority foreign ownership. Therefore, the FP variable in this paper is operationalised as the share of assets of banks in majority foreign ownership in the total assets of the Serbian banking sector.

In this paper, banks in majority foreign ownership refer to banks in which foreign shareholders hold more than 50% of ownership, following the ownership classification used by the NBS in its banking sector reports. Therefore, FP does not measure broader forms of foreign investor control in cases where foreign investors may exercise control or significant influence without holding a majority ownership stake. The empirical analysis is based strictly on the official classification of banks in majority foreign ownership.

The formula for this variable can be presented as follows:

FP_t = (Assets of banks in majority foreign ownership$_t$ / Total banking sector assets$_t$) × 100 (6)

Defined in this way, the variable shows the relative importance of foreign ownership in the Serbian banking sector. A higher FP value indicates a larger share of assets of banks in majority foreign ownership in total sector assets, while a lower value indicates a greater importance of domestic banks in the structure of the banking sector.

In addition, market growth, the reference interest rate, capital adequacy, the global financial crisis and the COVID-19 pandemic are included as control variables to capture the effects of banking sector expansion, monetary conditions, capital strength and external shocks on profitability.

Descriptive statistics such as mean, standard deviation, minimum and maximum were used to describe the sample. Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests were used to test whether the time series has a unit root or not (Dickey and Fuller 1981; Phillips and Perron 1988). The Autoregressive Distributed Lag (ARDL) approach and bounds tests were used for data analysis. The ARDL approach is appropriate even for relatively small samples (Ghatak and Siddiki 2001). The ARDL approach is used when the variables are of a different order of integration, I(0), I(1) or a combination thereof, but no variable is I(2). Diagnostic tests such as the Breusch-Godfrey LM serial correlation test, Breusch-Pagan/Cook-Weisberg heteroscedasticity tests, Durbin-Watson statistics, Ramsey RESET functional form and CUSUM test were performed to test whether basic assumptions of the models are fulfilled. Data analysis was conducted using Stata 17.0.

4. Results and discussion

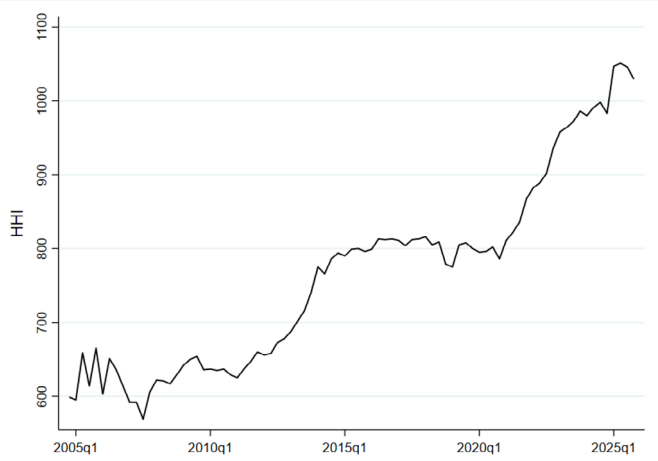
Table 2 shows descriptive statistics of the study variables from Q4 2004 to Q4 2025. The mean ROA is 1.519% and ranges from -1.00 to 3.20. This indicates that, during the observed period, the Serbian banking sector generated a positive return on total assets on average, although profitability was not stable throughout the entire period.

The mean ROE of 8.779% shows that the banking sector, on average, achieved a positive return on equity. However, the wider ROE range, from -5.37% to 22.70%, indicates greater variability in the return on equity compared to the return on assets. Based on the ROA and ROE data from Table 2, the Serbian banking sector was profitable on average during the observed period, but with noticeable fluctuations reflecting changes in the economic environment, market conditions and banks' business performance.

The HHI ranges from 569 to 1,051, with a mean of 764.635. This indicates that the Serbian banking sector was characterised by low concentration on average, although concentration reached the lower range of moderate concentration in the final year. From 2004 to 2012, the HHI fluctuated between 570 and 680 (Figure 1), reflecting a highly fragmented and competitive market structure consistent with the large number of banks operating in Serbia at the time (43-32 banks). Between 2013 and 2014, the HHI rose from 688 to around 790, coinciding with the intensification of mergers,

acquisitions and bank exits that reduced the number of market participants. From 2015 to 2020, concentration stabilised around 780-820, suggesting that the consolidation process temporarily slowed. From 2021 onward, an upward trend is observed, with the HHI rising from 811 to 1,051 in Q2 2025, before declining slightly to 1,029 by Q4 2025 (Figure 1). This latest phase corresponds to the final stage of the consolidation process, in which the number of banks fell further, pushing the sector for the first time above the conventional threshold of 1,000 that separates low from moderate concentration (Kostić 2008).

Figure 1. Herfindahl-Hirschman Index (HHI), Q4 2004 - Q4 2025

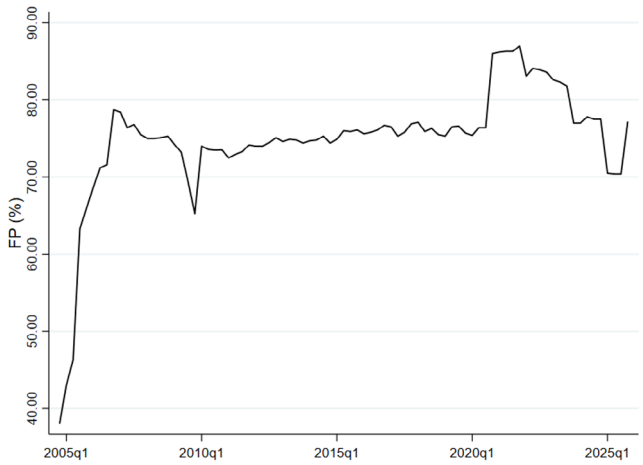


The horizontal axis shows time and the vertical axis shows HHI. Concentration fluctuates at relatively low levels until the early 2010s, rises sharply around 2013–2014, remains near 800 through much of 2015–2020, and rises again after 2021. The manuscript reports a range of 569–1,051 and an end-period value of 1,029.

Source: Authors' elaboration

FP ranges from 38% to 87%, with a mean value of 74.78%, indicating that banks in majority foreign ownership accounted for a substantial share of total banking sector assets during the observed period (Table 2). Foreign presence rose sharply from 38% in Q4 2004 to around 75-79% by 2007-2008 (Figure 2), consistent with the first wave of privatisation and foreign bank entry. Mirković and Knežević (2013) identify 2004-2006 as a period in which most bank privatisations were completed, while Ćorić (2020) notes that the first wave of privatisation transformed the ownership structure of the Serbian banking system, with foreign banks accounting for approximately 78% of total banking assets from 2007 onward. Between 2008 and 2020, FP remained relatively stable, fluctuating between approximately 73% and 77% (Figure 2), even as the total number of banks continued to decline steadily. FP subsequently increased in 2021-2022, reaching its maximum of approximately 87%, before gradually declining. There is also a reduction in FP toward the end of the period, followed by a partial recovery by Q4 2025 (Figure 2).

Figure 2. Foreign presence (FP), Q4 2004 - Q4 2025



The horizontal axis shows time and the vertical axis shows the share of banking sector assets held by banks in majority foreign ownership. The share rises rapidly from about 38%, fluctuates mainly around the mid-70s with a marked dip around 2009, reaches about 87% in the early 2020s, then falls before recovering near the end of 2025.

Source: Authors' elaboration

The market growth ranges from -3.197 to 17.765, with a mean of 3.213, showing that total assets grow by 3.213% per quarter on average. The mean reference interest rate of 8.02% indicates that the Serbian banking sector faced relatively pronounced changes in monetary conditions during the observed period. The reference interest rate represents an important channel through which monetary policy may affect bank

profitability, since changes in this rate influence the cost of funding, interest income, interest expenses and the net interest margin. A higher reference interest rate may increase banks' income from interest-bearing assets, but it may also raise funding costs and reduce lending activity, particularly if borrowing conditions for firms and households become less favourable.

The mean capital adequacy ratio of 22.111% indicates that the Serbian banking sector was relatively well capitalised during the observed period. The range of this ratio, from 16.396% to 28.900%, shows that the capital position of the sector varied over time, but on average remained at a level indicating a substantial ability of banks to absorb risks and preserve business stability. A higher capital adequacy ratio contributes to the resilience of the banking sector, but it may have different effects on profitability: on the one hand, it reduces risk and strengthens confidence in the sector, while on the other hand, a higher level of capital may limit return on equity if capital is not used efficiently.

Before running any analysis, it is necessary to determine the order of integration of the time series. For that purpose, Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests were used (Dickey and Fuller 1981; Phillips and Perron 1988). The results of both tests show that the time series ROA, ROE, FP, and MG are I(0), or stationary at level, while the time series HHI, RIR, and CAR are I(1), or stationary at first difference (Table 3).

Table 2. Descriptive statistics

Variable	M	SD	Min	Max
ROA	1.519	0.895	-1.000	3.200
ROE	8.779	6.211	-5.370	22.700
HHI	764.635	130.691	569.000	1,051.000
FP	74.782	7.649	38.000	87.000
MG	3.213	3.636	-3.197	17.765
RIR	8.020	5.137	1.000	20.800
CAR	22.111	2.525	16.396	28.900

Source: Authors' elaboration

Table 3. Unit-root test results

Variable	ADF: intercept	ADF: intercept and trend	PP: intercept	PP: intercept and trend	Order of integration
ROA	-4.045***	-4.547***	-21.064***	-29.026***	I(0)
ROE	-2.812**	-3.701**	-10.612**	-20.843**	I(0)
FP	-5.990***	-5.456***	-17.913**	-19.876**	I(0)
MG	-4.653***	-5.592***	-32.588***	-50.467***	I(0)
HHI	0.230	-2.080	0.636	-7.301	I(1)
ΔHHI	-12.770***	-12.911***	-122.319***	-120.960***	I(1)
RIR	-1.729	-1.770	-5.765	-12.887	I(1)
ΔRIR	-5.952***	-5.985**	-51.075***	-51.609***	I(1)
CAR	-2.720*	-2.682	-9.635*	-10.581	I(1)
ΔCAR	-10.462***	-10.420***	-91.890***	-91.850***	I(1)

Note. Integration orders refer to the level series. Δ denotes the first-difference operator;
*** p < 0.01; ** p < 0.05; * p < 0.10

Source: Authors' elaboration

That is, the variables are of a different order of integration, but none of them is I(2). Therefore, it is possible to apply the ARDL approach for data analysis that allows the variables in the model to be I(0) or I(1), to have different lags, the most optimal for each variable, and includes a bounds test (Pesaran, Shin, and Smith 2001).

The Akaike Information Criterion (AIC) was used to determine the optimal lag length and the optimal ARDL specification. The use of AIC is appropriate in this context because it allows the selection of a dynamic model that balances model fit and parsimony, while allowing sufficient lag structure to capture short-run adjustments (Lütkepohl 2005). Alternative ARDL specifications within lag lengths ranging from 0 to 4 were estimated, and the specification with the lowest AIC value was selected as the preferred model. Based on the AIC, ARDL(1, 1, 0, 3, 2, 1, 3, 2) was selected as the optimal model when the dependent variable is ROA, while ARDL(1, 1, 0, 3, 2, 1, 3, 3) was selected as the optimal model when the dependent variable is ROE.

The long-run and short-run results of the ARDL models are shown in Table 4. In the ROA model, the error correction term is negative (-0.590) and statistically significant at the 1% level. This indicates that approximately 59% of the deviation from the long-run equilibrium is corrected in each quarter. In the ROE model, the error correction term is also negative (-0.466) and statistically significant at the 1% level, indicating that approximately 46.6% of the deviation from the long-run equilibrium is corrected in each quarter. These results confirm the existence of a relatively fast adjustment process toward long-run equilibrium in both models.

In the long run, market concentration measured by HHI is positively and statistically significantly associated with both ROA and ROE at the 1% significance level. In the short run, the current-period HHI coefficient is negative and only marginally significant at the 10% level in both models. The difference in signs indicates that the estimated association between concentration and profitability varies across time horizons. However, the result must be interpreted within the concentration levels observed in the sample. HHI ranges from 569 to 1,051, with a mean of 764.635, indicating that the Serbian banking sector was predominantly characterised by low concentration and reached only the lower boundary of moderate concentration in some periods. The positive long-run coefficient provides no basis for inferring that high or excessive market concentration improves profitability.

Furthermore, the model does not include direct measures of market power, such as the Lerner Index or pricing margins, nor does it directly measure cost, managerial or profit efficiency. Consequently, the analysis cannot empirically distinguish between the market-power and efficient-structure explanations. Consolidation, economies of scale, changes in competitive conditions and efficiency improvements may be consistent with the observed positive long-run association, but they remain possible explanatory mechanisms rather than mechanisms tested or confirmed by the model.

To assess the economic magnitude of the HHI coefficients, we consider a 100-point increase in HHI. This represents approximately 0.77 of one sample standard deviation and is well within the observed sample range. Holding the other variables in the model constant, a 100-point increase in HHI is associated in the long run with an increase of approximately 0.50 percentage points in ROA and 5.10 percentage points in ROE. In the short run, the same increase is associated with a current-quarter decrease of approximately 0.30 percentage points in ROA and 0.4 percentage points in ROE; however, these short-run coefficients are only marginally significant at the 10% level. Relative to the sample means of ROA (1.519%) and ROE (8.779%), the estimated long-run magnitudes are economically non-negligible. Nevertheless, they should be interpreted as conditional model-based associations within the observed low-to-moderate concentration range, rather than as causal effects or as simulations of the consequences of regulatory policies that would increase market concentration.

Foreign presence, measured as the share of assets of banks in majority foreign ownership in total banking sector assets, is positively and statistically significantly associated with banking sector profitability in both the short run and the long run. In

the long run, the FP coefficient is positive and significant in both the ROA and ROE models, while the short-run coefficient is also positive and significant in the current period. This indicates that a higher share of assets of banks in majority foreign ownership is associated with higher profitability of the Serbian banking sector.

The economic magnitude of the FP coefficients can be interpreted using a 10-percentage-point increase in the share of assets held by banks in majority foreign ownership. This change represents approximately 1.31 sample standard deviations and remains within the observed FP range of 38% to 87%. Holding the other variables in the model constant, a 10-percentage-point increase in FP is associated in the long run with an increase of approximately 0.74 percentage points in ROA and 6.15 percentage points in ROE. In the short run, the same increase is associated with a current-quarter increase of approximately 0.43 percentage points in ROA and 2.87 percentage points in ROE. These estimated magnitudes are economically non-negligible relative to the sample means of ROA and ROE. However, they represent conditional associations derived from an aggregate sector-level model and should not be interpreted as evidence that an increase in foreign ownership would, by itself, produce the corresponding increase in profitability. The possibility that FP is associated with other observed or unobserved structural developments in the banking sector cannot be entirely excluded.

This result has an important economic interpretation. Banks in majority foreign ownership may be associated with higher profitability through several channels. First, they may have better access to international sources of finance and parent-bank support, which can reduce funding constraints and strengthen liquidity management. Second, they may transfer advanced risk-management practices, credit-scoring techniques and internal control systems, which can improve the quality of lending decisions and reduce risk-related costs. Third, foreign-owned banking groups often bring more developed corporate governance standards, technological know-how, digital banking solutions and more efficient organisational procedures. If present, these characteristics could contribute to lower operating inefficiencies, improved service delivery and more stable income generation. However, the model does not directly measure these channels, and they should therefore be regarded as theoretically plausible explanations rather than empirically confirmed mechanisms.

The stronger long-run association between FP and profitability may be consistent with structural and organisational characteristics associated with foreign bank presence becoming reflected in profitability over time. However, the model cannot determine whether this pattern operates through governance, risk management, technology, access to international finance, parent-bank support, the selection of more profitable banks into foreign ownership, or other unobserved factors. Similarly, the larger FP coefficient in the ROE model does not by itself establish that foreign ownership improves capital efficiency; it only indicates that the estimated association is stronger when profitability is measured by ROE rather than ROA. These potential mechanisms require further examination using bank-level data and direct measures of governance, efficiency, asset quality and parent-bank support.

The effect of market growth on profitability is positive but statistically non-significant in the long run. In the short run, however, market growth has a negative and statistically significant effect in periods *t, t-1 and t-2* in both models. This suggests that banking sector asset growth does not immediately translate into higher profitability. One possible explanation is that rapid asset expansion may be accompanied by higher operating costs, stronger competition, adjustment costs or more cautious lending and provisioning policies. The non-significant long-run effect indicates that these short-run pressures may weaken over time as the banking sector adjusts.

The global financial crisis of 2008/09 and the COVID-19 pandemic have statistically significant negative effects on banking sector profitability in the long run. Their effects are stronger on ROE than on ROA, which suggests that crisis periods affected shareholders' returns more strongly than the overall efficiency of asset utilisation. In the short run, the COVID-19 pandemic has a

statistically significant negative effect in the current period and in the first lag, with a stronger effect in the first lag. The global financial crisis has a negative and marginally significant short-run effect. These results indicate that crisis shocks reduce banking sector profitability through weaker lending activity, higher credit risk, increased loan-loss provisions and less favourable macro-financial conditions.

The reference interest rate has a non-significant positive effect on the profitability (ROA and ROE) of the banking sector in the long run. The long-run results suggest that monetary policy does not appear to be a primary long-term driver of banking sector profitability in the observed period. One possible explanation is that banks, borrowers and the market gradually adjust to changes in monetary conditions, so the long-run effect of the reference interest rate on profitability becomes neutralised over time. In the short run, the effect is positive in the *t* period, while in the *t-1* period, it is negative, non-significant ($p > 0.05$) and marginally significant in the *t-2* period ($p < 0.10$) (Table 4).

Table 4. ARDL models results

Term	DV: ROA	DV: ROE
Model	ARDL(1, 1, 0, 3, 2, 1, 3, 2)	ARDL(1, 1, 0, 3, 2, 1, 3, 3)
ECT	-0.590*** (0.093)	-0.466*** (0.085)
Long run		
HHI	0.005*** (0.001)	0.051*** (0.007)
FP	0.074** (0.037)	0.615** (0.266)
MG	0.057 (0.061)	0.298 (0.463)
COVID19	-1.678*** (0.559)	-11.019*** (3.986)
GFC	-1.005** (0.499)	-7.905** (3.836)
RIR	0.017 (0.044)	0.181 (0.309)
CAR	0.180*** (0.063)	0.409** (0.208)
Short run		
HHIt	-0.003* (0.002)	-0.004* (0.002)
FPt	0.043** (0.021)	0.287** (0.119)
MGt	-0.078*** (0.024)	-0.401*** (0.134)
MGt-1	-0.109*** (0.034)	-0.754*** (0.192)
MGt-2	-0.084*** (0.024)	-0.506*** (0.138)
COVID19t	-0.306** (0.137)	-1.634** (0.834)
COVID19t-1	-1.033** (0.419)	-5.528** (2.316)
GFCt	-0.237* (0.145)	-0.595* (0.325)
RIRt	0.189*** (0.060)	0.972*** (0.338)
RIRt-1	-0.077 (0.059)	-0.414 (0.329)
RIRt-2	-0.093* (0.054)	-0.565* (0.304)
CARt	-0.054* (0.033)	-0.513 (0.325)
CARt-1	-0.093 (0.061)	-0.333 (0.348)
CARt-2		-0.393 (0.314)
C	-7.015*** (2.029)	-40.832*** (11.845)

Note. Standard errors in (). *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$

Source: Authors' elaboration

This result suggests that an increase in the reference interest rate may initially improve bank profitability by increasing interest income, especially through loans and other interest-bearing assets with variable rates or through newly approved loans contracted at higher interest rates. In the initial period, the positive effect on interest income may be stronger than the increase in funding costs. However, as funding costs adjust, credit demand weakens, and borrowers face less favourable repayment conditions, the initial positive effect gradually diminishes. Therefore, the short-run effect of the reference interest rate appears to be transitory: it improves profitability immediately, but this benefit weakens as banks and borrowers adjust to tighter monetary conditions.

The capital adequacy ratio has a statistically significant positive effect on the profitability of the banking sector in the long run. This result indicates that a better-capitalised banking sector is more capable of absorbing losses, preserving stability and maintaining confidence among depositors, investors and regulators. Therefore, capital adequacy can have a positive long-run effect on profitability by strengthening the resilience and sustainability of banking operations. The effect is non-significant negative in the short run, up to 2 lags in the case of ROE. In the case of ROA, the effect is marginally significant at *t* period (at 10% level), while non-significant at *t-1* period (Table 4). This may indicate that strengthening the capital position does not immediately translate into higher profitability. In the short run, higher capital adequacy may be associated with retained earnings, lower leverage, a reduction in risk-weighted assets or more cautious lending policies, all of which may temporarily limit profitability. However, in the long run, a stronger capital base improves the stability and resilience of the banking sector, which explains its positive effect on profitability.

The bounds test was used to examine whether there is a long-run relationship between variables. Pesaran, Shin, and Smith (2001) ARDL bound tests confirm the existence of a long-run relationship because the F-statistic is greater than the critical values for I(1) regressors and the t-statistic is lower than the critical values for I(1) regressors for all significance levels (Table 5).

Diagnostic tests were performed to test whether the basic assumptions of the models are fulfilled (Table 6). Since the Breusch-Godfrey LM serial correlation test results up to 3 lags are non-significant for both models ($p > 0.05$), there is no reason for concern about residual serial correlation. The results of Breusch-Pagan/Cook-Weisberg heteroscedasticity tests were also non-significant for both models ($p > 0.05$), indicating that heteroscedasticity is not an issue in the models. Durbin-Watson statistics show that autocorrelation is not an issue in the models. Ramsey RESET test does not indicate the presence of omitted variable bias or functional form misspecification ($p > 0.05$).

Table 5. Bounds test results for the ARDL models

Model / statistic	Value	Significance	F: I(0)	F: I(1)	t: I(0)	t: I(1)
ROA: F-statistic	5.810	10%	2.030	3.130	-2.570	-4.230
ROA: t-statistic	-6.378	5%	2.320	3.500	-2.860	-4.570
ROA: k	7	2.5%	2.600	3.840	-3.130	-4.850
ROA: bounds		1%	2.960	4.260	-3.430	-5.190
ROE: F-statistic	4.802	10%	2.030	3.130	-2.570	-4.230
ROE: t-statistic	-5.489	5%	2.320	3.500	-2.860	-4.570
ROE: k	7	2.5%	2.600	3.840	-3.130	-4.850
ROE: bounds		1%	2.960	4.260	-3.430	-5.190

Source: Authors' elaboration

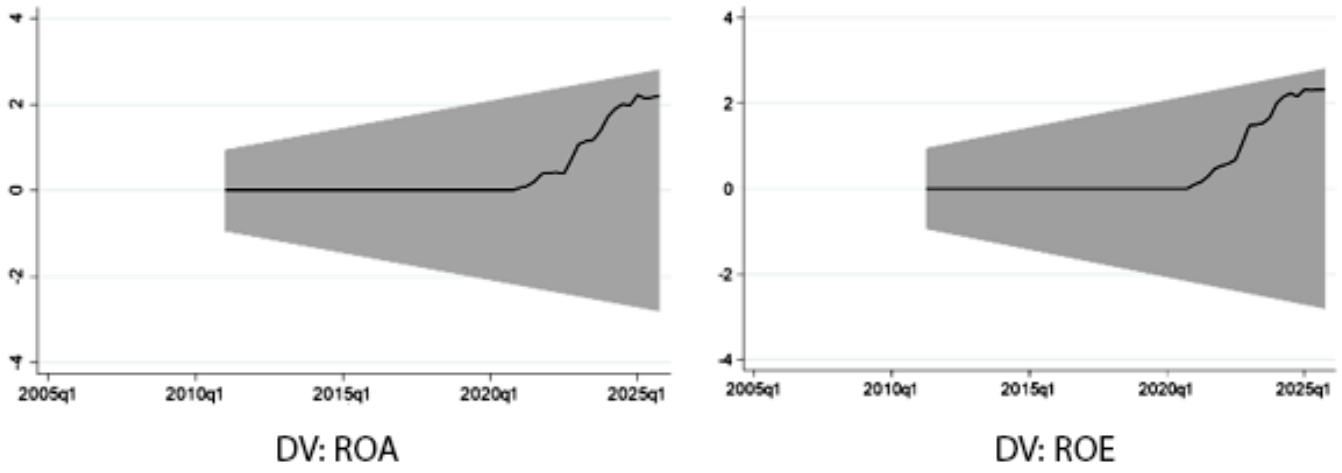
Table 6. Diagnostic test results for the ARDL models

Test	DV: ROA	DV: ROE
Breusch-Godfrey LM serial correlation test	0.631	0.535
Breusch-Pagan/Cook-Weisberg heteroscedasticity test	6.480	3.985
Ramsey RESET functional form test	3.246	4.198
Durbin-Watson statistics	2.118	2.122
CUSUM test for parameter stability	0.766	0.801

Note. The reported values are test statistics. Critical values for the CUSUM test for the model with dependent variable ROE at 1%, 5%, and 10% are 1.143, 0.948, and 0.849, respectively. Critical values for the CUSUM test for the model with dependent variable ROA at 1%, 5%, and 10% are 1.143, 0.948, and 0.849, respectively. *** p < 0.01; ** p < 0.05; * p < 0.10

Source: Authors' elaboration

Figure 3. Plots of the CUSUM test for both models



Both plots show time on the horizontal axis and the CUSUM path as a solid black line within widening grey 95% confidence bounds. Each path is approximately flat at zero until around 2021 and then increases, remaining inside the bounds throughout the plotted period. The left panel corresponds to ROA and the right panel to ROE.

Note: Grey area represents 95% confidence bounds, while the solid lines show the estimated parameters

Source: Authors' elaboration

Parameter stability is tested using the CUSUM (Cumulative Sum) test (Page 1954). Since test statistics are lower than critical values at 1%, 5%, and 10% significance levels, we fail to reject the null hypothesis of parameter stability for both models (Table 6). The estimated parameters in both plots remain within the 95% confidence bounds. Therefore, both models satisfy the stability condition at the 5% significance level (Figure 3). Based on the diagnostic tests results, the basic assumptions of both models are fulfilled.

Potential reverse causality between market concentration and profitability was examined using the Toda-Yamamoto (modified Wald) causality test. The results indicate no statistically significant causality from market concentration (HHI) to profitability (ROA), $\chi^2(4) = 3.64$, $p = 0.457$, or from profitability (ROA) to market concentration (HHI), $\chi^2(4) = 7.50$, $p = 0.112$. The Toda-Yamamoto causality test does not indicate causality from market concentration (HHI) to ROE, $\chi^2(5) = 8.49$, $p = 0.131$, or from profitability (ROE) to market concentration (HHI), $\chi^2(5) = 7.81$, $p = 0.167$. Therefore, the findings provide no evidence of reverse causality between HHI and ROA or ROE.

5. Conclusion

The aim of this study was to examine the relationship between foreign ownership, market concentration and profitability in the Serbian banking sector using quarterly data from Q4 2004 to Q4 2025 and applying the ARDL approach. The results indicate that market concentration is positively and statistically significantly associated with profitability in the long run, whereas its current-period short-run association is negative and only marginally significant. The estimated economic magnitudes suggest that changes in concentration within the observed sample range may be economically non-negligible. Nevertheless, the findings do not establish that concentration causes higher profitability. The model does not include direct measures of market power, pricing behaviour, cost efficiency or managerial efficiency and therefore cannot distinguish empirically between the market-power and efficient-structure explanations. These mechanisms remain possible interpretations of the results rather than confirmed transmission channels. Moreover, because HHI ranged from 569 to 1,051, the findings apply to a predominantly low-concentration environment and should not be extrapolated to highly concentrated banking markets.

Foreign presence is also positively and statistically significantly associated with banking sector profitability in both the short run and the long run, with a stronger association in the long run. This finding suggests that banks in majority foreign ownership may be related to higher profitability of the Serbian banking sector, but it should not be interpreted as evidence that foreign ownership alone causes higher profitability.

Market growth has a positive but statistically non-significant long-run effect on profitability, while its short-run effect is negative and statistically significant. The non-significant long-run effect of market growth differs from studies that report positive effects of banking sector expansion on profitability, such as Kohlscheen, Murcia Pabón, and Contreras (2018).

Capital adequacy has a statistically significant positive effect on banking sector profitability in the long run. However, the short-run effects of capital adequacy are mostly negative and statistically non-significant, suggesting that strengthening the capital position may temporarily limit profitability through retained earnings, lower leverage, a reduction in risk-weighted assets or more cautious lending policies.

The global financial crisis and the COVID-19 pandemic had statistically significant negative effects on the profitability of the Serbian banking sector in the long run. Their effects were stronger on ROE than on ROA, indicating that crisis periods affected shareholders' returns more strongly than the overall efficiency of asset utilisation. These findings are consistent with previous research showing that crisis shocks reduce bank profitability through weaker lending activity, higher credit risk, increased loan-loss provisions, lower demand for loans and less favourable macro-financial conditions (Dietrich and Wanzenried 2011; Augeraud-Véron and Boungou 2023; Rebić, Paunović, and Popović 2022; Hladika 2021).

The findings have several policy implications, although they should be interpreted with caution. The positive long-run association between foreign presence, market concentration and profitability does not necessarily imply a causal relationship. The results indicate that these structural characteristics are related to banking sector profitability during the observed period, but the model does not fully capture all possible channels through which ownership structure and concentration may influence performance.

For the National Bank of Serbia and other regulatory authorities, the results suggest the importance of continuously monitoring the interaction between ownership structure, market concentration, competition and financial stability. The positive association between concentration and profitability should not be interpreted as a recommendation to encourage further concentration without restriction. Although consolidation may be associated with stronger profitability within the observed low-to-moderate concentration range, excessive concentration could reduce competition, increase market power and create systemic vulnerabilities. Therefore, regulatory policy should preserve a balance between banking sector profitability, competition and stability.

The positive association between foreign presence and profitability also requires cautious interpretation. It suggests that banks in majority foreign ownership may be associated with higher profitability, possibly through stronger governance, risk management, technological capacity, access to international financial resources and more efficient business practices. However, this does not prove that foreign ownership alone causes higher profitability. Policy should therefore not be focused simply on promoting foreign ownership as such, but on strengthening the institutional, regulatory and competitive conditions under which all banks, domestic and foreign-owned, can operate efficiently and prudently.

Future research could extend this analysis by using bank-level panel data, which would allow for a more detailed examination of differences between individual banks in terms of size, ownership, business model, risk profile and efficiency. In addition, future studies could include variables such as non-performing loans, liquidity risk, cost efficiency, digitalisation and ownership concentration, subject to data availability. Such extensions would provide a more precise understanding of the channels through which ownership structure and market concentration affect profitability in the Serbian banking sector.

References

Athanasoglou, P. P., Brissimis, S. N., and Delis, M. D. 2008. Bank-specific, industry-specific and macroeconomic determinants of bank profitability. *Journal of International Financial Markets, Institutions and Money* 18 (2): 121-136.

Augeraud-Véron, E. and Boungou, W. 2023. The impact of COVID-19 on bank profitability: Cross-country evidence. *German Economic Review* 24 (1): 69-95.

Bain, J. S. 1951. Relation of profit rate to industry concentration: American manufacturing, 1936–1940. *The Quarterly Journal of Economics* 65 (3): 293-324.

Berger, A. N. 1995. The profit-structure relationship in banking: Tests of market-power and efficient-structure hypotheses. *Journal of Money, Credit and Banking* 27 (2): 404-431.

Claessens, S., Demirgüç-Kunt, A., and Huizinga, H. 2001. How does foreign entry affect domestic banking markets? *Journal of Banking & Finance* 25 (5): 891-911.

Ćorić, G. 2020. *Uticaj bankarstva u Srbiji na privredni razvoj od osnivanja prvih banaka do savremenog bankarstva* [The impact of banking in Serbia on economic development from the establishment of the first banks to modern banking]. Ph.D. diss., Singidunum University, Belgrade.

Cull, R., Martinez Peria, M. S., and Verrier, J. 2017. *Bank ownership: Trends and implications*. IMF Working Paper 17/60. Washington, DC: International Monetary Fund. https://www.imf.org/-/media/files/publications/wp/2017/wp1760.pdf.

Demirgüç-Kunt, A. and Huizinga, H. 1999. Determinants of commercial bank interest margins and profitability: Some international evidence. *The World Bank Economic Review* 13 (2): 379-408.

Demsetz, H. 1973. Industry structure, market rivalry, and public policy. *The Journal of Law and Economics* 16 (1): 1-9.

Dickey, D. A. and Fuller, W. A. 1981. Likelihood ratio statistics for autoregressive time series with a unit root. *Econometrica* 49 (4): 1057-1072.

Dietrich, A. and Wanzenried, G. 2011. Determinants of bank profitability before and during the crisis: Evidence from Switzerland. *Journal of International Financial Markets, Institutions and Money* 21 (3): 307-327.

Djalilov, K. and Piesse, J. 2016. Determinants of bank profitability in transition countries: What matters most? *Research in International Business and Finance* 38: 69-82.

Domanović, V., Todorović, V., and Savović, S. 2018. Internal factors of bank profitability in the Republic of Serbia. *Business and Economic Horizons* 14 (3): 659-673.

Đuranović, G. and Filipović, S. 2025. The impact of the external factors on the profitability of the banking sector in Serbia. *Ekonomika preduzeća* 73 (5-6): 283-297.

Fidanoski, F., Choudhry, M., Davidović, M., and Sergi, B. S. 2018. What does affect profitability of banks in Croatia? *Competitiveness Review: An International Business Journal* 28 (4): 338-367.

Ghatak, S. and Siddiki, J. U. 2001. The use of the ARDL approach in estimating virtual exchange rates in India. *Journal of Applied Statistics* 28 (5): 573-583.

Hladika, M. 2021. Impact of COVID-19 pandemic on the loans quality, provisions and profitability of the banking sector. In *Economic and Social Development: 69th International Scientific Conference on Economic and Social Development – Sustainability and Post COVID World: Book of Proceedings*, edited by J. Janjusevic, B. Taheri, and M. Kozina, 138-149. Dubai: Varazdin Development and Entrepreneurship Agency, Heriot-Watt University, and University North.

Kohlscheen, E., Murcia Pabón, A., and Contreras, J. 2018. *Determinants of bank profitability in emerging markets*. BIS Working Papers No. 686. Basel: Bank for International Settlements. https://www.bis.org/publ/work686.pdf.

Korytowski, M. 2018. Banks' profitability determinants in post-crisis European Union. *International Journal of Finance & Banking Studies* 7 (1): 1-12.

Košak, M. and Čok, M. 2008. Ownership structure and profitability of the banking sector: The evidence from the SEE region. *Zbornik radova Ekonomskog fakulteta u Rijeci:* časopis *za ekonomsku teoriju i praksu* 26 (1): 93-122.

Kostić, M. 2008. Merenje koncentracije ponude grane [Measuring supply concentration in an industry]. *Ekonomski horizonti* 10 (1): 89-108.

Laporšek, S., Švagan, B., Stubelj, M., and Stubelj, I. 2025. Profitability drivers in European banks: Analyzing internal and external factors in the post-2009 financial landscape. *Risks* 13 (1): 2.

Lütkepohl, H. 2005. *New introduction to multiple time series analysis*. Berlin and Heidelberg: Springer.

Mason, E. S. 1939. Price and production policies of large-scale enterprise. *The American Economic Review* 29 (1): 61-74.

Mirković, V., and Knežević, M. 2013. Doprinos stranih direktnih investicija rastu i razvoju bankarskog sektora: slučaj Srbije [The contribution of foreign direct investment to the growth and development of the banking sector: The case of Serbia]. Paper presented at the international conference *Possibilities and Perspectives for Foreign Direct Investments in the Republic of Serbia*, Institute of International Politics and Economics, Belgrade, Serbia, November 13–14.

Naaborg, I. and Lensink, R. 2008. Banking in transition economies: Does foreign ownership enhance profitability? *The European Journal of Finance* 14 (7): 545-562.

National Bank of Serbia. 2004–2025. *Banking Sector Reports and publicly available online data tables on the banking sector*, various quarterly issues and data releases. Belgrade: National Bank of Serbia. https://www.nbs.rs/sr/finansijske-institucije/banke/izvestaji-i-analize/ (accessed September 6, 2026).

Page, E. S. 1954. Continuous inspection schemes. *Biometrika* 41 (1/2): 100-115.

Pasiouras, F. and Kosmidou, K. 2007. Factors influencing the profitability of domestic and foreign commercial banks in the European Union. *Research in International Business and Finance* 21 (2): 222-237.

Peltzman, S. 1977. The gains and losses from industrial concentration. *The Journal of Law and Economics* 20 (2): 229-263.

Pesaran, M. H., Shin, Y., and Smith, R. J. 2001. Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics* 16 (3): 289-326.

Petria, N., Capraru, B., and Ihnatov, I. 2015. Determinants of banks' profitability: Evidence from EU 27 banking systems. *Procedia Economics and Finance* 20: 518-524.

Phillips, P. C. B. and Perron, P. 1988. Testing for a unit root in time series regression. *Biometrika* 75 (2): 335-346.

Rebić, M., Paunović, S., and Popović, B. 2022. Measuring concentration and efficiency in Bosnia and Herzegovina banking sector using dynamic panel model. *The South East European Journal of Economics and Business* 17 (1): 14-29.

Republic of Serbia. 2025. *Law on Banks*. RS Official Gazette, nos. 107/2005, 91/2010, 14/2015, and 19/2025. https://www.nbs.rs/export/sites/NBS_site/documentseng/propisi/zakoni/law_banks.pdf (accessed September 6, 2026).

Seemule, M., Sinha, N., and Ndlovu, T. 2017. Determinants of commercial banks' profitability in Botswana: An empirical analysis. *IUP Journal of Bank Management* 16 (2): 7-28. https://ssrn.com/abstract=3210407.