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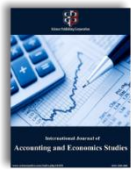

Navigating the new normal: drivers of European bank profitability post-crisis (2013-2023)

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Abstract

This study explores the factors influencing bank profitability, with a particular focus on the European banking sector. It seeks to enhance our understanding of the financial drivers behind banks operating in this diverse and complex market. Through comprehensive empirical analysis, the research identifies key elements that affect profitability across European banks. Using a dataset of 31 major European banks, covering the period from 2013 to 2023, advanced econometric methods, such as panel data analysis, are employed to assess various determinants of bank profitability. The study considers internal factors specific to each bank, drawn from their financial data, alongside macroeconomic indicators like GDP growth and inflation, sourced from the World Bank. The findings reveal that both bank-specific factors, such as size and capital ratios, and broader economic conditions, including inflation and the effects of the COVID-19 pandemic, have a significant impact on profitability. The results underscore the importance of maintaining adequate financial reserves, effective loan management, and the ability to navigate economic uncertainties, especially during crises. Among the econometric models evaluated, the fixed-effects model proved to be the most accurate in explaining variations in bank profitability.

Keywords: *Europe; Bank Sector; Capital Ratio; Inflation; Profitability; Covid-19.*

1. Introduction

The banking industry is a fundamental pillar of worldwide financial systems, which is essential in sustaining stability and promoting economic prosperity. As a central middleman in financial markets, banks help credit flow across borders and within countries. Therefore, bank profitability is a barometer for the economic system's general condition and for one institution's performance. A bank's profits show its operational efficiency, risk-management skills, and financial stability. Establishing investor trust, guaranteeing regulatory compliance, and promoting economic growth via continuous lending and investment activity depend on this profitability.

Banking is fundamental to the European economy and directly affects many different economic activities, like consumer expenditure and corporate investment. Driven by changing market dynamics, technological breakthroughs, and legislative changes, the European banking industry has seen significant changes recently. For banks, these changes have brought possibilities and difficulties, which emphasize the need to know the elements influencing profitability in this framework. Studying the factors affecting European bank profitability is essential for several reasons. First, it clarifies the financial system's stability and resiliency during times of economic instability. Second, it helps to create policies and plans meant to improve the efficiency and effectiveness of the banking industry. For legislators, investors, authorities, and financial experts, a thorough awareness of the factors influencing bank profitability is beneficial. Stakeholders may make well-informed choices that support sustainable development, the best use of resources, and economic stability by knowing the main elements under the influence of the banking sector.

As a measure of a bank's financial situation, profitability shows its capacity to provide steady income throughout time regularly. This indicator shows managerial performance and is very important in a more general economic context. Variations in profitability significantly affect economic growth, shaping choices on capital distribution, savings, and investments. Higher profitability banks are more suited to improve cash flow, increase access to finance, and generate more investment and growth opportunities. This dynamic may increase general economic productivity, create employment, and intensify competitiveness. From fields including finance, marketing, strategic management, accounting, and industrial economics, research on bank-level profitability has been a primary emphasis in financial studies. Many studies have looked at the elements influencing bank performance, providing information on the causes of profitability. Knowing these components is especially important in unpredictable economic periods, such as financial crises or world events.

This paper investigates the complex field of bank profitability, especially concerning European banks. Its goal is to uncover many elements affecting European banks' profitability through a thorough empirical study, thereby deepening our knowledge of the dynamics influencing financial institutions in this diverse regulatory environment.

This study investigates the factors influencing bank profitability using a dataset of 31 of the biggest banks in Europe by asset size from 2013 to 2023. It uses sophisticated econometric approaches, including panel data analysis, and draws from their financial records. The

study covers a range of internal elements unique to every bank, as well as macroeconomic data like GDP growth and inflation from the official World Bank website.

The results show that profitability is much influenced by macroeconomic factors like inflation and the consequences of the COVID-19 epidemic, as well as by bank-specific factors such as size and capital ratio. Particularly in times of crisis like the COVID-19 epidemic, the study underlines the need for banks to keep sufficient financial reserves and control loans and autonomic difficulties. Out of all the models tested, the fixed-effects model was the most realistic depiction of bank profitability. Studies from past times repeatedly show that internal issues largely influence bank profitability. These elements include operational effectiveness, capital structure, managerial techniques, and risk control measures. Although many studies have been done on banks' financial situation, targeted studies on specific areas and times are still much sought. The European banking industry is unique because of its different regulatory frameworks, market circumstances, and economic contexts throughout nations.

For the worldwide banking industry, the COVID-19 epidemic has brought unheard-of difficulties impacting operations, profitability, and general stability. The crisis has affected consumer behavior, corporate procedures, financial markets, and economic activity. Therefore, one of the most critical areas of investigation is how the epidemic affects the financial sector. Examining the effects of this worldwide crisis on industry, this paper seeks to investigate how COVID-19 has affected bank profitability in Europe. The study addresses many vital questions: How has the European banking industry responded to the COVID-19 epidemic? What effects has this worldwide crisis had on bank profitability? What knowledge may one acquire from this event to improve future disturbance preparedness? Using a thorough analysis of these issues, the research aims to provide an insightful analysis of the internal and external elements influencing bank profitability, thereby improving the knowledge of the difficulties and prospects confronting the European banking industry after the pandemic.

The banking sector is a basic component of Europe's economic structure, comprising a broad spectrum of institutions vital in financial intermediation, investment, and general economic stability. To understand the dynamics of this sector, one must study its structure, legal environment, main actors, and current developments.

Diversity defines the European banking scene, which ranges from minor regional and municipal institutions to big worldwide corporations. Among the prominent participants are Deutsche Bank (Germany), BNP Paribas (France), HSBC (UK), and Banco Santander (Spain). Operating within the European Union (EU) and beyond, these institutions greatly help create a worldwide financial system. With national authorities such as the Bank of England (BoE), Banque de France, and Bundesbank, the European Central Bank (ECB) shapes the regulatory environment for European banks. Basel III and other regulatory changes were meant to support financial stability, increase liquidity management, and lower risk in the banking industry after the 2008 financial crisis. Borri and Di Giorgio's (2022) research shows that these updated rules, which set higher capital requirements and more thorough stress testing for banks, have successfully reduced the probability of another significant financial catastrophe.

This research first reviews the body of current research on the elements affecting bank profitability and presents the theoretical framework. Then it describes the economic developments in Europe over the years. The third section describes the approach used, including model definitions and variable selection. Lastly, it highlights the main conclusions and their ramifications, while the third chapter offers empirical data and debates.

2. Literature review

Numerous studies have explored the factors influencing bank profitability over the years, generating significant interest in both conceptual and practical aspects of the topic within academic literature. Many researchers have investigated how specific characteristics of banks affect their profitability. Building on foundational work by Short, B.K. (1979) and Bourke, P. (1989), more recent studies have sought to identify key determinants of bank profitability across various countries. While some research focuses on panels of nations, others concentrate on individual countries.

Uralov (2020) analyzes bank performance using three metrics: return on investment, return on equity, and net interest margin. The findings reveal that the impact of these variables on profitability differs based on the profitability measure utilized, with economic growth notably influencing return on bank assets. Research by Smirlock (1985), Boyd and Runkle (1993), Bikker and Hu (2002), and Doğan (2013) demonstrates a significant positive relationship between bank size and profitability. Various studies, including those by Camilleri (2005), Athanasoglou and Delis (2008), Pasiouras and Kosmidou (2007), Gul and Zaman (2011), and Saeed (2014), suggest that larger banks typically achieve greater profitability. Menicucci and Paolucci (2016) found that, within Europe, profitability at the corporate level is significantly affected by factors such as bank size and capital ratio, with larger loan loss provisions often correlating with lower profitability. Additionally, their data indicates that banks with higher loan-to-deposit ratios generally exhibit increased profitability, though this relationship may not always be statistically significant.

Athanasoglou and Staikouras (2006), in their study of bank profitability in South-eastern Europe, found that while financial reforms and improvements in the aggregated balance sheets of credit institutions are interconnected, they have opposing effects on profitability. Rossi, Borroni and Piva (2018) explored how the factors influencing bank profitability have evolved following the recent financial crisis. Their research indicated that the determinants of profitability, once clearly defined in previous studies, have shifted due to new regulatory and competitive pressures. By analyzing commercial, cooperative, and savings banks using random effects panel regression, their study found that after a period characterized by excessive optimism—where rapid credit expansion and high leverage were seen as effective strategies for boosting profitability, maintaining a robust financial structure and prudent credit portfolio management have become the key factors for achieving higher returns.

As measured by return on assets (ROA) and return on equity (ROE), Petria, Capraru, and Ihnatov (2015) found that their empirical results matched their expectations, so highlighting several elements that significantly affect bank profitability, including credit and liquidity risks, management efficiency, business diversification, market competitiveness, and economic growth. Within the EU27, they observed a favorable relationship between bank profitability and competitiveness, supporting the European integration objective of increasing market competitiveness. Regarding ROE, their results likewise showed that bank size had little influence on profitability; ROA was not much affected. Their findings led them to advise regulatory agencies to increase their control of credit and liquidity risks and support more banking sector competition. They also counseled bank leaders on carefully monitoring these risks, diversifying income sources, and streamlining running expenses. From 2004 to 2011, Căpraru and Ihnatov (2014) examined the main factors influencing bank profitability in five Central and Eastern European nations: Romania, Hungary, Poland, the Czech Republic, and Bulgaria. Their study of 143 commercial banks examined net interest margin, ROA, and ROE as profitability measures. Across all measures, they found that managerial efficiency and capital adequacy growth favorably affected bank profitability. But significantly influencing ROA and ROE was inflation and credit risk.

Emphasizing the need for internal and external elements to decide bank profitability, the research also revealed that banks with better capital adequacy ratios often show more profitability.

Previous studies have pointed out various factors that may improve a bank's profitability: size (Berger, 1987; Bikker and Hu, 2002); capital ratio (Molyneux and Thornton, 1992); liquidity ratio (Bourke, 1989; Molyneux and Thornton, 1992); asset quality; operational efficiency; etc. Empirical research has carefully investigated these internal factors, and different variables have been suggested as predictors of bank profitability, thereby reflecting the qualities and objectives of every mentioned study.

Asset Size. Whether a bigger bank size results in higher profitability is one of the main unresolved issues in the literature. Larger banks often earn greater returns, for instance, according to Regehr and Sengupta (2016) and Ali and Puah (2019), suggesting a favorable link between size and profitability. They observed that banks with higher returns usually fit better for growth. On the other hand, research by Aladwan (2015), Thi Thanh Tran, Phan (2020), Javaid et al. (2011), and Vong and Chan (2009) found that lower asset sizes are linked with greater profitability, therefore implying a negative association between size and profitability. Their results show that small and medium-sized banks generally do better than bigger ones. Other research, such as that by Tharu and Shrestha (2019) and Alzoubi (2018), concluded that bank size (measured by assets) does not significantly influence profitability, indicating no relationship at all. The existing literature on the impact of bank size on profitability presents a somewhat ambiguous picture. This research also considers bank size as an independent variable, measured by total assets, converted into Euros using annual exchange rates. The literature review suggests a positive relationship between bank size and profitability.

Capital Ratio. The capital ratio is an important metric for assessing a bank's capitalization and overall stability, reflecting its capital adequacy. Often referred to as the equity-to-assets ratio, this measure is a fundamental indicator of a bank's capital strength (Golin, 2001). Strong capital is crucial for banks as it enhances their ability to withstand financial crises and ensures depositor security during challenging economic conditions. A solid capital structure enables financial institutions to absorb losses and reduces the risk of insolvency during adverse times. Conversely, banks with insufficient capital may struggle to manage risks effectively. Hirindu Kawshala (2017), Bitar, Pukthuanthong, and Walker (2018), and Javaid et al. (2011) found a positive and significant relationship between a bank's capital ratio and its profitability. They concluded that a higher capital ratio correlates with increased profitability. Agbeja, Adelakun, and Olufemi (2015) also reported that banks with higher capital ratios pose less risk compared to those with lower ratios, as indicated in their study on the capital adequacy ratio and bank profitability in Nigeria. Vong and Chan (2009) further emphasized the significance of the capital ratio concerning bank profitability. Conversely, Gul, Irshad, and Javaid et al. (2011) reported no significant relationship between bank profitability and capital ratio, noting that while the association between capital ratio and both marginal cost and ROA is minimal, it is not definitive, suggesting that well-capitalized banks may experience negative returns. Overall, the research indicates a positive relationship between the capital ratio and bank profitability.

Loan Ratio. Calculated as net loans divided by total assets, the loan ratio measures liquidity. Studies by Sufian and Habibullah (2009), among other research, show a consistent positive link between liquidity and profitability. Although they may not make great profits, banks with a significant concentration of liquid assets are often less vulnerable to hazards, which helps investors tolerate lower returns on equity. Particularly in terms of liquidity and profitability, loans are a significant revenue source for banks and significantly affect their operations. While loans are supposed to increase income, several studies have shown a negative correlation between bank loan volume and profitability. This contradiction emphasizes the different study results on the relationship between bank profitability and liquidity levels. Menicucci and Paolucci (2016) found that with both return on equity and return on assets, the ratio of net loans to total assets exhibits a positive but statistically meaningless correlation. This suggests that while a higher percentage of loans might improve the possibility of profitability, the impact needs to be more substantial to support confident decisions. According to Javaid et al. (2011), this loan ratio was a significant determinant of Pakistani bank profitability. On the other hand, Prabowo et al. (2018) revealed a hostile and statistically meaningless link between this ratio and ROA. Finally, Almazari (2014) found that for banks in Saudi Arabia, the loan ratio had a negative link with ROA; for Jordanian banks, this relationship was positive and substantial. Current research mainly points to a favorable correlation between loan ratios and profitability.

The deposits ratio, calculated as the rate of total deposits over the total assets, heavily relies on consumer deposits. As a result, a bank will get more deposits, have more loan alternatives to offer consumers, and be able to make more money. Lee and Hsieh (2013) emphasize this point by stating that while low deposits may hurt banks' profitability, higher deposits might help them generate more profits. Consequently, there is a positive correlation between client deposits and bank profitability. On the other hand, because banks must pay depositor interest, their inability to release funds through loans may lower their profitability level. More deposits, however, could reduce earnings if there is not enough demand for loans because this type of financing is expensive. Hirindu Kawshala (2017) on his research paper regarding the factors affecting bank profitability has established a positive and significant relationship between deposits and bank profitability. He states that a lower level of deposits negatively impacts bank profitability. The largest contribution to profitability comes from savings deposits, which are followed in order of importance by time deposits and, lastly, current deposits, which have the least contribution. Therefore, the Jordanian commercial bank will take a similar tack in drawing up unique strategic plans, diversifying its credit portfolio, and luring investor deposits, highlighted by Haddawee and Flayyih (2020) in their study. Additionally, Gul, Irshad, and Javaid et al. (2011) conclude that the total deposit over total assets has a significant and positive relationship with the profitability of banks. Therefore, most of the literature concludes a positive relationship between bank profitability and the deposits variable.

Loan Loss Provisions, calculated as the ratio of loan loss reserves to total loans, serve as a measure of capital risk and the quality of a bank's credit portfolio. Banks operating in higher-risk environments or lacking expertise in managing loans are expected to increase their loan-loss provision ratio to mitigate risk. Consequently, a higher ratio is anticipated to be negatively correlated with profitability. The ratio of loan loss reserves to total loans is assessed to determine how a bank's asset quality influences its profitability. In regression analysis, this ratio is treated as an independent variable because a high ratio often indicates poor-quality loans, thereby increasing the risk associated with the loan portfolio. Ul Mustafa, Ansari, and Younis (2012) found that in Pakistani banks, those with lower loan loss provisions are perceived as safer, and this safety can translate into higher profitability. Similarly, Ahmad, Tahir, and Aziz (2014), Alhadab and Alsahawneh (2016), and Menicucci and Paolucci (2016) observed a significant negative relationship between loan loss provisions and bank profitability in their studies. Given the theoretical expectation that increased exposure to credit risk typically leads to reduced profitability, a negative relationship between loan loss provisions and profitability is anticipated.

GDP Growth. The relationship between GDP growth and bank profitability has been extensively studied in the literature, with a consensus that macroeconomic conditions, such as GDP growth, play a crucial role in influencing the financial performance of banks. Studies generally show that improved profitability for banks and positive GDP growth have a close relationship. While firms engage in expansion and consumers raise their expenditure, the demand for loans and financial services usually rises as the economy develops. On the other hand, negative GDP growth or economic downturn might lower bank profits. Recessions bring about more unemployment, lower consumer spending, and lower company investments, which could reduce demand for credit and financial services. Furthermore, borrowers run a

greater risk of defaulting on their loans in times of economic crisis, which significantly influences loan loss provisions and non-performing assets and thus affects bank earnings (Athanasoglou, Brissimis, & Delis, 2008). Banks often need tight liquidity and higher financing costs during these difficult times might further compromise their profitability. External events like monetary policy, inflation, and changes in interest rates could influence the connection between GDP growth and bank profitability. To prevent overheating, central banks could, for instance, increase interest rates during economic booms. Although broadening their interest margins helps banks initially, rising interest rates might also reduce loan demand, affecting long-term profitability (Dietrich & Wanzenried, 2011).

Inflation. Determining bank profitability depends critically on inflation, expressed as a percentage change in consumer prices over time. Wide-ranging research on the link between inflation and bank profitability has produced conflicting results depending on the areas' economic background studied. Inflation can influence bank profitability in multiple ways. One of the primary channels is its impact on interest rates. As inflation rises, central banks tend to increase interest rates to control inflationary pressures. Higher interest rates can benefit banks by increasing the spread between what they pay on deposits and what they charge for loans, which positively affects their profitability. However, inflation can also lead to increased uncertainty in the economy, which may cause borrowers to struggle with loan repayments, increasing non-performing loans and loan loss provisions, which negatively affect profitability (Perry, 1992). Moreover, the ability of banks to adjust their interest rates in response to inflation is critical. Banks that can swiftly pass inflationary costs to their customers through higher interest rates are better positioned to maintain profitability. Nonetheless, inflation can also diminish the real value of loans and deposits if interest rate adjustments lag inflation, reducing bank profitability in real terms (Gul et al., 2011). Results of empirical research on the effect of inflation on bank profitability have been conflicting. Perry (1992) proposed that whether inflation is expected or unforeseen determines how much it affects profitability. Anticipating inflation allows banks to modify their interest rates, reducing adverse effects. Conversely, unexpected inflation could cause mispricing of loans and deposits, compromising bank profitability. Bourke (1989) also discovered a favorable link between inflation and profitability; yet, in hyperinflation, the impact becomes lessened. In conclusion, while inflation can provide opportunities for banks to enhance their profitability through broader interest margins, it can also present risks by increasing loan defaults and creating economic uncertainty. How inflation affects profitability depends on how well banks anticipate and adjust to inflationary pressures.

2.1. Post-2020 digital transformation focus

In addition to traditional determinants of bank profitability, recent scholars have increasingly emphasized the role of digital transformation and technological innovation as critical performance drivers in the post-2020 European banking landscape. The COVID-19 crisis acted as a catalyst for widespread adoption of fintech partnerships, online banking platforms, cloud computing, and AI-driven risk management tools, all of which have fundamentally reshaped cost structures, customer engagement, and revenue models (Feyen et al., 2021; Deloitte, 2020; Huňady et al., 2024; Kelecic, 2020).

Several empirical studies have found a positive association between digital investment intensity and both ROA and ROE, suggesting that technologically adaptive banks tend to realize efficiency gains, enhance cross-selling capabilities, and lower customer acquisition costs (Vives, 2022; IMF, 2021). Blockchain-based innovations, particularly in payments and compliance (e.g., KYC, AML), are also being linked to reductions in operational risk and back-office expenditure (Arner et al., 2020). For instance, research by Gomber et al. (2021) documents that digitally mature banks across Europe exhibited stronger revenue stability and faster post-COVID recovery trajectories than their less digitized peers.

Despite these advancements, digital transformation poses challenges, including cybersecurity risks, regulatory fragmentation, and significant capital investment requirements, which may temper short-term profitability (Zetzsche et al., 2020). Therefore, the net impact of digitalization is often non-linear and contingent upon institutional capacity, regulatory clarity, and the ability to scale technological infrastructure. Consistently, the literature calls for more granular, cross-country analysis to understand how European banks navigate these trade-offs to optimize profitability.

2.2. Accounting perspectives on bank profitability

While the literature on bank profitability has traditionally emphasized financial and macroeconomic determinants, recent research underlines the critical role of accounting standards and auditing frameworks in shaping key profitability metrics such as ROA and ROE. In particular, the adoption of IFRS 9 (International Financial Reporting Standard 9) across European jurisdictions has fundamentally transformed how banks recognize and provision for credit losses. Unlike the incurred-loss model under IAS 39, IFRS 9 mandates an expected credit loss (ECL) approach, which requires earlier and more forward-looking recognition of impairments (EBA, 2023; Novotny-Farkas, 2016). This shift directly impacts net income, asset values, and ultimately ROA and ROE, especially in periods of macroeconomic stress.

Moreover, fair value accounting practices can introduce volatility into profitability measures, particularly for banks with large trading portfolios or exposure to derivative instruments. Changes in market valuation — even if unrealized — affect reported earnings and equity under IFRS 13, with downstream effects on performance ratios (Laux & Leuz, 2009).

From an auditing perspective, variations in audit quality, auditor independence, and the enforcement rigor of national accounting regulators can lead to inconsistencies in how profitability is measured and compared across jurisdictions. Empirical evidence shows that banks audited by Big Four firms tend to exhibit more conservative provisioning behavior and smoother earnings, thereby affecting the stability of profitability indicators (Kanagaretnam et al., 2010; Garcia et al., 2020).

These accounting and auditing considerations are particularly salient in the aftermath of the COVID-19 pandemic, when credit risk models, provisioning assumptions, and macro-overlay adjustments significantly influenced reported profitability. As such, future research should more explicitly incorporate accounting policy variables, including the application intensity of IFRS 9 and auditor characteristics, into profitability models to better capture cross-country variation in reported financial outcomes.

2.3. Interdisciplinary perspectives on bank profitability

In addition to traditional economic and accounting frameworks, bank profitability is increasingly shaped by interdisciplinary factors, notably regulatory compliance regimes and insights from behavioral finance. For instance, the implementation of Basel III capital requirements, which emphasize stricter Tier 1 capital ratios, countercyclical capital buffers, and liquidity coverage ratios, has had profound implications for how banks manage leverage and profitability trade-offs (BIS, 2019). Higher capital ratios — although positively associated with financial resilience — may compress return on equity in the short term by increasing equity financing costs, thus affecting strategic lending behavior and capital allocation (Cecchetti & Schoenholtz, 2017; Anginer et al., 2018).

Furthermore, behavioral finance literature highlights the role of consumer psychology and trust in shaping deposit behavior during crises. Empirical studies show that depositor withdrawals or reallocation decisions are often driven not solely by interest rate differentials, but by perceived institutional stability, government guarantees, and media narratives (Kiss et al., 2018; Acharya & Mora, 2015). In the context of the COVID-19 pandemic, such factors likely influenced deposit growth patterns across countries, with implications for the deposits-to-assets ratio, a key internal profitability determinant in this study. Understanding how depositor behavior interacts with perceived bank solvency and macro-shocks could provide a richer behavioral dimension to interpreting fluctuations in profitability metrics like ROA and ROE.

Integrating these interdisciplinary dimensions reinforces the notion that bank profitability is not only a function of internal efficiencies and macroeconomic conditions but is also shaped by evolving regulatory architectures and psychological responses of market participants during periods of systemic stress.

Taken together, the reviewed literature reveals a multidimensional understanding of bank profitability. Internal bank characteristics—such as size, capital structure, loan performance, and deposit behavior—interact with macroeconomic indicators and institutional frameworks to influence ROA and ROE. Moreover, the introduction of IFRS 9, the operationalization of Basel III, and the accelerating pace of digital transformation further complicate the profitability landscape, especially in the post-crisis period. These insights provide a theoretical basis for the selection of variables and model structure in this study. The following section outlines the methodology used to empirically test whether these bank-specific and macroeconomic factors significantly influence profitability across major European banks from 2013 to 2023, using panel data regression techniques informed by this integrated literature base.

3. Methodology and data

Building on the literature, which highlights the multidimensional nature of bank profitability—from internal performance drivers to macroeconomic and regulatory influences—this section outlines the methodological framework used to test these relationships empirically.

This study assesses the impact of management on profitability through an analysis of financial statements. Specifically, it focuses on the income statements and balance sheets of the top 31 banks in Europe, which offer pertinent data.

Using panel data, a multiple regression analysis, including cross-sectional and time-series information, was conducted to investigate the elements affecting the profitability of European banks. This approach conforms to past studies and uses descriptive and multivariate analytic methods to evaluate how several bank features together influence profitability. We used the Stata program to investigate the connections among the variables of interest and run the regression models for the study.

The study tested two models, each with a different profitability metric as the dependent variable. The model specifically tested two different profitability indicators, ROE and ROA, and it included eight independent variables.

3.1. Dependent and independent variables

The dependent variables in this study are considered alternative indicators of profitability. To evaluate bank profitability, various ratios have been used in the literature, such as those by Sufian and Habibullah (2009) and Naceur and Omran (2011). Table 1 includes all the variables, dependent and independent, and their respective definition and formula.

ROA, a frequently used measure of bank profitability in academic research, reflects how effectively a bank manages its resources to generate profits and the efficiency with which management converts assets into earnings (Hassan and Bashir, 2005; Golin, 2001). It is determined by the ratio of net income to total assets. Essentially, ROA gauges a bank's management effectiveness and operational efficiency in producing income relative to its assets. Rivard and Thomas (1997) argue that Return on Assets is a crucial measure of a bank's effectiveness in generating profits from its financial and real assets, regardless of the bank's equity levels.

ROE is another dependent variable utilized in this study, calculated as the ratio of net income to total equity. It is the return on shareholders' equity and is of great importance since it demonstrates the efficacy with which a bank's management uses the money of its shareholders. Stated differently, return on equity measures a company's ability to make a profit on each unit of shareholders' equity and illustrates the effectiveness of its use of capital invested to drive earnings growth. ROE is frequently used in financial literature to measure profitability.

Table 1: Variable Definitions

Dependent Variables			
Symbol	Name	Definition	Source
ROE	Return on Equity	Net Income / Total Equity	Bank annual reports
ROA	Return on Assets	Net Income / Total Assets	
Independent Variables			
Symbol	Name	Description	Source
Bank Specific Variables			
SIZE	Size	Natural Logarithm of Total Assets	
CAP	Capital ratio	Equity / Total Assets	Bank annual reports
LOAN	Loan ratio	Net Loans / Total Assets	
LLP	Loan loss provisions	Loan loss reserves / Total Loans	
DEP	Deposits Ratio	Total deposits / Total Assets	
Country-Specific Variables			
GDP	GDP Growth	The percentage rate at which each economy is expanding or contracting from one year to the next.	World Bank
INFL	Inflation	The annual percentage change in consumer prices for each country.	

Note: The variables SIZE, CAP, LOAN, DEP, and LLP are derived from the annual reports of each respective bank, collected from the official websites of the banks for the years 2013 to 2023. The variables GDP Growth (GDP) and Inflation (INFL) are sourced from the World Bank database.

Most of the independent variables in this study—such as size, capital ratio, deposits ratio, loan rate, and loan loss provisions—are internal factors affecting bank performance, largely shaped by management decisions and goals. These variables can have a substantial impact on a bank's operational outcomes. Management practices directly influence these factors, with decisions typically informed by financial data from balance sheets and income statements.

Size, which is found to be the natural logarithm of total assets converted into the same currency (Euro) for each bank by using their respective country's exchange rate for each year from 2013 to 2023. The question of how much size increases bank profitability is among

the most crucial ones in terms of bank strategy. Generally, research indicates that an increase in size tends to have a positive effect on profitability.

Capital ratio, which represents the capital strength of a bank, is found as the ratio of equity to total assets. The equity-to-total-assets ratio reflects a bank's ability to manage losses and risk exposures and is an indicator of its capitalization. This ratio is crucial in assessing the bank's financial health and stability. A higher ratio signifies that the bank has sufficient capital, which helps it meet regulatory capital requirements more easily. Additionally, having more capital allows the bank to extend more loans, potentially enhancing profitability.

The Deposits ratio serves as a crucial source of funding for banks. The ratio of deposits to total assets indicates the proportion of a bank's assets that is financed by these deposits. According to existing research, deposits are typically expected to positively affect bank profitability. Studies have shown that banks that rely more on deposits for their funding generally experience higher ROA, as increased deposits boost their lending capacity and potentially enhance profits (Menicucci and Paolucci, 2016). Nevertheless, the impact of growing deposits on profitability is also affected by factors such as the quality of income-generating assets and the bank's operational efficiency, especially its ability to transform deposit liabilities into profitable assets.

Loan ratio is used in this study as an independent variable in order to determine the effect of loans on banks' profitability and is calculated by the ratio of net loans to total assets. Most assets that carry interest are loans, which are seen to positively correlate with bank profitability. Assuming all other factors are constant, profitability should generally increase as a higher proportion of deposits is converted into loans. However, banks with rapidly growing loan portfolios may face higher funding costs, which could potentially reduce profitability.

Loan Loss Provisions (LLP) are sums that financial institutions set aside to cover any loan default losses. This is a crucial factor determining how asset quality affects European banks' profitability. An increase in the loan loss provision ratio can arise in dangerous circumstances should banks neglect to control their lending policies adequately. A larger ratio suggests weaker credit quality and less profitability, implying an anticipated negative link between this ratio and profitability.

GDP growth reflects a nation's economy's general state and growth, and it shows its yearly percentage change in economic production. Usually, a growing economy results in more corporate activity and consumer spending, which may improve asset quality and demand for loans, boosting banks' profitability. Still, a bank's credit risk management strategies and operational effectiveness also affect how profitable it is given a GDP increase.

Inflation has a complex link with bank profitability, indicated by yearly percentage changes in consumer prices. For banks, moderate inflation may help expand the interest rate difference between loans and deposits, improving profitability. On the other hand, significant or erratic inflation might provide difficulties, including growing expenses and a devaluation of the actual loan value, affecting profitability. Banks that find it difficult to predict and control inflationary pressures might have higher default rates and smaller profit margins (Bernanke, 2007). Therefore, the capability of banks to modify their financial policies to match changing inflationary circumstances determines the general impact of inflation on bank profitability.

The dummy variable is used to check for the COVID-19 pandemic consequences on the banking sector. The years from 2013 until 2018, which have not been affected by the COVID-19 pandemic, are denoted with a 0 in the dataset, and the years from 2019 until 2023 are denoted with 1, so we can have a clear understanding of the impact that this pandemic has caused.

3.2. Models

In this study, we used a panel data multiple regression to analyze the cross-section and time series data to investigate the factors that influence the profitability of European banks. We also use both a descriptive and a multivariate analysis, as observed in many other prior studies, to investigate the combined impact of bank attributes on the profitability level of banks. The analysis will evaluate two models with distinct profitability measures (dependent variables) in each model. Two distinct measures of profitability—return on equity (ROE) and return on assets (ROA)—will be included in the regression analysis as dependent variables, and eight factors that determine profitability—size, capital ratio, loan ratio, deposits ratio, loan loss provisions, GDP growth, impact of COVID-19 and Inflation—will be included as independent variables, as explained previously.

Using a dataset of 31 of the largest banks in Europe, over a period of 10 years, this study will constitute the fundamental estimation technique by applying different tests such as the correlation test, the Hausman test for fixed effect or random effect models, and the multicollinearity test.

Panel data (also known as cross-sectional time series data) is utilized in the study due to its ability to capture both individual variability and temporal changes in the cross-sectional units. To analyze the factors influencing the profitability of European banks, the following linear regression model will be estimated:

$$y_{it} = \alpha + \beta_{it} X_{it} + \epsilon_{it} \quad (1)$$

Here, i represents an individual bank, and t denotes the year. y_{it} signifies the profitability of the bank i at time t and X_{it} denotes the determinants of the bank's profitability. The term ϵ_{it} represents a normally distributed error term.

Expanding on the equation above to incorporate the variables detailed in Table 1, the regression model is expressed as follows:

$$ROA_{it} = \beta_0 + \beta_1 SIZE_{it} + \beta_2 CAP_{it} + \beta_3 LOAN_{it} + \beta_4 DEP_{it} + \beta_5 LLP_{it} + \beta_6 GDP_{it} + \beta_7 INFL_{it} + \beta_8 COV_t + \epsilon_{it} \quad (2)$$

$$ROE_{it} = \beta_0 + \beta_1 SIZE_{it} + \beta_2 CAP_{it} + \beta_3 LOAN_{it} + \beta_4 DEP_{it} + \beta_5 LLP_{it} + \beta_6 GDP_{it} + \beta_7 INFL_{it} + \beta_8 COV_t + \epsilon_{it} \quad (3)$$

To evaluate performance, we use two different indicators: ROE and ROA. Each of these serves as an alternative measure of bank iHis performance during the period t. Consequently, two distinct models are tested, with each model incorporating one of these profitability measures as the dependent variable. The regression analysis for the equation employs fixed effects and random effects models, where each profitability measure is considered as the dependent variable. To address cross-sectional heteroscedasticity, we apply White's (1980) correction, which adjusts the standard errors of the coefficients accordingly.

3.2.1. Hypotheses

Respectively to the ROA and ROE models, two main hypotheses are tested, examining the relationship between various independent variables and bank profitability:

1) Hypotheses for ROA Model

H_0: None of the determinants, including bank-specific factors (SIZE, CAP, DEP, LOAN, LLP) and macroeconomic indicators (GDP, INFL), nor the COVID-19 pandemic effects, exhibit a statistically significant impact on the Return on Assets of European banks. Mathematically, this implies $\beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = \beta_7 = \beta_8 = 0$

H_1: At least one of the determinants (bank-specific or macroeconomic factors, or COVID-19 effects) has a statistically significant impact on the Return on Assets of European banks. This implies that at least one of the coefficients $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7, \text{or } \beta_8 \neq 0$.

2) Hypotheses for ROE Model

H_0: None of the determinants, including bank-specific factors (SIZE, CAP, DEP, LOAN, LLP) and macroeconomic indicators (GDP, INFL), nor the COVID-19 pandemic effects, exhibit a statistically significant impact on the Return on Equity of European banks. Mathematically, this implies $\beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = \beta_7 = \beta_8 = 0$.

H_1: At least one of the determinants (bank-specific or macroeconomic factors, or COVID-19 effects) has a statistically significant impact on the Return on Equity of European banks. This implies that at least one of the coefficients $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7, \text{or } \beta_8 \neq 0$.

3.3. Dataset and sample collection

We conducted the study using a balanced panel that has data for 31 of the largest banks in Europe, including the bank with the greatest impact in Albania, for the period between 2013 and 2023. The main sources for collecting data for bank-specific characteristics were the annual reports, balance sheets, and income statements of each respective bank, at their respective official website and the website of the World Bank. They are considered the biggest banks in Europe due to their large number of assets and are selected carefully to provide all the needed information for each year that the research aims to study.

The banks selected for this study were sourced from the S&P Global Market Intelligence website, specifically the list of Europe's 50 largest banks by assets for 2023. The selection of banks from each country is designed to be proportional, with banks chosen from each country based on the availability and representativeness of data. In some countries, only a limited number of banks met the necessary data requirements; therefore, selecting only one bank from these countries was essential for maintaining data integrity. This approach ensures a balanced and comparable analysis across the different countries included in the study.

The table below demonstrates the amount of total assets, total equity, and total liabilities for each country in the collected dataset for the year 2023.

Table 2: Total Assets, Total Equity, and Total Liabilities by Country for the year 2023

Country	Nr of Banks	Total Equity	Total Assets	Total Liabilities
Albania	1	637	5795	5158
Austria	2	48351	535396	487045
Belgium	2	36479	526100	489621
Denmark	2	276768	5452589	5175821
Finland	2	47487	745093	697606
France	3	223587	4011498	3787911
Germany	3	122451	2102564	1980113
Ireland	1	15069	136349	121280
Italy	3	134262	1890672	1756410
Netherlands	2	76352	1353492	1277140
Norway	1	23240	348237	324997
Poland	1	45227	501516	456289
Spain	2	153841	2410862	2257021
Sweden	2	39174	620088	580914
Switzerland	1	86108	1717246	1631138
UK	3	117799	2873157	2478126
Total	31	1,446,832	25,230,655	23,506,591

Focusing on three main indicators—total equity, total assets, and total liabilities—Table 2 offers a thorough picture of the financial situations of numerous European nations for the year 2023. The information in the table emphasizes every nation's financial situation and makes it possible to examine their relative stability and economic strength. With assets more than liabilities of over €1.44 trillion, this positive equity implies that this region has typically had a steady financial situation in 2023. The significant difference between total assets and liabilities also suggests that, taken as a whole, these nations are not excessively dependent on debt, which is encouraging for economic resilience.

Furthermore, the financial data for 2023 shows that most of the nations on the table have a good equity situation, that is, total assets are more than total debt. Although national governments vary greatly in terms of size and financial situation, the sample shows generally solid financial stability. While smaller nations like Albania and Ireland exhibit lesser financial buffers, larger economies as Germany, France, and the UK show significant equity bases and good asset-to-liability ratios. However, even in the smaller economies, the overall financial outlook is largely positive, suggesting that these nations have sufficient resources to manage liabilities and maintain economic stability.

4. Results and findings

Including both the fixed-effects and random-effects models in the analysis allowed a more comprehensive understanding of the data. The Hausman test indicated that the fixed-effects model is preferable, but presenting the random-effects model provides additional insights and serves as a robustness check. By comparing results from both models, it's possible to identify any significant differences in findings, ensuring that conclusions drawn about the factors influencing bank profitability are well-supported and reliable.

The variables that come out as statistically not significant are omitted from the study because the study aims to have variables that are significant not only economically but also statistically.

Table 3: Determinants of Financial Profitability – Random Effects Model

	ROA			ROE		
Variable	Coef.	Robust Std. Err.	Prob.	Coef.	Robust Std. Err.	Prob.
Bank-Specific Variables						
Size	-0.00207***	0.00050	0.000	-0.01118**	0.00565	0.048
Capital Ratio	0.013356*	0.00755	0.077			
Loan Ratio (Lag.1)				0.038896*	0.02103	0.064
Country-Specific Variables						
Inflation (Lag.1)	0.000285***	0.00081	0.000	0.003896***	0.00100	0.000
Dummy Variable						
Covid-19	-0.003020***	0.00090	0.001	-0.045643***	0.00911	0.000
Covid-19 (Lag.1)	0.004089***	0.00075	0.000	0.065719***	0.00903	0.000
Constant	0.0282827	0.00717	0.000	0.188063	0.07558	0.013
R^2 Within	0.1201			0.1759		
R^2 Between	0.6868			0.3350		
R^2 Overall	0.3933			0.2273		
Nr. of obs.	310			310		

Note: ***Significant at 1% level, **Significant at 5% level, *Significant at 10% level.

In the random effects model, bank-specific variables demonstrate varied influences on profitability measures. The size of the bank hurts ROA, suggesting that larger institutions may encounter inefficiencies or diminished returns on assets. Conversely, the capital ratio shows a positive but marginally significant effect on ROA, indicating that a robust capital base can enhance asset performance, albeit with limited significance for ROE. Additionally, the lagged loan ratio positively correlates with ROE, implying that banks with higher loan ratios in prior periods are likely to achieve better returns on equity. It is noteworthy that the loan loss provisions (LLP) ratio was omitted from the analysis due to its statistical insignificance across all models, suggesting that this variable may not effectively capture the risk-adjusted profitability dynamics of banks in the examined period. This omission could indicate that factors other than loan loss provisions are more critical in influencing profitability.

Country-specific factors significantly shape the financial profitability of banks in the random effects model. Inflation, especially its lagged effect, demonstrates a positive association with both ROA and ROE. This suggests that banks can benefit from higher inflation through increased interest margins and improved pricing strategies. Conversely, the GDP growth variable was excluded from the analysis due to its statistical insignificance, which may suggest that the direct relationship between economic expansion and bank profitability is not as pronounced in this dataset, indicating that other factors play a more critical role in influencing profitability.

The inclusion of the COVID-19 dummy variable underscores the profound impact of external shocks on bank profitability. The random effects model indicates that the pandemic led to a significant decline in both ROA and ROE, with coefficients of -0.003020 for ROA and -0.045643 for ROE, emphasizing the vulnerability of the banking sector during crises. The negative coefficients illustrate the immediate adverse effects on financial performance, while the positive lagged coefficients suggest a recovery trajectory, indicating that banks are gradually returning to pre-pandemic profitability levels as conditions stabilize. The adverse effects of COVID-19 emphasize the necessity for banks to develop strategies to mitigate risks associated with external shocks in the future.

Table 4: Determinants of Financial Profitability – Fixed Effects Model

	ROA			ROE		
Variable	Coef.	Robust Std. Err.	Prob.	Coef.	Robust Std. Err.	Prob.
Bank-Specific Variables						
Size	0.002487**	0.00106	0.019	0.042587*	0.02466	0.094
Capital Ratio	0.012449*	0.00712	0.082			
Loan Ratio	0.003884*	0.00218	0.075			
Loan Ratio (Lag.1)				0.044761**	0.01933	0.028
Country-Specific Variables						
Inflation (Lag.1)	0.000285**	0.00011	0.008	0.004103***	0.00093	0.000
Dummy Variable						
Covid-19	-0.003638***	0.00069	0.000	-0.053487***	0.00827	0.000
Covid-19 (Lag.1)	0.003826***	0.00077	0.000	0.061538***	0.00919	0.000
C	-0.031387	0.13646	0.022	-0.499385	0.31540	0.124
R^2 Within	0.1786			0.2164		
R^2 Between	0.6123			0.3181		
R^2 Overall	0.1265			0.0234		
Nr. of obs.	310			310		

Note: ***Significant at 1% level, **Significant at 5% level, *Significant at 10% level.

In the fixed effects model, bank-specific variables demonstrate a more favorable relationship with profitability outcomes compared to the random effects model. The positive impact of size on both ROA and ROE suggests that larger banks can leverage economies of scale to improve profitability, potentially due to enhanced market positioning and operational efficiencies. The capital ratio also shows a significant positive association with ROA, reinforcing the idea that well-capitalized banks are better positioned to utilize their assets effectively. Additionally, the loan ratio exhibits a significant positive correlation with ROA and lagged ROE, indicating that effective loan management and strategic lending practices are critical to enhancing bank profitability. Like the random effects model, the LLP ratio was omitted from this analysis due to its consistent lack of statistical significance, suggesting that the impact of loan loss provisions on bank performance may be overshadowed by other, more critical factors.

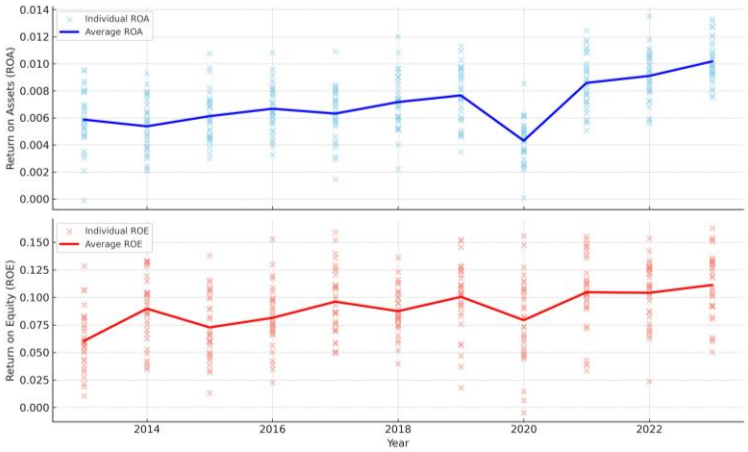

Fig. 1: Return on Assets (ROA) and Return on Equity (ROE) of European Banks (2013–2023). Individual ROA and ROE Values, Respectively, Are Shown with Dots; the Lines Represent the Average Value Per Year.

Figure 1 illustrates the annual trajectories of Return on Assets and Return on Equity for 31 major European banks over the 2013–2023 period. The figure encapsulates both the within-year dispersion of profitability metrics and the trend in their central tendencies. The data reveal an upward trajectory in both ROA and ROE over the decade, punctuated by a marked decline in 2020—a reflection of the exogenous shock imposed by the COVID-19 pandemic. This inflection is consistent with the statistically significant negative coefficients observed in both the fixed-effects and random-effects models (see Tables 3 and 4) and aligns with the broader literature documenting the pandemic's disruptive impact on the banking sector (Borri & Di Giorgio, 2022; ECB, 2024).

The post-pandemic rebound observed from 2021 onward—evidenced by a reversion toward pre-pandemic average profitability levels—validates the positive lagged COVID-19 coefficients and reinforces the hypothesis that banks demonstrated substantial resilience and adaptive financial reconfiguration in response to the crisis (Rossi et al., 2018). The wide interquartile range of individual bank values each year, especially in ROE, underscores the pronounced heterogeneity in financial performance, likely stemming from differences in capitalization structures, asset quality, risk exposure, and national regulatory contexts. This heterogeneity further justifies the econometric strategy of applying fixed-effects models, which control for unobservable, time-invariant bank-level characteristics (Baltagi, 2021). Notably, ROE appears to exhibit greater volatility, in line with its sensitivity to leverage and capital efficiency dynamics, as observed in prior empirical studies (Menicucci & Paolucci, 2016).

Taken together, these graphical insights serve not merely as descriptive tools but as visual validation of the study's central findings: that European bank profitability is sensitive to both idiosyncratic factors and macroeconomic shocks, and that recovery trajectories can diverge substantially across institutions.

Country-specific variables remain influential in the fixed effects model, with inflation continuing to demonstrate a positive relationship with both ROA and ROE. This finding reinforces the notion that banks can benefit from rising inflation through improved interest margins and pricing power. Moreover, the GDP growth variable was again omitted due to its statistical insignificance, suggesting that while macroeconomic growth is often linked to financial performance, other determinants provide a more direct influence on profitability in the context of this study.

Although variables such as Loan Loss Provisions and GDP growth were statistically insignificant across both random-effects and fixed-effects models and therefore excluded from the final regressions, this result warrants further contextual interpretation. The insignificance of LLP, a traditional proxy for credit risk and asset quality, may reflect the increased use of forward-looking provisioning models under IFRS 9, which blur the historical link between observed loan defaults and profitability by embedding expectations and macroeconomic overlays into impairment estimates (Novotny-Farkas, 2016; EBA, 2023). Moreover, European banks may have responded to post-crisis regulatory incentives by smoothing provisions across time to reduce volatility in earnings (Kanagaretnam et al., 2010), thereby diluting the predictive value of LLP for profitability ratios like ROA and ROE.

Similarly, the lack of statistical significance for GDP growth does not imply its economic irrelevance. Rather, it may reflect the decoupling of macroeconomic growth from banking profitability in highly regulated and capital-constrained environments, where prudential measures, such as leverage caps and risk-weighted asset ceilings, limit credit expansion during booms (Dietrich & Wanzenried, 2011; Anginer et al., 2018). In addition, profitability during the study period may have been driven more by internal strategic responses (e.g., cost reduction, digitalization) and policy support measures (e.g., TLTROs) than by traditional macroeconomic cycles. These dynamics suggest that GDP growth may influence profitability indirectly or non-linearly, warranting more granular, possibly nonlinear modeling in future research.

Therefore, while the statistical omission of these variables is methodologically justified, their economic complexity and theoretical relevance remain intact. Their insignificance in this context may be a function of structural shifts in banking practices, regulatory evolution, and changes in how risk is internalized and reported across European banks.

The fixed effects model accentuates the significant impact of the COVID-19 pandemic on bank profitability, reinforcing the findings from the random effects model. The negative coefficients for the COVID-19 dummy variable across both ROA and ROE highlight the severe financial strain placed on banks during the pandemic. This model's results indicate that the adverse effects of Covid-19 are not only immediate but also lingering, with the lagged coefficients suggesting that while banks may begin to recover, the road to regaining full profitability remains challenging. This emphasizes the need for strategic adjustments and resilience in the face of ongoing economic uncertainties, ensuring that banks are well-prepared for future disruptions.

5. Conclusions

This study sheds light on the factors influencing the profitability of major European banks, measured by Return on Assets and Return on Equity, over the period from 2013 to 2023. The findings highlight the importance of both bank-specific factors, such as size, capital ratio, loan activity, and loan loss provisions, as well as macroeconomic conditions, including inflation, GDP growth, and the impact of the COVID-19 pandemic.

The Hausman test findings show that the fixed-effects model better explains ROA and ROE, as profitability depends more on bank-specific factors. This model considers unobservable elements that could vary between banks but stay consistent over time, including managerial quality or business strategy, therefore offering a more realistic view of how bank-specific and macroeconomic variables interact to affect performance.

Regarding elements exclusive to banks, the regression analysis produces some significant results. Larger banks often exhibit higher returns on assets and equity due to economies of scale, diversified services, greater market power, better access to capital, enhanced risk management, and strong brand recognition, all of which contribute to their superior profitability. Conversely, the capital ratio positively and significantly impacts profitability, implying that banks with larger capital buffers are more suited to withstand shocks and invest in promising prospects, generating more profits. Furthermore, improving ROA and ROA is lending activity, as shown by the loan ratio and the lagged loan ratio. Although this comes with inherent risks, as indicated by the variance in loan loss terms, this result implies that banks that participate more actively in lending often produce more significant interest revenue, hence improving profitability. The lagged variable illustrates banks' difficulties in controlling credit risk, especially in uncertain economic times.

Macroeconomic variables significantly influence bank profitability. Consistently, the substantial effect of lagged inflation on ROA and ROE suggests that banks may gain from inflationary conditions by changing loan pricing or taking advantage of better interest rates. Although showing some positive effects in some models, GDP growth is only sometimes a significant predictor, suggesting that the general economic environment may have a more complex impact on bank profitability, depending on other elements, such as the regulatory environment or market structure.

One of the most significant findings of this study pertains to the dynamic impact of the COVID-19 pandemic on bank profitability. The immediate effect of the pandemic, captured by the COVID-19 dummy variable, is both economically and statistically negative for ROA and ROE, reflecting widespread operational disruption, elevated loan defaults, and a contraction in credit demand during 2020. This aligns with established evidence on the financial distress caused by the pandemic across global banking sectors (Borri & Di Giorgio, 2022; ECB, 2024).

The subsequent positive and significant lagged coefficients observed in both profitability measures, however, suggest a rebound in performance beginning in 2021. This apparent resilience can be attributed, at least in part, to extraordinary public policy interventions that buffered the financial sector from systemic collapse. In particular, the implementation of loan repayment moratoriums, temporary capital and liquidity relief under CRR II/CRD V, and state-backed credit guarantee schemes helped stabilize balance sheets and maintain liquidity (OECD, 2021; OECD, 2024; EBA, 2022). Additionally, monetary accommodation by the European Central Bank, including targeted longer-term refinancing operations (TLTRO III), reduced funding costs and supported interbank market functioning (ECB, 2024).

Beyond regulatory support, many banks proactively accelerated digital transformation strategies, enhanced cost discipline, and restructured lending portfolios to adapt to the post-pandemic environment (Deloitte, 2020). These adjustments likely contributed to the observed profitability recovery in the years following the initial shock. While causality cannot be definitively established from the lagged coefficients alone, the timing and consistency of these interventions with the empirical rebound strongly suggest that the recovery was not merely cyclical but at least partially structural and policy-facilitated.

By analyzing the drivers of European bank profitability, this research adds generally to the body of knowledge already in publication. Particularly in times of crisis, the results highlight the need for additional financial reserves, effective loan activity management, and macroeconomic adaptation capacity. With the first adverse effects followed by indications of recovery, the research also emphasizes the possible long-term consequences of the COVID-19 epidemic on the banking industry. Policymakers and bank managers should benefit from these realizations as they negotiate a more complicated and unpredictable economic environment in which both internal bank variables and outside economic circumstances powerfully shape profitability.

Finally, the study clarifies the elements affecting bank profitability and underscores the need for institutional flexibility and resilience in a fast-changing economy. The complexity of the banking industry calls for an integrated analytical strategy—one that combines macroeconomic indicators, regulatory architecture, accounting standards, and bank-specific strategies to fully grasp performance dynamics.

In addition to its practical and policy contributions, the study holds important interdisciplinary implications. The findings underline how profitability metrics like ROA and ROE are shaped not only by economic performance and bank-level strategy, but also by the accounting and technological frameworks within which banks operate. For instance, the implementation of IFRS 9 has altered how credit risk is provisioned and reported, influencing earnings profiles across institutions. Likewise, fintech-driven innovations—such as AI-enhanced credit scoring, blockchain in compliance, and digital client onboarding—are increasingly redefining operational efficiency and risk exposure. These developments suggest that future research and regulatory efforts should adopt a more integrative lens that considers the interplay of accounting standards, financial technology, and behavioral dynamics in shaping the profitability and resilience of modern banking institutions. Such a perspective is essential for designing informed regulation and performance metrics in a rapidly evolving financial ecosystem.

From an accounting perspective, the findings also carry important implications for financial reporting, particularly in how profitability is measured and communicated under modern accounting standards. The implementation of IFRS 9 has introduced a more anticipatory approach to credit risk recognition through the expected credit loss model, which can significantly influence reported net income and the volatility of ROA and ROE, especially in times of economic stress or uncertainty. This raises challenges for analysts and regulators in comparing profitability across banks, as differences in model assumptions, macroeconomic overlays, and disclosure transparency may obscure underlying performance. Additionally, the broader use of fair value accounting (IFRS 13) in asset and liability valuation can introduce earnings volatility, which may distort comparability or strategic decision-making. These findings reinforce the need for auditor scrutiny, regulatory oversight, and standardized disclosure practices, especially when profitability metrics are used for cross-country or longitudinal comparisons. Enhanced attention to the accounting infrastructure underpinning financial results is therefore essential to fully interpret profitability trends in a post-crisis regulatory environment.

Future research should build on these findings by investigating three key areas. First, the evolving regulatory environment—particularly the long-term effects of Basel III finalization, CRR II/CRD V implementation, and IFRS 9 provisioning frameworks—merits deeper exploration. Understanding how these standards shape risk-taking, earnings smoothing, and capital allocation across banks will clarify the interplay between compliance and profitability. Second, the profitability impact of digital transformation—including fintech partnerships, AI-based lending algorithms, and the integration of blockchain in back-office functions—should be empirically evaluated across diverse institutional settings. This would provide a more granular understanding of how technological innovation interacts with profitability metrics and competitive dynamics. Finally, future research should investigate the behavioral dimensions of banking, such as depositor psychology, trust in financial institutions, and managerial decision-making under uncertainty, especially during systemic crises. These interdisciplinary angles will enrich profitability models and align them more closely with the realities of a rapidly evolving banking sector.

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