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Investigating the Causality between Bank Profitability and Economic Growth: Evidence from Central and Eastern Europe

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Abstract

This article investigates the impact of bank profitability on economic growth for a sample of 16 countries from Central and Eastern Europe during the period from 2000-2021. While low bank profitability is considered a risk for economic growth, the extent to which higher levels of profitability are conducive to growth remains an open question. The remarkably consistent empirical results obtained using multiple econometric techniques uncover a statistically and economically significant positive relationship. A one percent increase in banks' return on assets is associated with higher economic growth in the range of 0.625 and 0.635 percentage points. When richer dynamics of bank profitability are explored, the impact of past realisations of bank profitability on growth does not endure in the long run. We also performed a battery of country-specific tests to examine the bidirectional causality between bank profitability and economic growth in the selected countries.

1. Introduction

Financial systems perform the salient function of channeling loanable funds between surplus and deficit units (Buckle & Beccalli, 2011), supposedly promoting efficiency and economic growth (Petkovski & Kjosevski, 2014). When it comes to the efficient operation of banks, the principles of liquidity, solvency and profitability are among the most important ones (Mirzaei & Mirzaei, 2011). The profitability of banks, as the ultimate financial performance, is a function of the efficiency of the financial intermediation process. At the same time, achieving the desired rate of profitability implies balancing between other fundamental principles of banking activities (liquidity, solvency, capital adequacy and prudent placement). Respecting regulatory constraints and risk preference, banks navigate the process of financial intermediation between these two alternatives. The first alternative involves maximising profits at a tolerable level of risk, whereas the second one involves minimising risk with a satisfactory level of profit.

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There are several reasons why bank profitability is exceptionally important. First, higher profitability allows banks to generate more funds to approve more loans in the economy. This mechanism has been convincingly described by Albertazzi and Gambacorta (2009) as follows.

Following a decline in bank profitability, if capital is low enough, and if it is too expensive to issue new shares, banks will reduce lending. This is because, otherwise, they will not be able to meet regulatory capital requirements. A reduction in lending will produce a real (negative) effect on consumption and investment in the economy. Second, restrictive cash lending policies by banks, due to low profitability, will reduce the impact of flexible monetary policy measures, as banks play a key role in the monetary transmission mechanism. It is not surprising therefore that the German central bank highlights that a stable and profitable banking system is key to an effective monetary policy, and that, especially after the financial and debt crisis in the Euro area, bank profitability and capital have become the focus of monetary policy in the European financial system (Deutsche Bundesbank, 2018). Third, as Trujillo-Ponce (2013) pointed out, higher bank profitability is important for regulators, because it guarantees more flexible capital ratios, even in a riskier business environment. Finally, a healthy and profitable banking system can better withstand negative shocks and thus contribute to the stability of the entire financial system (Athanasoglou et al., 2008).

From a broad perspective, the profitability of banks is important not only to banks but also to the economy on the whole. Athanasoglou et al. (2008) highlighted that the profitable banking sector plays an important role in overcoming economic shocks. ECB (2021) underscored that profitable banks can attract capital from investors and are also likely to generate additional capital through their retained earnings. Trujillo-Ponce (2013) argued that the profitability of banks is also essential for the sustainability of the banking system and that profitable banks can inject more funds into the economy.

Commercial banks, like other businesses, have similar expectations regarding the health of the economy. When there is a consensus among the business community about favorable economic prospects, businesses expand their operations. Otherwise, entrepreneurs follow a path that limits their investment expansion. While commercial banks expand their loans during economic expansions, they contract during recessionary periods. At this point, businesses criticize banks for their low-risk appetite. When the economy is experiencing a recovery, commercial banks contribute to the money stock and thus help expand the demand for goods and services. When the economy reaches the apex of credit and deposit expansion, we no longer have increases in employment and real income, but only an increase in the overall price levels. Onthe other hand, if banks reduce their loans during a decline in the economic activity, there may be significant decreases in total demand and production due to the decline in real prices. Therefore, the contribution of the commercial banking system to economic growth and stability depends largely upon the pool of resources and the use of bank funds. In order to facilitate growth, banks' funding sources need to grow. To help maintain macro-financial stability, bank transactions should not exacerbate economic fluctuations. However, when banks are purely guided by the profit motive, they may destabilize the economy. According to Parasiz (2000), if banks

fail to access expanding funding sources, their profits will remain low.

In sum, the influence of bank profitability on economic growth remains an open question that has been, somewhat surprisingly, overlooked in the literature. To our knowledge, only a few studies have explored this relationship (Cole et al., 2008; Klein & Weill, 2017). In order to fill this gap, we examined the causal effect of bank profitability on economic growth through a panel analysis on 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 2000-2021.

The aforementioned region witnessed a spectacular growth in the banking system over the past three decades. When the transition began in the early 1990s in these countries, the establishment of a functioning banking sector was delayed or jeopardised by a number of adverse developments, such as wars, political instability, hyperinflation and Ponzi-type schemes. The banking sector in Central and South Eastern Europe requires an analysis of two stages of development. The first stage covers the transition period (until 2005), whereas the second stage covers the post-transition period (from 2005 to the present). During the transition period, state banks in the Central and South Eastern Europe region survived a radical restructuring of the business model, ownership transformation (privatisation) and internationalisation. The consequences of these processes are reflected in the increased efficiency of financial intermediation as well as the implementation of a flexible organisational structure and modern risk management models. The second phase consisted of a period of major restructuring, asset clean-up and large-scale recapitalisation that foreran the privatisation programs (Felice et al. 2006). In the post-transition period, oligopolistic banking structures were formed, with the dominance of several leading banks (market leaders) prone to collusive (contractual) profit-maximising behavior.

Further, the countries studied here have similar banking sectors in terms of observed indicators. First, a recognizable feature of the banking sectors in the region is their transition and pronounced ownership transformation. This is reflected in the dominant presence of foreign banks in terms of ownership structure, that is, the minor influence of domestic banks on the regional economies. Second, considering the size and requirements of the market, a large number of banks exist in these countries; however, this has not led to an adequate level of competitiveness. Yet, it is important to note that the performance of the banking sector has improved, which is reflected by the indicators of liquidity and profitability, especially during the period before the 2008 crisis. Post this crisis, there was a slowdown in economic flows, which was reflected in the banking sector. Hence, some indicators fell significantly and remained at a level that was significantly lower than the pre-crisis period.

In order to examine the relationship between banks' profitability and economic growth, we applied the System Generalised Method of Moments (S-GMM), which considers a substantial number of parameters and allowed us to deal with the potential endogeneity problem. We note that the economic and social conditions in each of the sampled economies are different, which is manifested through the positions of their monetary and fiscal policies, levels of unemployment,

productivity, and banks' profitability. That said, the effect of banks' profitability on economicgrowth may differ from one country to another. To fill this gap, we relied on the heterogeneous panel Granger-causality test with cross-sectional dependence, as suggested by Dumitrescu and Hurlin (2012).

This research study makes several important contributions to the existing literature. Primarily, this is the first study to investigate the impact of bank profitability on economic growth across a range of countries in Central and South Eastern Europe, which are at different stages of economic development but operate within a similar regulatory setting. Second, our study differs from previous investigations in the field. Cole et al. (2008) focused on the link between bank stock returns and economic growth, while we have used return on assets (ROA) as a measure of bank profitability. Consequently, the real growth of GDP per capita has been used as a measure of economic growth. Klein and Weill (2017) used global data to investigate the impact of bank profitability oneconomic growth. Given that banks around the world operate under different policies andregulations, the findings of their study cannot be generalised to Central and Eastern Europe. Third, we also investigated the causal relationship between bank profitability and economic growth and identified how the impact of bank profitability varies across different economies in Central and Eastern Europe. This is the first study that has investigated such a relationship in the individual countries within the sample.

The rest of this article is organised as follows. In Section 2, we present a selective literature review of the major empirical findings regarding bank profitability and economic growth relationship. In Section 3, we present the data. Section 4 discusses the problems associated with estimating growth equations, as well as the chief econometric method: S-GMM. Section 5 describes the results of the analysis of the relationship between bank profitability and economic growth. The main findings are distilled in Section 6, which suggests several avenues for further investigation.

2. Review of Literature

It would be difficult to generate economic growth and development without banks. Banks, as financial intermediaries, collect and transfer loanable funds to the production process points where funds are needed. From a micro perspective, the role of banks is to provide businesses and citizens with liquid funds and ensure the accumulation of funds for investments and private sector development.

Provision of loans and various credit services is the primary function of modern banks. As part of its loan function, the bank puts into circulation both mobilised and concentrated financial resources, thereby enabling uninterrupted flows of financing. At the micro level, the role of banks involves generating economic growth and development, by increasing the rates of growth of macroeconomic aggregates (Komazec, 2006). The banking sector can significantly influence long-term economic growth by affecting the development of the private sector.

A study by Chava et al. (2013) conducted for the economy of the United States suggested that policies aimed at developing financial markets can have a positive externality on the economy by boosting innovative activity and, thereby, long-term economic growth. The negative effects of intrastate deregulation and the

positive effects of interstate deregulation on innovation, however, suggest that the manner wherein financial sector reform is carried out is important to realize its potential benefits to the real economy. This study demonstrated that financial development has a positive effect on economic growth by easing constraints and thus positively influences innovation.

Ayadi et al. (2010) investigated the implications of the presence of local cooperative banks[2]on regional economic growth, using regional data from seven European countries during 2000 to 2008. They argued that the presence of cooperative banks had a significant positive impact on growth rates in most countries, through their lending to small and medium-sized businesses, and that the effect was much stronger in poorer regions. Also, these authors showed that, in addition to coexisting with other banks under similar conditions, cooperative banks reacted to changes in market trends while fulfilling the integral role of contributing to stability and regional growth in their economies.

Tan and Floros (2012) investigated the relationship between bank profitability and economic growth for the 2003-2009 period, using a sample of 101 Chinese banks. The application of the GMM provided evidence supporting the negative link between GDP growth and the profitability of banks measured in terms of ROA and net interest margin (NIM).

Hamza and Khan (2014) explored the impact of banking sector profitability on economic growth in Pakistan. Using a sample of 10 commercial banks during the 2008-2012 period, they found a positive and significant association between bank profitability and economic growth.

Adekola (2016) studied five banks during the 2005-2014 period in Nigeria. The study concluded that low profitability of banks had a significant and negative effect on economic growth in Nigeria. It recommended that the regulatory authority must ensure that the gains of the banking reforms processes are sustained. The central bank was advised to take more decisive measures aimed at tightening the risk management framework of the Nigerian banking sector, as this would have a positive effect on their profitability.

By applying the Classical Engle Granger Cointegration and Granger's (1969) Causality test over the 1992-2017 period, Alev (2018) examined the long-term relationship between the bank profitability and economic growth of Turkish banks. In this study, growth rate in GDP was considered as the dependent variable, whereas ROA and return on equity (ROE) were employed as bank profitability indicators. The empirical results showed that bank profitability, both in terms of ROA and ROE, positively affected economic growth.

[2] The European banking context is a mix of different types of banks: public, state, cooperative, mutual and private banks. A particular distinction is made between Stakeholder Value (STV) banks (of which cooperative banks are a major component) and Shareholder Value (SHV) banks. The distinction is ultimately about the banks' bottom line objectives and the extent to which profit maximisation is the central focus of business models. As with savings banks, cooperative banks can be categorised as 'dual-bottom line' institutions. Cooperative banks have long been an integral and well-established part of the financial system in several European countries. They are an important part of the diversity and plurality in European banking and have their own characteristic business models, ownership and governance structures.

Klein and Weill (2017) investigated the impact of bank profitability on economic growth by performing a cross-country analysis on a sample of 133 countries over the period from 1999 to 2013, with several empirical estimations [Ordinary Least Squares (OLS), panel fixed-effects and instrumental-variables regressions, and S-GMM]. Their first major conclusion is that an existing high level of bank profitability contributes positively to economic growth. Further, their second conclusion is that the previous level of bank profitability exerts a negative influence on economic growth, leading to the absence of significance for the overall bank profitability, but the so-called impact is short-lived.

Kumar and Bird (2020) investigated the relationship between bank profitability and economic growth in the Asia-Pacific region during 2004-2014, using the S-GMM estimator. Their findings suggested that there was a positive and statistically significant relationship between the profitability of banks and economic growth. Their results also showed that the impact of profitability on economic growth was much larger in developed economies compared to small and large emerging economies.

Moussa and Hdidar (2019) used a panel data analysis model to investigate the relationship between bank profitability and economic growth on a sample consisting of 18 Tunisian banks between 2000 and 2017. The ROA and ROE were viewed as indicators of bank profitability, whereas several indicators specific to banking operations, GDP growth rate and inflation rate were used as independent variables. They concluded that there existed a positive link between economic growth and bank profitability.

3. Data and Variables

To determine the impact of banks' profitability on economic growth in Central and Eastern Europe, we constructed a sample consisting 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) and employed a panel- regression analysis for the 2000-2021 period.

The selection of countries was mainly based on similarities in terms of historical and socio-economic developments as also in terms of geographical and cultural proximity. On the other hand, there also existed differences among these countries that made them a remarkably heterogenous group. These differences were mostly reflected in the high disparities observed with respect to the level of public debt, GDP growth, GDP per capita growth, European Union (EU) membership and so on. We have noted that the data series for Serbia and Montenegro are incomplete because they were part of a single country until 2006.

The banking sector in the Central and Eastern Europe has undergone significant changes since the fall of communism in the late 1980s and early 1990s. The structure of the banking sector in these countries is similar, with a mix of domestic and foreign-owned banks. In some countries, such as Poland, foreign-owned banks dominate the sector, while in others, such as Bulgaria, the majority of banks are domestically owned.

The level of credit as a percentage of GDP varies across the region.

According to World Bank data, as of 2020, the level of credit as a percentage of GDP ranged from around 50% in Albania to over 100% in Estonia and Slovenia.

One of the main processes that has shaped the banking sector in the region is privatisation, which began in the early 1990s. Several state-owned banks were sold to private investors, including foreign banks, which brought in new business models, capital and expertise. Another important process was the integration of these countries into the EU, which led to the adoption of EU banking regulations and increased competition from foreign banks.

Overall, the banking sector in the region has become more stable and competitive in recent years, with improved regulation and oversight, stronger capitalisation as also a more diverse range of financial products and services. However, there still exist challenges, such as high levels of non-performing loans in some countries, which continue to impact the sector.

Our dependent variable was the real growth of GDP per capita (in constant 2015 US$). This variable has also been used in other studies (for example, Arcand et al., 2015; Klein & Weill, 2018, 2022). To capture bank profits, we used banks' ROA data. According to Garcia-Herrero et al. (2009) and Bolt et al. (2012), banks' ROA is a standard indicator of bank profitability. In this study we also followed Klein and Weill (2018) and employed ROA before tax to avoid the impact of cross-country differences in taxation. Based onthe earlier body of empirical literature (for example, Athanasoglou et al., 2008), we hypothesised that profitability indicators would have a positive impact on economic growth. We also included the net interest margin or the interest rate spread (lending rate minus deposit rate), expressed as a percentage.

To control the growth persistence, we used lagged GDP growth as a potential determinant. Lucas (1988) suggested that GDP growth in period (t–1) had a positive and significant effect on GDP growth in period (t), in developed and emerging markets. On the other hand, Wijnbergen (1983) showed that past GDP growth had a negative and significant effect on contemporaneous GDP growth in Turkey. In line with the findings of Cole et al. (2008), we hypothesised that lagged GDP growth would have a positive impact on economic growth.

We modelled economic growth as a function of five additional explanatory variables that are standard variables in finance-growth-nexus literature (for example, Arcand et al., 2015): net interest margin, inflation rate, trade openness, government expenditure and educational attainment.

The inflation rate has been defined as the annual percentage increase in the consumer price index. Most of the previous studies have found that inflation had a negative and significant impact on economic growth. Very high inflation negatively affects the economy, whereas low and stable inflation (from 1% to 5% per annum) can even be useful. Thus, the influence of inflation can be negative as well as positive.

Further, we used the annual percentage change in government expenditure as a potential determinant of economic growth. Wijnbergen (1983) found that an increase in public expenditure led to an increase in economic growth in Turkey. However, Buffie (1984) suggested that government expenditure had a negative impact on economic growth in 87 developed and developing countries. Given the ambiguous theoretical guidance, we were unable to predict the relationship between

government expenditure and economic growth.

With respect to the openness of the economy, we followed Andersen and Babula (2009) and defined trade openness as the sum of exports and imports of goods and services. Based on the study by Kumar and Bird (2020), which suggested a positive relationship between trade and economic growth, we also hypothesised that trade openness would have a positive impact on bank profitability.

A positive sign was also expected concerning the coefficient on the education attainment. 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 enrollments (Kjosevski, 2013). We used secondary gross enrollment ratio: the ratio of total enrollment, regardless of age, to the population of the age group that officially corresponds to the level of education shown.

As in studies by King and Levine (1993), Beck and Levine (2004), and Arcand et al. (2015), we used logs of all control variables. The data for the selected variables were obtained from the World Bank's World Development Indicators (WDI) database, Eurostat and the Federal Reserve Bank of St. Louis. Table 1 presents the variables within the model in greater detail.

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)	World Development Indicators
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	World Development Indicators
Government expenditure	GEXP	Percent of GDP	World Development Indicators
Educational attainment	EDU	Ratio of total enrollment, 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.

Table 2 Descriptive Statistics

Country	Trade (% of GDP)			GDP growth (annual %)			Inflation, consumer prices (annual)			General government final consumption			School enrollment, secondary (% net)			Bank return on assets		
	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
Albania	59.95	83.20	73.71	-3.48	8.54	3.96	-0.37	7.77	2.47	10.38	11.87	11.11	68.41	87.39	83.76	0.61	2.07	1.19
BiH	73.74	101.28	86.99	-3.119	7.10	2.84	-1.584	7.43	1.41	19.44	23.46	21.85	N.A	N.A	N.A	-1.798	1.51	0.66
Bulgaria	75.26	130.29	111.91	-4.39	7.06	3.11	-1.418	12.35	3.74	15.57	20.11	17.47	83.43	91.23	86.88	-5.836	3.02	1.44
Croatia	70.39	103.76	87.00	-8.099	10.45	1.33	-1.125	6.08	1.83	19.13	23.95	20.97	88.49	96.49	93.09	-0.757	1.82	0.83
Czech Republic	91.33	157.57	129.60	-5.797	6.77	2.57	0.118	6.36	2.35	18.75	21.92	19.96	87.77	91.00	89.46	0.378	2.65	1.51
Estonia	116.7	170.76	142.70	-14.62	10.09	3.92	-0.492	10.36	3.21	15.83	21.25	18.70	85.07	94.36	91.34	-1.895	4.37	1.79
Hungary	116.6	168.34	151.06	-6.595	7.10	2.53	-0.227	9.80	4.30	19.68	23.01	20.90	85.04	90.55	89.12	-0.837	3.16	1.53
Latvia	81.53	130.22	107.90	-14.24	11.97	3.49	-1.084	15.40	3.49	17.22	21.10	19.00	89.64	93.80	92.00	0.967	3.05	0.97
Lithuania	83.37	156.57	127.89	-14.83	11.11	4.05	-1.134	10.93	2.48	16.29	22.43	18.52	90.95	99.65	96.94	-5.160	2.17	0.68
Montenegro	77.59	132.34	104.03	-15.30	12.43	2.72	-0.710	8.76	2.38	17.79	29.94	21.70	89.07	90.05	89.49	-4.342	2.40	0.04
N.Macedonia	71.06	147.81	104.70	-6.110	6.47	2.52	-0.739	8.33	2.13	13.99	23.83	17.38	N.A	N.A	N.A	-0.923	2.46	1.32
Poland	58.15	117.62	85.70	-2.540	7.06	3.63	-0.874	9.90	2.71	17.68	19.20	18.37	89.01	94.08	91.48	-3.215	2.61	0.98
Romania	48.52	87.36	71.27	-5.517	10.43	3.78	-1.544	45.67	9.06	14.01	18.81	15.75	82.76	85.29	83.86	-1.184	3.74	1.19
Serbia	22.49	116.65	82.38	-2.731	9.03	3.58	1.122	95.01	14.13	15.99	24.19	19.14	89.58	93.78	92.00	-4.681	3.30	0.75
Slovak Republic	108.7	190.70	160.89	-5.455	10.83	3.39	-0.520	12.04	3.42	17.14	21.54	19.24	84.20	88.28	85.78	-0.104	1.31	0.66
Slovenia	102.3	161.74	133.57	-7.548	8.11	2.42	-0.525	8.91	2.87	17.45	20.56	19.11	91.37	96.43	93.57	-9.984	1.84	0.06

Table 3 Descriptive Statistics

Country	Trade (% of GDP)			GDP growth (annual %)			Inflation, consumer prices (annual			General government final consumption			School enrollment, secondary (% net)			Bank return on assets		
	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
2000	74.52	188.36	128.08	-6.11	12.43	3.78	-0.05	5.11	3.05	11.76	22.43	19.05	82.35	91.37	87.35	-0.02	4.79	1.86
2001	51.93	131.05	88.27	-3.07	8.29	3.84	1.37	95.01	13.82	10.63	25.17	19.95	68.41	92.72	86.22	-1.80	3.74	0.95
2002	53.71	123.32	86.42	1.49	7.09	4.60	0.28	22.54	6.08	11.34	24.86	19.89	83.69	94.48	89.14	-4.68	3.38	1.12
2003	56.18	125.15	86.77	2.22	10.57	4.86	-1.13	15.27	3.81	11.10	26.76	20.01	84.92	96.39	89.81	-3.22	3.43	1.51
2004	60.63	139.65	95.42	4.15	10.43	6.07	-0.45	11.87	4.81	11.21	26.31	19.24	85.79	97.51	90.69	-1.90	3.25	1.73
2005	59.36	147.73	100.04	3.51	10.72	5.79	0.53	16.12	4.47	11.03	29.94	18.96	78.93	98.61	89.80	0.35	2.89	1.59
2006	61.68	164.63	106.71	3.95	11.97	6.88	1.28	11.72	4.55	10.53	21.98	18.17	85.11	99.65	91.44	0.64	3.16	1.80
2007	63.51	166.33	110.21	0.28	11.11	6.85	1.50	10.09	4.73	10.48	21.08	17.79	84.92	99.30	91.29	0.51	2.95	1.97
2008	65.17	162.07	110.82	-5.13	9.31	3.74	3.32	15.40	8.13	10.38	22.22	18.59	84.20	98.24	90.82	-0.25	2.48	1.27
2009	58.47	144.95	94.62	-14.84	3.35	-5.61	-0.74	8.12	2.68	11.11	23.46	19.47	83.44	97.24	90.69	-5.16	2.13	0.04
2010	71.40	157.40	106.94	-4.47	6.29	1.39	-1.08	6.14	2.40	11.16	23.13	19.10	83.96	96.98	90.59	-4.34	1.79	0.23
2011	78.44	168.70	117.76	-0.09	7.26	2.67	1.80	11.14	4.20	10.97	23.09	18.55	85.48	97.31	90.96	-1.30	4.37	0.82
2012	76.51	176.85	120.85	-2.72	7.04	0.59	2.03	7.33	3.54	10.84	23.37	18.36	85.33	97.04	91.05	-2.15	2.11	0.48
2013	75.87	181.96	120.39	-1.03	3.77	1.57	-0.09	7.69	2.05	11.03	22.83	18.14	84.21	97.46	90.95	-9.98	3.30	0.10
2014	75.41	178.60	121.38	-1.59	4.22	2.17	-1.42	2.08	0.14	11.45	22.86	18.14	84.23	97.60	90.75	-5.84	1.98	0.23
2015	71.80	180.68	120.82	1.81	5.39	3.24	-1.04	3.50	0.08	11.11	22.00	17.89	84.54	97.50	91.27	-0.76	1.60	0.45
2016	74.81	184.56	121.01	1.93	4.70	2.99	-1.58	1.12	-0.24	11.27	20.96	17.77	82.77	97.52	90.99	0.09	2.11	0.99
2017	78.19	188.47	125.61	1.08	7.32	3.99	0.81	3.72	2.12	11.50	20.55	17.56	82.85	98.43	90.98	-0.24	2.46	1.18
2018	76.81	190.70	127.12	2.68	5.36	4.03	1.42	4.63	2.38	11.29	20.60	17.61	86.61	92.07	89.25	0.51	2.16	1.14
2019	76.28	184.13	125.56	2.09	4.74	3.64	0.36	3.83	2.05	11.35	20.60	17.83	78.98	98.79	89.93	-0.34	3.05	1.20
2020	59.95	169.95	116.04	-15.31	-0.13	-4.59	-1.05	3.37	1.27	11.87	23.95	19.75	79.31	98.58	89.57	0.27	1.56	0.74
2021	74.52	188.36	130.09	3.02	12.43	6.57	1.92	5.11	3.52	11.76	22.43	19.07	81.29	86.75	84.53	0.54	1.63	1.08

The summary statistics are reported in Table 2 and Table 3, but we will only refer to notable differences among countries. The average banks' ROA is 1.02%. Bulgaria recorded the highest value of 4.79% in 2000, while Slovenia had the lowest value of -9.990% in 2013. The selected countries, on an average, recorded an inflation rate of 3.97%. The countries from the sample did not experience hyperinflation episodes during the period under investigation. As for the annual GDP per capita growth, the selected countries had a mean growth rate of 3.2%. For instance, Montenegro had a large GDP slump by 15.31% in 2020 (as a result of COVID-19 and decline of tourist visitors), whereas Bosnia and Herzegovina experienced a GDP growth of 12.8% in 2000, primarily as a result of the post-war recovery. The government expenditure showed the lowest values for Albania in 2000 (9.69% of GDP), whereas the highest expenditure was registered in Montenegro in 2005 (29.94% of GDP). We may say that the GEXP is similar across countries' groups with a mean of 18.7% of GDP. The EU countries have a somewhat higher government expenditure, on an average, expressed as a percentage of GDP. Further, there exist large differences between the countries in terms of educational attainment (measured by the population having least secondary education) (EDU). Albania had the lowest value in 2000 with 46.42.69, while the highest value of 89.20 was achieved by Lithuania in 2006. Finally, among the selected countries, Slovakia had the highest degree of trade openness of 190.7% in 2018, whereas Serbia the lowest trade openness of 22.49%. The accession to the EU is generally considered as a strong impetus for trade liberalisation.

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 Group Effect Using S-GMM

Maddala and Wu (1999) argued that one of the main advantages of panel data compared to other types of data is that the approach allowed for testing and adjustment of the assumptions implicit in cross-sectional analyses. Additionally, Hsiao (2014) underscored the following benefits of conducting a panel-regression analysis: (1) increased degrees of freedom and reduction of the problems of data multicollinearity, (2) construction of more realistic behavioral models and discrimination between competing economic hypotheses, (3) elimination or reduction of estimation bias, (4) attainment of more precise estimates of micro relations and generation of more accurate micro predictions, (5) provision of information about the appropriate level of aggregation and (6) simplification of cross-sections or time series data inferential procedures.

In order to provide consistent and unbiased results, we implemented three alternative estimation techniques. We started the analysis with the assessment of fixed effects. The fixed effect model is a statistical method used in panel data

analysis. This model includes a set of fixed effects or dummies to control for unobserved time-invariant heterogeneity across cross-sectional units. Some of the main characteristics of the fixed effect model are mentioned here. It controls for unobserved time-invariant heterogeneity: by including fixed effects or dummies for each cross- sectional unit, the model accounts for unobservable differences between units that might affect the dependent variable. It is a type of within-estimator: the fixed effect model estimates the within- group variation of the dependent variable, rather than the between-group variation, which is the focus of the random effect model. It produces unbiased estimates of the coefficients: the fixed effect model can address the issue of endogeneity by controlling for unobserved heterogeneity. This implies that the coefficients of the independent variables are unbiased, even if they are correlated with the error term. The model assumes that the effects of the independent variables are constant across time. The fixed effect model also assumes that the coefficients of the independent variables are the same across all time periods. The model requires a panel data set: it is appropriate for panel data sets wherein the same cross-sectional units are observed over multiple time periods. However, this model can be less efficient than other estimators. As the fixed effect model estimates a separate intercept for each cross-sectional unit, it can be less efficient than other estimators, particularly when the number of cross-sectional units is large. Finally, when the number of cross-sectional units is large, relative to the number of time periods, the fixed effect model can suffer from the incidental parameter problem wherein the number of parameters estimated becomes too large relative to the sample size.

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 noted in earlier studies, the process of estimation encounters the problems of heterogeneity and endogeneity, which produce inconsistent and biased estimates with the pooled OLS estimator (Gábor & Gábor, 2021; Pattillo et al., 2002; Woo & Kumar, 2010). The regression model applying pooled OLS fails to account for the unobserved country-specific effects that vary across countries. Thereby, the result may be affected by an omitted variable bias (Pattillo et al., 2002) and the analysis continues using the evaluation of the models via fixed effect method (FEM) and random effect method (REM). These econometric models control the heterogeneity in the sample and consider the stationary FEM effects or specific, modelled REM effects. However, the presence of a fixed effects panel estimation is likely to impose a correlation between the lagged endogenous variable and the residuals, thereby negatively biasing the results for the coefficient on the lagged term (for example, Pattillo et al. 2002). Therefore, the use of OLS, FEM and REM is not suitable in this case.

To account for potential endogeneity problems, we employed the instrumental variable (IV) estimation technique proposed by Baum et al. (2012). In particular, the estimator used in our research study was the S-GMM developed by Blundell and Bond (1998). By applying this method, we assumed that all the control variables were predetermined or endogenous. S-GMM estimators use the

lags of the variables as instruments. In this context, we followed Klein and Weill (2018) and used all the available lags, starting with the second lags for endogenous variables and the first lags for predetermined variables. All existing variables except education were defined as endogenous. Education and the lagged variables were defined as being predetermined. We dealt with the potential problem of having too many instruments compared to the number of groups (for example, Roodman, 2009) by keeping the number of instruments lower than the number of countries. In the standard un-collapsed form, each instrumental variable creates one instrument for each time period and the lag attributable to that period; in the collapsed form, a single column vector of instruments is created instead of a whole matrix. Although collapsing can reduce the statistical efficiency in large samples, it can be a helpful tool in avoiding the bias in finite samples, which are usually characterised by instrument proliferation. The latter helps avoid any bias due to the large number of instruments in a relatively small sample. The validity of the instruments selected can be tested using the Sargan test. In addition, we tested the serial correlation in the residuals differentiated once [autoregressive process AR(1)] and twice [autoregressive process AR(2)]. According to Arellano and Bond (1991), the first-order autocorrelation in the differentiated residuals does not imply that the estimates are inconsistent; however, the second-order autocorrelation would imply that this is the case.

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

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

where gr stands for real GDP growth and ROA for banks' return on assets. Countries are indexed with i and years with t; gri,t−1 is the past realisation of growth; ROAi,t denotes banks' return on assets; ROAi,t−1 indicates the impact of the past level of bank profitability on growth; NIMi,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 4.

In this study, we also used the least squares dummy variable corrected (LSDVC). The LSDVC estimation is a statistical method used to estimate the coefficients in a linear regression model with time-varying variables, such as changes in policy or programme interventions. Some of the main characteristics of LSDVC estimation are as follows: it is a type of fixed effects estimator that includes dummy variables for each cross-sectional unit in the regression equation. Further, it allows for the inclusion of time-varying variables, which are captured by the dummy variables representing changes over time. It addresses the problem of endogeneity, which occurs when there is a correlation between the independent variables and the error term in the regression model. By including fixed effects, LSDVC estimation controls for unobservable time-invariant heterogeneity that may be correlated with the independent variables. It produces unbiased estimates of the coefficients, even when the error term and the independent variables are correlated. LSDVC estimation requires a panel data set, wherein the same cross-sectional units are observed over

multiple time periods. It assumes that the fixed effects are uncorrelated with the independent variables and the error term, and that the error term is homoscedastic and normally distributed. The standard errors in LSDVC estimation are corrected with regard to clustering of observations within cross-sectional units, to account for potential correlations within groups. Overall, LSDVC estimation is a powerful technique for estimating the effects of time- varying variables in panel data settings and can produce reliable estimates even when endogeneity is a concern.

4.2 Testing Cross-Sectional Dependence

Before we moved on to testing the causality in a panel framework suggested by Dumitrescu and Hurlin (2012), we first checked the possible cross-sectional dependence across countries. In fact, we have witnessed significant cross-border movement of workers, financial integration and international trade in the past decades; hence, it is reasonable to assume that a shock affecting one country can also affect the others in the panel. Pesaran (2006) indicated that ignoring the cross-section dependence — which implies that a shock affecting any of the units constituting the panel can affect other units as well — can lead to biased results. In this context, it is important to see how the slope coefficients are treated — as homogeneous or heterogeneous. According to Poon and Granger (2003), the causality running from one variable to another by imposing the joint restriction on the panel is the strong null hypothesis. Moreover, the homogeneity assumption for the parameter is unable to capture the heterogeneity because of the country-specific characteristics (Breitung & Das, 2005).

In order to thoroughly examine the cross-section dependence, we conducted the following three tests: the Lagrange multiplier (LM) test (Breusch & Pagan, 1980), the cross-sectional dependance (CD) test (Pesaran, 2004) and the bias-adjusted LM test (Pesaran et al. 2008).

Further, according to Poon and Granger (2003), when working with panel data, investigating the homogeneity or the heterogeneity of the data (existence or not of individual effects) is of crucial importance. The null hypothesis of slope homogeneity against alternative heterogeneity can be described as follows:

$$H_0 \beta = \beta i \text{ (for all i)}$$

$$H_1 \beta_i = \beta_j \text{ (for a non-zero friction of the pair-vise slopes for i} \neq \text{j (Apply F-test)} \quad (2)$$

To test for the null hypothesis, we will used two slope homogeneity tests ($\tilde{\Delta}$ and $\tilde{\Delta}_{adj}$ proposed from Pesaran and Yamagata (2008)

4.3. Testing Non-Granger Causality

The causality between variables was examined at both panel and country levels by applying the panel causality test, as suggested by Dumitrescu and Hurlin (2012). In fact, the test is an advanced version of the causality test introduced by

Granger (1969). It can be applied to heterogeneous panels with or without cross-sectional dependence and may be used both when T > N and N > T. The test uses two separate HNC distributions: asymptotic and semi- asymptotic. The former is used when T > N and the latter when N > T. After setting up the methodology, we started our empirical study by testing for CD and the homogeneity of the slope across countries. Based on the outcomes of the tests, we aimed to decide which causality method could be employed to identify the direction of the causality relation between bank profitability and economic growth. In order to test the causal relationship, we selected all the countries from the panel.

5. Results from Panel Data Estimations

5.1 Estimation Results

The estimated coefficients from the three panel data models (static fixed-effects panel data estimation, S-GMM estimation and LSDVC) estimation) are presented in Table 4. 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. We have presented the LSDVC estimator, building upon the theoretical estimation formulas in Bruno (2005), which estimates a bootstrap variance covariance matrix for the corrected estimator.

Table 4 Alternative Dynamic Panel Data Estimations

Dependent variable: Contemporaneous real growth of GDP per capita

Explanatory variable	***Fixed effects panel data estimation***	***System GMM estimation***	***Least Squares DummyVariable Corrected (LSDVC) estimation***
	[1]	[2]	[3]
Lagged real growth of GDP per capita	**0.293*****	**0.397*****	**0.371*****
	[0.07]	[0.05]	[0.07]
Return on assets (ROA)	**0.630*****	**0.635*****	**0.625*****
	[0.23]	[0.19]	[0.12]
Lagged ROA	**-0.258***	**-0.285****	**-0.299****
	[0.13]	[0.13]	[0.12]
Net interest margin	0.135	-0.091	0.139
	[0.09]	[0.10]	[0.13]
Ln (Government expenditure/GDP)	-3.120	**-3.236****	-3.022
	[3.24]	[1.31]	[3.07]
Ln (Trade openness)	**4.965***	0.619	**4.714****
	[2.35]	[0.63]	[2.30]
Ln (1+infl. rate/100)	**-14.181***	-4.011	**-13.290***
	[6.80]	[5.73]	[7.17]
Educational attainment	-6.038	-3.441	-6.158
	[4.02]	[1.93]	[5.61]
Number of observations	259	259	259
Number of countries	16	16	16
Number of instruments	/	53	/
R-squared	0.754	/	/
Sargan test (p-value)	/	0.593	/
Arellano-Bond test [AR (1)]	/	0.004	/
Arellano-Bond test [AR (2)]	/	0.413	/

*Source:*Author's calculations
Notes: [1] Robust standard errors are reported in parentheses. [2] All specifications include time dummy variables, but the statistically significant ones arenot reported here.

The estimation results indicated a positive and statistically significant relationship between ROA and economic growth. Although we addressed potential endogeneity (especially reverse causality) in the empirical specification, by treating contemporaneous ROA as an endogenous variable, we interpreted the nexus between contemporaneous values of real GDP growth and bank profitability as the finding of a positive relationship. In other words, an increase in banks' ROA by one percent is associated with a higher rate of economic growth in the range between 0.625 and 0.635 percentage points, ceteris paribus. Since the second lag of the dependent variable was found to be insignificant, we do not report the estimation results here. However, we also considered potentially richer dynamics of banks' profitability by adding the past levels of banks' return on assets (ROAt-1). The impact of profitability on growth does not outlive the long run, as evidenced by the negative impact of past levels of banks' profitability. An increase of one percent in the past

levels of bank profitability leads to a decrease of 0.26 to 0.30 percentage points of contemporaneous economic growth. These results suggest that the impact of bank profitability on economic growth follows a dynamic pattern, in line with the results of Reinhart and Rogoff (2014) and Klein and Weill (2022).

This finding also suggests that bank profitability may contribute to both the upward and downward parts of the business cycle. The business cycle refers to the fluctuations in economic activity that occur over time, typically characterised by periods of expansion (upward phase) and contraction (downward phase). While we did not explicitly test for it, we acknowledge that this issue merits an investigation of its own. The hypothesised impact of bank profitability can be conceptualised into two phases. During the upward phase of the business cycle, when the economy is expanding, bank profitability tends to increase. This is because during economic expansions, there is generally a higher demand for loans from businesses and consumers. Banks earn income from the interest charged on loans, so increased lending activity can boost their profitability. Moreover, during economic expansions, default rates on loans tend to be lower, as borrowers are in a better financial position to repay their debts. This can lead to lower provisions for loan losses, which can also positively impact bank profitability. Additionally, banks may experience higher fee income from services such as investment banking, asset management and other financial services during periods of economic growth, which can contribute to their profitability.

During the downward phase of the business cycle, when the economy is contracting, bank profitability may decline. During economic contractions, businesses and consumers may reduce their borrowing, leading to decreased demand for loans. This can result in reduced interest-based income for banks. Additionally, as economic conditions worsen, borrowers may face financial difficulties and higher default rates on loans, leading to increased provisions for loan losses, which can negatively impact bank profitability. Moreover, during economic downturns, there may be a decline in demand for other fee-based services such as investment banking, asset management and other financial services, which can further affect bank profitability.

It is important to note that other factors, such as changes in interest rates, regulatory policies, market conditions and bank-specific factors, can also influence bank profitability and its impact on the business cycle. The relationship between bank profitability and the business cycle is complex and multifaceted, and various factors can interact to shape its dynamics. This also implies that a high level of bank performance affects the promotion of economic development, according to findings by Ayadi et al. (2010), Yudistira and Ike (2014), Alev (2018) as also Klein and Weill (2018; 2022). Profitable banks indeed tend to be drivers of economic growth. Hence, economic growth is likely to be associated with an increase in bank profitability.

A further implication is that cooperative banks have a significant market share in lending to small and medium-sized enterprises (SMEs) that are often recognised as drivers of economic development, especially in transition and post-transition economies. If banks are profitable, they will be able to transfer an increasing volume of funds from savers to users, which will generate economic activity and promote economic growth. In contrast, it is a risk to the economy if banks are not financially sound, as they will not be able to efficiently perform their intermediary functions.

Our findings, when associated with the positive impact of bank profitability on economic growth, support the proposition made by Athanasoglou et al. (2008) that a well-functioning and profitable banking sector is necessary for driving economic growth.

Thus, our estimations lead to two main conclusions. First, bank profitability helps foster economic growth. We found evidence that the existing level of bank profitability was positively associated with greater economic growth. Second, upon considering the dynamics of bank profitability by jointly estimating the impacts of the previous and existing levels of bank profitability, we observed no significant impact of bank profitability on economic growth. The significantly positive impact of the existing level was offset by the significantly negative impact of the past level. Regarding the other explanatory variables, we observed that past levels of GDP growth positively contributed to contemporaneous growth. The coefficient value in the range between 0.293 to 0.397 indicates inertia or persistence effects in the growth dynamics.

The above findings indicate that trade openness can significantly improve a country's economic growth. This is rationalised by the argument that open economies gain high access to advanced technology (Almeida & Fernandes, 2008; Baldwin et al. 2005; Barro & Sala-i-Martin, 1997) and expand the market to regions with great potential (Alesina et al., 2000; Bond et al., 2005), thereby stimulating economic growth. This result is also entirely consistent with endogenous growth theories.

The inflation rate turned out to be negatively associated with economic growth in the selected countries during the period under investigation. This implies several consequences. First, the fact that changes in the inflation rate are related to changes in economic growth should be considered when implementing economic policy. Second, the countries of Central and Eastern Europe have started a period of recovery and economic expansion following the global crisis. In this regard, special attention should be paid to the adequate control of phenomena such as inflation. In the long run, it is possible that increased economic growth may cause additional price growth, and this mechanism could produce negative long-term effects or hyperinflationary effects. Economic policy makers in Southeast European countries face a very important and sensitive task related to balancing a targeted increase in economic activity with consistently maintaining a stable and low long-term inflation rate. The results obtained are consistent with the view that a moderate rate of inflation is related to economic growth, as well as that stable and sustainable economic growth implies price stability.

Finally, the results of the Sargan test confirm the validity of our instruments and the presence of autocorrelation. The AR(2) test exhibits no second-order serial correlation in the specified models.

5.2 Cross-Sectional Dependence, Stationarity and Panel Causality Results

The results of the CD test are reported in Table 4. Since the values were less than 0.01, we rejected the null hypothesis of no CD at a significance level of 1% for all models and concluded that there was no CD among the variables. These findings imply that a shock occurring in one country can be transmitted to other countries in the sample.

Table 5 Cross-Sectional Dependence Results

Cross-sectional dependence test	*Statistic*	*p-value*
Breusch-Pagan LM	322.39***	0.0000
Pesaran scaled LM	12.03***	0.0000
Pesaran CD	6.85***	0.0000
Slope Homogeneity Tests		
$\widetilde{\Delta}$	3.918	0.0000
$\widetilde{\Delta}_{adj}$	5.216	0.0000

Source: Authors' calculations.
Notes: The symbols ***, ** and * denote statistical significance at the level of 1, 5 and 10%, respectively

The null hypothesis of slope homogeneity was rejected in the two tests at all significance levels, thus supporting country-specific heterogeneity. In other words, a significant economic relationship in one income group country is not transmitted in other. The existence of CD and heterogeneity across countries supports the suitability of the panel causality approach.

The results of the panel Granger causality test suggested by Dumitrescu and Hurlin (2012) are shown in Table 6. It must be noted that only the values of the asymptotic statistic ZHNC are reported because N. The results suggest that unidirectional causality runs from bank profitability (ROA) to GDP growth at lag order 1; whereas, at lag order 2, our results suggest a bi- directional causal relationship between bank profitability and GDP growth. This indicates that the impact of bank profitability on GR is immediate, whereas GR has a somewhat delayed impact on bank profitability. Overall, the causality results suggest bank profitability influences economic growth to a large extent in Central and Eastern Europe. The conclusion that bank profitability impacts GDP growth immediately is based on the finding that changes in bank profitability appear to lead to immediate changes in GDP growth. In other words, when banks become more profitable, they tend to increase lending, which can lead to increased economic activity and GDP growth in the short term. The conclusion that GDP growth has a delayed impact on bank profitability is based on the finding that changes in GDP growth appear to have a lagged effect on bank profitability. This means that changes in GDP growth may not have an immediate impact on bank profitability, but rather, might take some time to materialize. Overall, the bidirectional relationship between bank profitability and GDP growth suggests that there is a feedback loop between these two variables, wherein changes in one variable can influence the other variable over time. However, the precise mechanisms driving this relationship might be complex and might depend on various factors, such as the structure of the banking sector and the overall economic and regulatory environment. This is also consistent with the results of contemporaneous relationships between bank profitability and GDP growth, as shown in Table 6.

Table 6 Dumitrescu-Hurlin Panel Granger-Causality Test Results

Null Hypothesis	*Lag Order: 1*		*Lag Order: 2*	
	Results	*p-Value*	*Results*	*p-Value*
H0: Bank profitability does notGranger-cause GDP Growth.	2.2862	0.0222	6.7417	0.0000
H0: GDP Growth does not Granger-cause Bank profitability.	0.1711	0.8641	4.1669	0.0000

Source: Authors' calculations.

The country-specific Wald statistics were employed in order to determine which hypothesis was valid for each of the selected countries. A summary of the test results is presented in Table 7. It can be inferred that the results of both tests are correlative. This finding can be regarded as an important criterion for the reliability of the results.

Table 7 Panel Granger-Causality Results across Countries

	Direction			
Countries	*ROA→ GR*		*GR → ROA*	
	W-stat.	*Prob.*	*W-stat.*	*Prob.*
Albania	0.650476	0.431081	4.008876	0.061479
Bosnia and Herzegovina	2.804324	0.112307	0.288117	0.598385
Bulgaria	1.251044	0.27891	0.229931	0.637686
Croatia	0.473973	0.500453	2.422972	0.137988
Czech Republic	13.67752	0.001784	1.087066	0.311723
Estonia	4.670823	0.045239	0.050995	0.824033
Hungary	0.516301	0.482786	0.136576	0.016555
Latvia	0.940014	0.349968	1.465047	0.247677
Lithuania	0.292876	0.599172	0.041894	0.84156
Montenegro	0.313589	0.585788	0.253373	0.623822
Macedonia	0.086498	0.772459	2.967084	0.104245
Poland	6.702413	0.019114	0.035624	0.85253
Romania	1.807278	0.196501	0.807875	0.381304
Serbia	0.04139	0.841202	1.398509	0.25325
Slovakia	1.745305	0.996727	1.017974	0.328016
Slovenia	0.165581	0.089147	0.080668	0.779824

Source: Authors' calculations.

The results of this study indicate that there is no bidirectional causality between the profitability of the banks and economic growth in the selected countries. Nonetheless, profitability of the banks alone was generating economic growth in the

Czech Republic, Estonia and Poland, whereas economic growth positively impacted profitability only in Albania. In the other countries, namely, Bosnia and Herzegovina, Bulgaria, Croatia, Hungary, Latvia, Lithuania, Montenegro, Macedonia, Romania, Serbia, Slovakia and Slovenia, there was no impact of either profitability or economic growth on the other variables. Considering that loans were the main driver of the profitability of the banks in the Central and Eastern European countries, these results are not surprising. Bank credit growth is positively and significantly related to ROA, suggesting that, all other things being equal, an expansion of the loan book might create new business opportunities for banks and thus be associated with higher incomes (ECB, 2015). Also, if we analyse domestic credit offered to the private sector by banks (% of GDP) for 2020, using the data from the World Bank development indicators, the Czech Republic, Estonia and Poland (countries where the profitability had a positive impact on economic growth) had the largest shares of credit as a % of GDP (53.2%, 64.8% and 50.1%, respectively). In sum, profitability is an important determinant of economic growth in several countries, but our results do not support this assumption universally. Therefore, we can cautiously say that the relationship between profitability and economic growth varies from one country to another.

6. Conclusions

Bank profitability impacts financial stability and economic growth. Profits are the first line of defense against losses from credit impairment. Retained earnings are an important source of capital, enabling banks to build strong buffers to absorb additional losses. These buffers ensure that banks can provide financial services to households and businesses, even in the face of adverse developments, thereby smoothing rather than amplifying the impact of negative shocks on the real economy. Banks with poor structural profitability can face higher funding costs and may be tempted to take on more risk. Financially weaker banks are more likely to be connected to unprofitable firms. This reduces the flow of lending to profitable firms that need funding to invest and grow. The resultant misallocation of capital towards unproductive businesses weighs on long-run economic growth.

Our investigation of the relationship between bank profitability and economic growth for a sample of 16 countries from Central and Eastern Europe for the 2000-2021 period using several estimation techniques points out to a positive and statistically significant relationship between banks' profitability and economic growth. Two major findings emerge. First, contemporaneous levels of bank profitability are positively related to contemporaneous economic growth. The estimation results suggest that a one percent increase in banks' return on assets is likely to be associated with higher economic growth in the range between 0.625 to 0.635 percentage points, other things being equal. Second, the impact of the past level of profitability on economic growth turns out to be statistically significant and negative when a richer dynamic of bank profitability is explored. These findings were proved robust by a battery of robustness checks, including the use of alternative measures of profitability and growth.

As for the other tested variables, the results are in line with the previous empirical literature. Contemporaneous values of economic growth are affected by

past values, indicating growth persistence. The findings also show that international trade openness can significantly improve each country's economic growth. Further, inflation was seen to be positively connected with economic growth in the selected countries.

The major findings of the panel causality test suggested by Dumitrescu and Hurlin (2012) reveal that banks' profitability generates economic growth in the selected countries. Yet, the results also indicate that banks' profitability has a positive impact on economic growth in the Czech Republic, Estonia and Poland, whereas economic growth positively impacts profitability only in Albania, while no impact has been established in other countries.

This study, therefore, contributes substantially to the literature on bank profitability. Here, we have investigated the consequences of banking profitability and provided evidence about its impact on economic growth, adding a new perspective to the literature on the finance-growth nexus. The normative implications of our work are especially relevant for monetary authorities and policymakers seeking to promote economic growth. Finding that bank profitability positively affects economic growth would confirm the major importance of fostering bank profitability, and conversely, finding a negative impact would imply that increased bank profitability harms economic growth. If the latter is true, pro-growth authorities should not dwell on promoting bank profitability.

This study does face some limitations, whose removal would certainly contribute to more robust results. First, there was no data for some selected determinants over a long period, and we have some missing data observations during the selected period. Second, the study ignored some other variables that might affect bank performance, such as interest rates, regulatory policies, market conditions as also bank-specific factors, such as client care, bank image, market strategies and others. Third, including a larger number of countries in the sample and a longer time horizon could provide additional evidence in favor of or against the empirically tested hypotheses.

Future avenues of research on bank profitability and economic growth could consider the impact of other potentially relevant determinants, such as client care, bank image and market strategies. Also, researchers could use varied methods, such as two- or three-least squares or panel co-integration models. The agenda for future research could also focus on the effects of bank type and of domestic-foreign ownership of the banking sector on bank-level data, using quantile regression estimators. Further, the connection between bank profitability and economic growth may be influenced by bank competition determinants; this could be another important research avenue for the future.

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