

Examining the relationship between bank profitability and economic growth: insights from Central and Eastern Europe

Jordan Kjosevski*

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Abstract

In this research article, we delve into the influence of bank profitability on the economic growth of 16 countries in Central and Eastern Europe over the period spanning from 1999 to 2022. While low levels of bank profitability are often seen as a potential threat to economic growth, the question of whether higher profitability contributes positively to growth remains unanswered. Our extensive empirical analysis, utilizing various econometric methods, consistently reveals a statistically and economically significant positive relationship. Specifically, a one percent increase in the return on assets of banks is associated with a notable increase in economic growth, falling within the range of 0.575 to 0.603 percentage points. In addition to these significant findings, future research could delve deeper into the nuanced relationships between different dimensions of bank profitability and economic performance, including the effects of varying ownership structures and competition dynamics.

Keywords: bank profitability, economic growth, Central and Eastern Europe, panel analysis

JEL: G21, O16, O40

* University St. Kliment Ohridski – Bitola, Republic of Macedonia; e-mail: jordan_kosevski@uklo.edu.mk.

1. Introduction

Financial systems perform the salient function of channelling loanable funds between surplus and deficit units (Buckle, Beccalli 2011), supposedly promoting efficiency and economic growth (Petkovski, Kjosevski 2014). The relationship between the development of the financial system and economic growth has been the subject of long-standing debates. Although a general consensus seems to have been reached, economists have expressed different views on the importance of the financial system in economic growth. For example, two pioneering works, Bagehot (1873; cited in Levine 1997) and Hicks (1969), argue that the financial system played a crucial role in promoting industrialization in England by enabling the mobilization of capital for “vast undertakings”. Additionally, Schumpeter’s (1912; cited in Levine 1997) capital theory adds that a well-developed banking system fosters technological innovations by identifying entrepreneurs with the best chances of successful innovative products and production processes.

In contrast, Robinson (1952) contends that “where enterprise leads, finance follows” (p. 86). According to this viewpoint, economic development creates a demand for certain types of financial products, thus stimulating financial development, rather than the other way around. Some economists even do not consider the banking-growth relationship to be significant. Lucas (1988), for instance, argues that the role of the banking sector in economic growth is often overemphasized, and other economists, including Nobel laureates (e.g. Meir, Seers 1984), do not even mention banks in the context of growth.

This rich history of debates and varied perspectives on the role of the financial system in economic growth underscores the complexity of this relationship. Our study aims to contribute to this discourse by examining the impact of bank profitability on economic growth in a specific region and during a specific time frame, shedding light on how these factors interact in the context of Central and South Eastern European countries.

Within the sphere of effective banking operations, the principles of liquidity, solvency, and profitability stand out as fundamental (Mirzaei, Mirzaei 2011). Bank profitability, as the ultimate gauge of financial performance, is intricately linked to the efficiency of financial intermediation. Simultaneously, achieving the desired level of profitability requires a delicate equilibrium among other core banking principles, encompassing liquidity, solvency, capital adequacy, and prudent investment. Adhering to regulatory constraints and risk preferences, banks navigate the terrain of financial intermediation, straddling two alternatives. The first involves maximizing profits at an acceptable level of risk, while the second entails minimizing risk while maintaining a satisfactory profit level.

The significance of bank profitability is underscored by several compelling reasons. Firstly, higher profitability equips banks to generate more capital, thereby enabling increased lending in the economy. This mechanism is succinctly outlined by Albertazzi and Gambacorta (2009): In the event of declining bank profitability, if capital reserves are insufficient and raising capital through issuing new shares is prohibitively expensive, banks curtail lending. This is imperative to meet regulatory capital requirements. Reduced lending has a tangible, adverse impact on consumption and investment in the economy. Secondly, when banks enforce stringent lending policies due to low profitability, it diminishes the effectiveness of flexible monetary policy measures, given the pivotal role of banks in the monetary transmission mechanism. Consequently, it is unsurprising that the German central bank highlights the pivotal role of a stable and profitable banking system in effective monetary policy. This is particularly

pertinent following the financial and debt crisis in the euro area, where bank profitability and capital have assumed a central role in the European financial system (Deutsche Bundesbank 2018). Thirdly, as pointed out by Trujillo-Ponce (2013), heightened bank profitability is of paramount importance to regulators, as it ensures more adaptable capital ratios, even in a riskier business environment. Lastly, a robust and profitable banking system is better equipped to weather negative shocks, thus contributing to the overall stability of the financial system (Athanasoglou, Sophocles, Delis 2008).

From a broader perspective, the profitability of banks holds significance not only for the banks themselves but also for the broader economy. Athanasoglou, Sophocles and Delis (2008) emphasize that a profitable banking sector plays a pivotal role in mitigating economic shocks. According to ECB (2015), profitable banks are better positioned to attract capital from investors and are likely to generate additional capital through retained earnings. Trujillo-Ponce (2013) argues that bank profitability is also vital for the sustainability of the banking system, and profitable banks can inject more funds into the economy.

The influence of bank profitability on economic growth is a question that, somewhat surprisingly, has received limited attention in the literature. To our knowledge, only a few studies have explored this relationship (Cole, Moshirian, Wu 2008; Klein, Weill 2017). To address this gap, we conducted a panel analysis to examine the causal effect of bank profitability on economic growth in a sample of 16 countries from Central and South Eastern Europe (Albania, Bosnia and Herzegovina, Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Macedonia, Montenegro, Poland, Romania, Serbia, the Slovak Republic, and Slovenia) over the period from 1999 to 2022.

The countries studied in this analysis share certain commonalities in their banking sectors. Firstly, a prominent characteristic is the transition and significant ownership transformation in the banking sector. Foreign banks dominate the ownership structure, with limited influence from domestic banks, highlighting the minor impact of domestic banks on these regional economies. Secondly, despite a substantial number of banks operating in these countries to cater to market size and demand, this proliferation has not translated into a commensurate level of competitiveness. It is important to note, however, that banking sector performance has improved, as reflected in liquidity and profitability indicators, especially in the period prior to the 2008 financial crisis. Following this crisis, economic flows slowed down, which also impacted the banking sector, resulting in some indicators falling significantly and remaining notably lower than pre-crisis levels.

To examine the relationship between bank profitability and economic growth, we applied the System Generalized Method of Moments (S-GMM), a method that considers a substantial number of parameters and addresses potential endogeneity issues.

This research study makes several noteworthy contributions to the existing literature. Firstly, it is the first study to investigate the impact of bank profitability on economic growth across a diverse range of Central and South Eastern European countries, which are at various stages of economic development but operate within a similar regulatory framework. Secondly, our study differs from prior investigations in this field. While Cole, Moshirian and Wu (2008) focused on the link between bank stock returns and economic growth, we used return on assets (ROA) as a measure of bank profitability, with real GDP per capita growth serving as our measure of economic growth. Klein and Weill (2017) employed global data to explore the impact of bank profitability on economic growth, but given the diverse policies and regulations governing banks worldwide, their findings cannot be generalized to the specific context of Central and Eastern Europe. Thirdly, we delved into the causal relationship between bank profitability

and economic growth and elucidated how this impact varies across diverse economies within Central and Eastern Europe. This is the first study to investigate such a relationship at the individual country level within our sample.

The subsequent sections of this article are organized as follows. In Section 2, we present a selective review of the pertinent literature, highlighting key empirical findings on the relationship between bank profitability and economic growth. Section 3 provides an overview of the data used in our analysis.

In Section 4, we discuss the challenges associated with estimating growth equations and introduce the primary econometric method employed, the S-GMM. Section 5 details the results of our analysis on the relationship between bank profitability and economic growth. The key findings are distilled in Section 6, which also suggests potential avenues for further research and exploration.

2. Literature review

2.1. Theory of economic growth

Understanding the determinants of economic growth has been the subject of a long-standing debate among academic economists and policymakers. Higher economic growth is beneficial for the overall economy, so understanding the factors that determine it is crucial for its enhancement or maintenance. The roots of such considerations can be traced back to the classical period (Hume 1742; Tucker 1776; Smith 1776), which serves as the basis for many characteristics of modern theories of economic growth, such as competitive behaviour, equilibrium dynamics, diminishing returns, and their relationship with capital accumulation, the importance of population growth rates, “the effects of technological progress in the form of increased specialization of labour, as well as the discovery of new products and methods of production, and the role of monopoly power as a motive for technological development” (Barro, Sala-i-Martin 2004, p. 9). However, there is no simple answer to determining the determinants of economic growth, as growth theory is constantly evolving. In this section, we will briefly present the flow of thought on economic growth, with the aim of building a foundation upon which we will analyse the effects of banking development on economic growth in Central and Eastern Europe. The goal is not an in-depth analysis of growth theory; thus, comprehensive and advanced reading on economic growth is Barro and Sala-i-Martin (2004).

2.1.1. Neoclassical economic growth

Representatives of classical economics primarily focused on capital accumulation but ignored the role of technology until the publication of the groundbreaking works by Solow (1956, 1957) and Swan (1956). Solow significantly advanced the theory of growth by developing a formal model, based on neoclassical tradition, explaining the movements of key variables over time, such as GDP and capital per capita. Two key characteristics of the conceptual structure of neoclassical theory are significant. First, it is based on the “derivative approach when analyzing economic growth” (Thirlwall 2005, p. 140), i.e. an aggregate production function that expresses the relationship between aggregate production on one side and the volume of inputs and their productivity on the other. Second, the neoclassical model

is designed to show the long-term equilibrium growth rate, with all resources inputs fully engaged, and the contributions of capital and labour equal to their marginal productivity. The main result of this model is that the growth rate decreases as the economy progresses toward its stable state, where income, capital, and consumption per capita grow at a constant rate. This suggests that countries with low initial capital levels are expected to grow faster than rich countries, so their income per capita will approach the income level of rich countries. The main assumptions of Solow's growth model are: perfect competition, homogeneous product, homogeneous capital, constant returns, perfect exchange of capital and labour, and diminishing marginal productivity of labour and capital (Barro, Sala-i-Martin 2004). As a result of the last assumption, economies starting with lower initial capital levels are expected to have a higher capital return, and hence, are expected to grow faster than rich countries and approach the income level of the leading country.

In Solow's model, the driving force of short and medium-term economic growth is the accumulation of physical capital, determined by the savings rate. In the long run, GDP per capita is entirely determined by technological development, which is assumed to be exogenous in the model. In this theory, technology is considered a public good, meaning it is freely available to all. The neoclassical model of growth predicts that, in the long run, countries will reach their stable state. The Solow model serves as a starting point for many empirical analyses of economic growth. Several decades later, empirical research (Mankiw et al. 1992) recognized the role of human capital (education and health of workers) as equally important as physical capital. This research led to the development of the so-called augmented Solow model. However, as the Solow model, by its construction, does not explain the driving force of economic growth (technological progress), it fails to explain what it actually aims to explain: "we end up with a growth model that explains everything except long-run growth, which is an obviously unsatisfactory state of affairs" (Barro, Sala-i-Martin 2004, p. 11). Consequently, as an alternative to the neoclassical model, a theory of endogenous growth was developed, which we will discuss further.

2.1.2. Endogenous growth

The problem of incorporating endogenous technological development into neoclassical growth theory while maintaining the assumption of perfect competition led to the modification of neoclassical growth theory by Romer (1986; 1990; 1994), Lucas (1988), Rebelo (1991), and others. They developed the 'new' theory of endogenous growth, making technological development endogenous in the model. In practice, the transition to endogenous growth was made by keeping the derivative approach and the general equilibrium framework while modifying the assumptions about the nature of the production function and relaxing the assumptions of perfect competition, which were foundational in the old neoclassical model. In the theory of endogenous growth, the assumption of perfect competition is replaced by imperfect competition and increasing returns to scale. The theory of endogenous growth can be seen as a complement to the Solow model, combining elements of the previous theory with the assumptions of increasing returns, elements of imperfect competition, and some of the microeconomic research on science, development, and technological change (Hands 2001).

Later, more sophisticated variants of endogenous growth theory emerged, where innovation growth increases the diversity and quality of production. These theories take into account the effects

of general-purpose technologies and represent radical technological discoveries (for a review of the literature, see Aghion, Howitt 1998 and Verspagen 2004). While the new growth theories that seek to “endogenize” technological changes are considered major alternatives to the old neoclassical theory, there are a large number of other alternatives (listed in Gore 2007), which go further by abandoning the derivative approach and the general equilibrium framework. We briefly discuss some of them below.

2.1.3. Alternative approaches to economic growth

These theories reject the derivative approach in different ways, focusing on: institutions, structure, and demand, respectively. The first alternative theory (Nelson, Winter 1974; 1982) links economic growth with institutions and the economic capabilities of agents (firms). This approach was developed as a critique of the microfoundations of the neoclassical framework.

The second major alternative growth theory (Ocampo 2005) abandons the production function by interconnecting economic growth and the sectoral structure of production. Instead of “viewing the growing economy as an inflated balloon, in which the added factors of production and the stable flow of technological changes gradually increase aggregate GDP,” growth is seen as a dynamic process in which some sectors lead while others lag, “as part of a continuous transformation of the production structure” (Ocampo 2005).

The third alternative growth theory (Setterfield 2002; Blecker 2002) rejects the production function because it explains growth solely through production factors on the supply side and their productivity while ignoring the role of demand in this process. Demand-led theories of economic growth identify that at any given time, the degree of utilization of production resources depends on demand conditions. Also, these theories are based on the viewpoint that factors of accumulation and technological progress, ultimately, are determined by demand.

2.2. Empirical studies

The role of banks as facilitators of economic growth has been a central focus of various studies in the literature. Several studies have explored the relationship between bank profitability and economic growth, albeit with different findings and methodologies.

Chava et al. (2013) conducted a study in the United States, suggesting that policies promoting financial market development can positively impact long-term economic growth by stimulating innovation. However, it is essential to note that the study primarily focused on the US economy, which may not be directly generalizable to other regions with distinct economic structures and regulatory frameworks.

Ayadi et al. (2010) examined the influence of local cooperative banks on regional economic growth in European countries. Their findings indicated a positive impact on growth rates, particularly in economically disadvantaged regions. While this study underscores the potential of cooperative banks in fostering growth, it is crucial to acknowledge that the impact of cooperative banks can vary across different banking systems and economic contexts.

In contrast, Tan and Floros (2012) investigated the relationship between bank profitability and economic growth in China and found a negative link between GDP growth and bank profitability

measured by ROA and NIM. This finding is intriguing as it suggests that in some contexts, high bank profitability may not necessarily translate into robust economic growth. It also highlights the importance of considering regional variations and economic structures when analysing this relationship.

Hamza and Khan (2014) reported a positive association between bank profitability and economic growth in Pakistan, aligning with the conventional wisdom that profitable banks can contribute to economic development. However, the study's limited sample size and focus on a specific country raise questions about the generalizability of these findings to a broader set of economies.

Adekola's study (2016) in Nigeria identified a negative effect of low bank profitability on economic growth, emphasizing the need for effective regulatory measures to ensure the sustainability of banking sector reforms. This finding underscores the importance of regulatory frameworks in shaping the impact of bank profitability on economic growth, but it also highlights the need for further research in different economic contexts.

Alev (2018) explored the relationship between bank profitability and economic growth in Turkish banks, demonstrating a positive impact of bank profitability on economic growth. However, it is crucial to consider that the findings may not be directly transferable to other countries due to variations in banking systems and economic structures.

Klein and Weill's comprehensive cross-country analysis revealed nuanced findings (Klein, Weill 2017). While high existing bank profitability positively contributed to economic growth, the previous level of bank profitability exerted a short-term negative influence on economic growth. This highlights the dynamic nature of the relationship between bank profitability and economic growth, emphasizing the importance of considering temporal factors.

Kumar and Bird's study in the Asia-Pacific region found a positive relationship between bank profitability and economic growth (Kumar, Bird 2020). Nevertheless, the study emphasized variations across different economies, indicating that the impact of profitability is more pronounced in developed economies compared to emerging ones. This suggests that economic context plays a significant role in shaping this relationship.

Moussa and Hdidar (2019) examined the link between bank profitability and economic growth in Tunisia, reporting a positive association. However, the specific indicators used and the contextual factors in Tunisia may limit the generalizability of these findings to other regions.

In summary, while the literature generally supports the idea that bank profitability can positively influence economic growth, the studies reviewed here underscore the complexity of this relationship. Variations in economic contexts, regulatory frameworks, and methodological approaches can lead to contrasting findings. Therefore, a nuanced understanding of the relationship between bank profitability and economic growth requires careful consideration of these factors in specific regional and temporal contexts. Further research is needed to explore this relationship in greater depth, especially in regions with diverse economic structures and regulatory environments.

3. Data and variables

To assess the impact of bank profitability on economic growth in Central and Eastern Europe, our study focused on a sample of 16 countries (Albania, Bosnia and Herzegovina, Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Macedonia, Montenegro, Poland, Romania, Serbia,

the Slovak Republic, and Slovenia) over the period from 1999 to 2022. The selection of these countries was based on both their historical and socio-economic similarities, as well as their geographical and cultural proximity. However, it is worth noting that these countries also exhibited significant differences in terms of public debt levels, GDP growth rates, GDP per capita growth, European Union (EU) membership, and other factors. Additionally, data series for Serbia and Montenegro were incomplete due to their status as a single country until 2006.

The banking sector in Central and Eastern Europe has undergone substantial transformations since the collapse of communism in the late 1980s and early 1990s. The general structure of the banking sector in these countries is somewhat uniform, featuring a mix of domestic and foreign-owned banks. However, the dominance of foreign-owned banks varies from country to country. For instance, in Poland, foreign-owned banks play a major role, whereas in Bulgaria, most banks are domestically owned.

Credit levels as a percentage of GDP differ across the region, with 2020 data from the World Bank indicating a range from approximately 50% in Albania to over 100% in Estonia and Slovenia. These variations underscore the diverse economic conditions in the region.

Privatization was a significant process that shaped the banking sector in these countries, commencing in the early 1990s. State-owned banks were privatized and sold to private investors, including foreign banks, introducing new business models, capital, and expertise. Another crucial development was the integration of these countries into the EU, leading to the adoption of EU banking regulations and heightened competition from foreign banks.

While the banking sector in the region has become more stable and competitive in recent years due to improved regulation, oversight, increased capitalization, and a wider range of financial products and services, challenges remain. For instance, some countries still grapple with high levels of non-performing loans, which continue to impact the sector.

Our study employed the real growth of GDP per capita (in constant 2015 US dollars) as the dependent variable, which is consistent with previous research (e.g. Arcand, Berkes, Panizza 2015; Klein, Weill 2018, 2022). To measure bank profitability, we used data on banks' Return on Assets (ROA), a widely recognized indicator in the banking industry. To avoid the influence of cross-country differences in taxation, we followed the approach of Klein and Weill (2018) by utilizing ROA before tax.

To account for growth persistence, we included lagged GDP growth as a potential determinant. Previous studies have produced mixed results on this variable's impact, with some indicating a positive effect and others a negative one. Our hypothesis was that lagged GDP growth would positively influence economic growth.

We also incorporated five additional explanatory variables commonly used in finance-growth literature: net interest margin, inflation rate, trade openness, government expenditure, and educational attainment. The inflation rate was defined as the annual percentage increase in the consumer price index. While many studies have found a negative relationship between inflation and economic growth, the impact can vary from being negative to positive.

Government expenditure, representing the annual percentage change in government spending, was another variable considered. The relationship between government expenditure and economic growth is complex, with some studies suggesting a positive effect and others a negative one.

Trade openness, defined as the sum of exports and imports of goods and services, was included based on previous research indicating a positive link between trade and economic growth.

Lastly, educational attainment was measured using the secondary gross enrolment ratio, which represents the ratio of total enrolment to the population of the corresponding age group. Although there exist several measures of the education variable, in empirical studies on determinants of economic growth, the most used measures are primary or secondary enrolments (Kjosevski 2013). We used the secondary gross enrolment ratio: the ratio of total enrolment, regardless of age, to the population of the age group that officially corresponds to the level of education shown.

All control variables were transformed into logarithmic form, as commonly done in similar studies. Data for these variables were sourced from reputable sources such as the World Bank's World Development Indicators (WDI) database, Eurostat, and the Federal Reserve Bank of St. Louis. Additional details on the variables used in the model can be found in Table 1.

Table 1
Definition of variables

Variables	Symbol	Units	Source
Real GDP per capita growth	GR	Percent	World Development Indicators
Bank return on assets	ROA	In percent (before taxes)	
Net interest margin	NIM	Percent	FRED, Federal Reserve Bank of St. Louis
Inflation rate	INF	Percent (Consumer Price Index, average annual change)	World Development Indicators
Trade openness	TRADE	Percent of GDP	
Government expenditure	GEXP	Percent of GDP	
Educational attainment	EDU	Ratio of total enrolment, to the population of the age group	Eurostat

Source: authors' calculations.

We also present descriptive statistics for all countries and discuss the main trends in the evolution of the selected variables over time.

The summary statistics presented in Table 2 reveal some noteworthy variations among the countries in our sample. The average Return on Assets (ROA) for banks across these countries is 1.02%. Bulgaria stands out with the highest recorded ROA of 4.79% in 2000, while Slovenia reported the lowest figure, plummeting to -9.990% in 2013.

In terms of inflation rates, the selected countries collectively averaged 3.97%. It is important to note that none of these countries experienced hyperinflation during the study period. Regarding annual GDP per capita growth, the average growth rate among the selected countries is 3.2%. Notable fluctuations are observed, such as Montenegro's sharp decline of GDP by 15.31% in 2020, attributed to the impact of COVID-19 and a reduction in tourist visitors. Conversely, Bosnia and Herzegovina recorded a remarkable GDP growth of 12.8% in 2000, primarily due to post-war recovery efforts.

Table 2
Descriptive statistics

Descriptive stats.	GR	ROA	NIM	GOVEP	INF	TRADE	EDU
Mean	3.20	1.02	4.39	18.70	3.97	109.85	77.29
Median	3.57	1.09	3.97	18.94	2.64	104.69	78.80
Maximum	12.77	4.79	20.74	29.94	95.0	190.70	89.20
Minimum	-15.31	-9.99	1.36	9.69	-1.58	22.49	46.42
Standard deviation	3.95	1.44	2.42	2.95	7.55	32.43	7.70
No. of observations	352	319	330	352	340	352	301

Source: authors' calculations.

Government expenditure also exhibits variations, with Albania recording the lowest value in 2000 at 9.69% of GDP, while Montenegro registered the highest expenditure in 2005, reaching 29.94% of GDP. On average, government expenditure accounts for 18.7% of GDP across the selected countries. It is worth noting that the EU countries tend to have slightly higher government expenditure as a percentage of GDP.

Educational attainment, as measured by the population with at least secondary education (EDU), displays significant diversity among the countries. Albania reported the lowest value in 2000, with a rate of 46.42%, while Lithuania recorded the highest rate of 89.20% in 2006.

Finally, trade openness, expressed as the sum of exports and imports of goods and services, varies notably. Slovakia reported the highest degree of trade openness in 2018, reaching 190.7%, while Serbia had the lowest trade openness at 22.49%. It is important to highlight that accession to the European Union often serves as a catalyst for trade liberalization.

4. Methodology

This section explains the methodology used to empirically study the effect of bank profitability on economic growth. For presentational convenience, we divide it into two parts. In the first part, we investigate the impact of bank profitability on economic growth. In the second part, we estimate the relationship between bank profitability and economic growth in all groups while also assessing the relationship across individual economies.

4.1. Growth theories and empirical analysis

Moving to empirical analysis, a generic model of economic growth is often used in the literature:

$$g_{i,t} = X_{i,t}\gamma + Z_{i,t}\pi + \varepsilon_{i,t} \quad (1)$$

where $g_{i,t}$ represents the real GDP growth in economy i in period t .

Following the growth theories outlined above, Barro and Sala-i-Martin (2004) suggest that real economic growth should be linked to two groups of variables: initial values of certain variables denoted as $X_{i,t}$ (such as GDP itself or variables related to education and health) and the population growth rate, and control variables denoted as $Z_{i,t}$ reflecting economic policy activities, institutional settings, or other country characteristics. Including initial values of certain variables dates back to the Solow-Swan and Ramsey models, which predict that, for a given value of these variables, the growth rate of initial GDP per capita or initial human capital per capita will reduce growth. In other words, a rich economy tends to grow more slowly, and vice versa. However, each economy has its own stable state, determined by control variables, the so-called level of production per “effective” worker in the steady state (Barro, Sala-i-Martin 2004, p. 517). Therefore, for given values of static (initial) variables, changes in control variables (e.g. changes in public consumption) can impact economic growth.

A major problem in empirical analysis of economic growth is which control variables to include in the model. This is a result of what Brock and Durlauf (2001) refer to as the “open-ended theory”; that is, the causal link between one variable and economic growth proposed by one theory does not exclude the link between another variable and economic growth proposed by another theory. The literature (Durlauf, Quah 1999) suggests more than 90 potential variables as explanatory factors for economic growth. However, the primary aim of our empirical analysis in this chapter is not to contribute to growth theories but to analyse whether and how banking development affects economic growth. For this purpose, we will specify a minimal model of economic growth as a tool to capture this relationship.

4.2. Group effect using S-GMM

Maddala and Wu (1999) highlighted that panel data analysis offers several advantages compared to other types of data analysis. Additionally, Hsiao (2014) induces the following benefits of conducting a panel-regression analysis: (1) increasing degrees of freedom and reducing the problems of data multicollinearity, (2) constructing more realistic behavioural models and discriminating between competing economic hypotheses, (3) eliminating or reducing estimation bias, (4) obtaining more precise estimates of micro relations and generating more accurate micro predictions, (5) providing information on the appropriate level of aggregation, and (6) simplifying cross-sections or time series data inferential procedures.

These advantages underscore the utility of panel data analysis in addressing a wide range of research questions and enhancing the quality of empirical investigations in various fields, including economics and social sciences.

To ensure the consistency and impartiality of our results, we employed three different estimation techniques. Our initial analysis began with an assessment of fixed effects, a statistical method commonly used in panel data analysis. The fixed effect model incorporates a set of fixed effects or dummy variables to account for unobservable, time-invariant heterogeneity among various cross-sectional units. The fixed effect model is a valuable tool for addressing unobserved heterogeneity

in panel data analysis and producing unbiased coefficient estimates. However, researchers should be mindful of its limitations, particularly when dealing with a substantial number of cross-sectional units or when the assumption of constant effects over time may not hold.

Overall, the fixed effect model is a useful method for controlling unobserved heterogeneity in panel data settings and producing unbiased estimates of the coefficients of the independent variables. However, it does have its limitations, particularly when the number of cross-sectional units is large or the effects of the independent variables vary over time.

As previously observed in studies conducted by Gábor and Gábor (2021), Pattillo, Poirson and Ricci (2002), the process of estimation faces challenges related to heterogeneity and endogeneity. These challenges can lead to inconsistent and biased estimates when employing the pooled Ordinary Least Squares (OLS) estimator. The pooled OLS regression model lacks the capacity to account for unobservable country-specific effects that vary across different countries. This limitation can introduce omitted variable bias, as highlighted by Pattillo, Poirson and Ricci (2002). Consequently, our analysis proceeded by evaluating alternative econometric models, namely the Fixed Effect Method (FEM) and Random Effect Method (REM). These models effectively control for heterogeneity within the sample and consider both time-invariant fixed effects and specific modelled random effects.

However, it is important to note that the presence of fixed effects in panel estimation can introduce a correlation between lagged endogenous variables and residuals. This correlation can negatively bias the results, as discussed by researchers like Pattillo, Poirson and Ricci (2002). Therefore, the conventional use of OLS, FEM, and REM is not suitable in this context.

To address potential endogeneity issues, we adopted an instrumental variable (IV) estimation technique, as proposed by Baum, Checherita-Westphal and Rother (2012). Specifically, we employed the System Generalized Method of Moments (S-GMM) developed by Blundell and Bond (1998). In our approach, we assumed that all control variables were predetermined or endogenous in nature. S-GMM estimators use lags of the variables as instruments to address endogeneity concerns. Following the methodology outlined by Klein and Weill (2018), we utilized all available lags, starting with the second lags for endogenous variables and the first lags for predetermined variables.

We designated all existing variables, except education, as endogenous, while education and lagged variables were considered predetermined. To avoid the potential issue of having too many instruments compared to the number of country groups, as highlighted by Roodman (2009), we maintained a balanced number of instruments relative to the number of countries. In our analysis, we employed a collapsed form of instrumental variables, creating a single column vector of instruments rather than an entire matrix. This approach, although potentially less statistically efficient in large samples, helps mitigate bias in finite samples, which are often characterized by instrument proliferation.

To ensure the validity of the instruments selected, we conducted Sargan tests. Additionally, we assessed serial correlation in the residuals through first-order differentiation (autoregressive process AR(1)) and second-order differentiation (autoregressive process AR(2)). According to the findings of Arellano and Bond (1991), the presence of first-order autocorrelation in the differentiated residuals does not necessarily imply inconsistent estimates. However, the presence of second-order autocorrelation would indicate potential issues with consistency.

To estimate the impact of bank profitability on economic growth, we followed Klein and Weill (2018) and proposed the following growth model:

$$gr_{i,t} = \alpha_0 + \alpha_1 gr_{i,t-1} + \beta_1 ROA_{i,t} + \beta_2 ROA_{i,t-1} + \beta_3 NIM_{i,t} + \dots + \varepsilon_{i,t} \quad (2)$$

where gr stands for real GDP growth and ROA for banks' return on assets; countries are indexed with i and years with t ; $gr_{i,t-1}$ is the past realisation of growth; $ROA_{i,t}$ denotes banks' return on assets; $ROA_{i,t-1}$ indicates the impact of the past level of bank profitability on growth; $NIM_{i,t}$ is the net interest margin; t is a matrix comprising of the other control variables (education, inflation, trade openness and government expenditures).

As already mentioned, we used the age dependency ratio as an exogenous instrument in the regression equations. The estimation results of the equation given in (1), using the S-GMM test, are demonstrated in Table 3.

5. Estimation results

The estimated coefficients from the three panel data models (static fixed-effects panel data estimation, S-GMM estimation) are presented in Table 3. The typical complications arising from panel data estimations were tackled by applying Bruno's (2005) bias-corrected least-square dummy variable estimator, developed for short dynamic panels with fixed effects, and extended to accommodate unbalanced data.

The estimation results reveal a significant and positive relationship between Return on Assets (ROA) and economic growth. Even after addressing potential endogeneity concerns, particularly reverse causality, our empirical specification indicates a positive link between contemporaneous ROA and real GDP growth. To elaborate, a one percent increase in ROA is associated with a higher economic growth rate, ranging between 0.575 to 0.603 percentage points, all else being equal. It is worth noting that the second lag of the dependent variable did not yield significant results, and therefore, we won't present those estimation results here. However, we also explored the potential dynamics of bank profitability by including past levels of ROA (ROA_{t-1}). Interestingly, the impact of profitability on growth appears to be short-lived, as evidenced by the negative influence of past profitability levels. Specifically, a one percent increase in past profitability levels leads to a decrease of 0.23 to 0.27 percentage points in contemporaneous economic growth. These findings suggest that the relationship between bank profitability and economic growth exhibits a dynamic pattern, consistent with prior research by Klein and Weill (2022).

These results imply that bank profitability may play a role in both the upward and downward phases of the business cycle. The business cycle encompasses economic fluctuations, including periods of expansion (upward phase) and contraction (downward phase). Although we didn't explicitly test this, it is evident that this issue warrants further investigation. The hypothesized impact of bank profitability can be conceptualized in two phases:

Upward (expansion). During economic expansion, bank profitability tends to rise. This is because expanding economies typically witness increased demand for loans from businesses and consumers. Banks generate income from interest on loans, so higher lending activity can boost profitability. Additionally, lower default rates on loans during economic expansions contribute positively to profitability, as borrowers are in a better position to repay their debts. Furthermore, banks may benefit from higher fee income from services like investment banking and asset management during periods of economic growth, further enhancing their profitability.

Table 3
Empirical results

Explanatory variable	Fixed effects panel data estimation	System GMM estimation
	(1)	(2)
Lagged real growth of GDP per capita	0.245*** [0.02]	0.348*** [0.07]
Return on assets (ROA)	0.575*** [0.23]	0.603*** [0.19]
Lagged ROA	-0.232* [0.13]	-0.273** [0.13]
Net interest margin	0.124 [0.07]	-0.051 [0.2]
Ln (Government expenditure/GDP)	-3.152 [3.48]	-3.589** [1.52]
Ln (Trade openness)	4.836* [2.58]	0.523 [0.36]
Ln (1 + inflation rate/100)	-12.129* [6.54]	-4.125 [5.82]
Educational attainment	-6.263 [4.25]	-3.531 [1.71]
Number of countries	16	16
Number of instruments	/	47
R-squared	0.832	/
Sargan test (p-value)	/	0.627
Arellano-Bond test [AR (1)]	/	0.009
Arellano-Bond test [AR (2)]	/	0.531

Notes:

[1] Robust standard errors are reported in parentheses.

[2] All specifications include time dummy variables, but the statistically significant ones are not reported here.

Downward (contraction). Conversely, during economic contractions, bank profitability may decline. Reduced borrowing by businesses and consumers during economic downturns leads to decreased demand for loans, resulting in reduced interest-based income for banks. Higher default rates on loans during economic hardships also increase provisions for loan losses, negatively impacting bank profitability. Additionally, decreased demand for fee-based services like investment banking during economic downturns can further affect profitability.

It is crucial to recognize that other factors, including changes in interest rates, regulatory policies, market conditions, and bank-specific factors, also influence bank profitability and its impact on the

business cycle. The relationship between bank profitability and the business cycle is intricate and multifaceted, shaped by the interaction of various factors. Furthermore, our findings align with previous research by Ayadi et al. (2010), Alev (2018), as well as Klein and Weill (2018; 2022), emphasizing that profitable banks can act as drivers of economic growth. Therefore, economic growth is likely to be associated with increased bank profitability.

Moreover, cooperative banks, which often have a significant market share in lending to small and medium-sized enterprises (SMEs), are recognized as catalysts for economic development, especially in transitioning and post-transition economies. When banks are profitable, they can channel more funds from savers to users, stimulating economic activity and fostering economic growth. Conversely, if banks are financially unstable, they may struggle to perform their intermediary functions efficiently, posing risks to the economy. In this context, our findings, along with the positive impact of bank profitability on economic growth, support the assertion made by Athanasoglou, Sophocles and Delis (2008) that a well-functioning and profitable banking sector is essential for driving economic growth.

In summary, our estimations lead to two main conclusions:

- Bank profitability contributes to economic growth, with evidence indicating a positive association between current profitability levels and higher economic growth rates.
- However, when we consider the dynamic aspect of bank profitability by jointly assessing the impacts of past and current profitability levels, the effect on economic growth becomes non-significant. The positive impact of current levels is counterbalanced by the negative impact of past levels.
- Regarding other explanatory variables, we observed that past GDP growth rates have a positive contribution to current economic growth, implying a degree of inertia or persistence in growth dynamics.
- Lastly, our findings highlight the significant positive impact of trade openness on a country's economic growth. This is in line with the argument that open economies gain access to advanced technology and expand their markets, stimulating economic growth. These results are consistent with endogenous growth theories.

On the other hand, the inflation rate exhibited a negative association with economic growth in the selected countries during the study period. This suggests that changes in inflation rates should be carefully considered when implementing economic policies. Moreover, it is essential for policymakers to balance targeted economic activity increases with maintaining stable and low long-term inflation rates, especially as countries in Central and Eastern Europe enter periods of recovery and economic expansion following global crises.

Finally, our Sargan test results confirm the validity of our instruments and indicate the presence of autocorrelation. However, the AR(2) test shows no second-order serial correlation in the specified model.

6. Conclusions

Bank profitability plays a pivotal role in both financial stability and economic growth. Profits act as the first line of defence against potential losses stemming from credit impairments. They enable banks to accumulate capital through retained earnings, which, in turn, allows them to establish robust buffers capable of absorbing unexpected losses. These buffers are essential as they ensure that banks

can continue to provide financial services to households and businesses, even in the face of adverse economic developments. This, in turn, helps to mitigate the impact of negative shocks on the real economy rather than exacerbating them. In contrast, banks with weak structural profitability may face higher funding costs and might be tempted to take on excessive risks. Financially vulnerable banks are also more likely to be connected to unprofitable firms, which can lead to a misallocation of capital away from productive businesses. Such misallocation can hinder long-term economic growth.

Our study delves into the relationship between bank profitability and economic growth, focusing on a sample of 16 countries in Central and Eastern Europe over the period of 1999–2022. Through the application of various estimation techniques, we have uncovered two key findings. Firstly, there exists a statistically significant and positive relationship between current bank profitability and contemporaneous economic growth. Specifically, a one percent increase in a bank's return on assets is associated with a higher economic growth rate ranging between 0.575 to 0.603 percentage points, all else being equal. Secondly, when we explore a more dynamic aspect of bank profitability by considering past profitability levels, we observe a statistically significant and negative impact on economic growth. In this context, a one percent increase in past profitability levels results in a decrease of economic growth by 0.23 to 0.27 percentage points. These findings remained robust even after subjecting them to a battery of robustness checks, including the use of alternative measures of profitability and growth.

In addition to these findings, our study aligns with previous empirical literature in several aspects. We find evidence of growth persistence, where current economic growth is influenced by past values. Moreover, international trade openness is shown to have a significantly positive effect on economic growth across the selected countries. Conversely, inflation is found to have a negative association with economic growth in these countries.

Our study makes a substantial contribution to the literature on bank profitability by shedding light on its consequences and its impact on economic growth, providing a fresh perspective on the finance-growth nexus. These findings hold notable implications for monetary authorities and policymakers striving to promote economic growth. If bank profitability is indeed found to be a driver of economic growth, it underscores the importance of fostering bank profitability. Conversely, if a negative impact is observed, it suggests that an excessive focus on promoting bank profitability may be detrimental to economic growth. In the latter case, pro-growth policymakers should consider alternative strategies.

While our study provides valuable insights, it does have some limitations that, if addressed, could lead to more robust results. These limitations include missing data for certain determinants over an extended period and some data observations missing during the study period. Moreover, our analysis omits other variables that can potentially affect bank performance, such as interest rates, regulatory policies, market conditions, and bank-specific factors like customer service, bank reputation, and marketing strategies. Additionally, expanding the sample size to encompass more countries and extending the time horizon could offer further evidence to support or challenge our tested hypotheses.

Future research avenues in the realm of bank profitability and economic growth might explore the influence of other relevant determinants like customer service, bank reputation, and marketing strategies. Researchers could also employ alternative methods such as two- or three-stage least squares or panel co-integration models. Investigating the effects of bank types and domestic-foreign ownership of the banking sector on bank-level data using quantile regression estimators could yield valuable insights. Furthermore, the impact of bank competition determinants on the connection between bank profitability and economic growth could be an intriguing avenue for future research.

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Relacja pomiędzy rentownością banków a wzrostem gospodarczym w krajach Europy Centralnej i Wschodniej

Streszczenie

Badanie zaprezentowane w artykule koncentruje się na ustaleniu relacji pomiędzy rentownością banków a wzrostem gospodarczym w 16 krajach Europy Centralnej i Wschodniej w okresie od 1999 do 2022 r. Są to następujące kraje: Albania, Bośnia i Hercegowina, Bułgaria, Chorwacja, Czechy, Estonia, Węgry, Litwa, Łotwa, Macedonia, Czarnogóra, Polska, Rumunia, Serbia, Słowacja i Słowenia. Powszechnie się przyjmuje, że niska rentowność banków stanowi zagrożenie dla wzrostu gospodarczego. Nasze badanie skupia się natomiast na odpowiedzi na pytanie: dlaczego wyższa rentowność banków pozytywnie wpływa na wzrost gospodarczy. Równocześnie, bazując na pokrewnych badaniach, analizujemy w sposób bardziej zniuansowany uwarunkowania rentowności banku związane ze strukturą własności i potencjałem konkurencyjnym.

Główna hipoteza weryfikowana w artykule brzmi następująco: rentowność banków mierzona stopą zwrotu z aktywów jest w krajach Europy Centralnej i Wschodniej pozytywnie skorelowana ze stopą wzrostu gospodarczego. Motywacją takiego badania jest pogłębienie wiedzy, generalnie, na temat wkładu rosnącej efektywności sektora bankowego w procesy rozwoju gospodarczego.

Wykorzystując metody analizy ekonometrycznej, ustalono, że wzrost stopy zwrotu z aktywów o jeden punkt procentowy prowadzi do wzrostu PKB o 0,575 do 0,603 punktu procentowego. Taki rezultat uświadamia znaczenie i rolę sektora bankowego w promowaniu rozwoju gospodarczego w krajach, które wciąż znajdują się w okresie transformacji systemowej.

Słowa kluczowe: rentowność banków, wzrost gospodarczy, Europa Centralna i Wschodnia, analiza panelowa