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EFFICIENCY, PROFITABILITY AND CREDIT ACTION OF STATE AND PRIVATE BANKS DURING COVID-19 AND THE WAR IN UKRAINE

Maciej GONISZEWSKI

University of Gdansk; maciej.goniszewski@ug.edu.pl, ORCID: 0009-0002-4462-271X

Purpose: The objective of this study is to ascertain whether, during the global pandemic caused by the SARS-CoV-2 virus and the outbreak of war in Ukraine – commercial banks operating in the Polish market demonstrated differentiation in terms of efficiency, profitability, and the volume and quality of lending resulting from the state or non-state nature of institutions with a decisive role in ownership supervision.
Design/methodology/approach: The study undertook a review of the existing literature on the impact of banks under state control on the performance of the country's financial sector and economy. It then proceeded to undertake a comparison of the size and dynamics of change in efficiency, profitability and asset quality indicators achieved by 19 commercial banks.
Results: A comparison of the value and dynamics of change in the economic indicators of banks, taking into account the nature of the institutions exercising ownership control, revealed that the hypothesis that there were no differences between the distinguished groups could be rejected. State-dependent banks exhibited higher volatility of efficiency indicators and lower resilience to the impact of the pandemic. Additionally, they exhibited higher profitability outside the year of the pandemic's outbreak, a higher commitment of capital to lending, and a poorer quality of the loan portfolio.
Research limitations/implications: The findings of the study substantiate the differentiation between state-owned and private banks. State-owned banks are more inclined to take risks and maintain lending during periods of economic turbulence and heightened market volatility. The limited number of commercial banks operating as joint-stock companies in Poland during the 2019-2023 period constrained the scope for employing more advanced statistical analysis tools. To corroborate the findings, it would be prudent to undertake a further study encompassing a more diverse range of banks, for instance, those from Central and Eastern European countries.
Originality/value: The paper presents, to the best of the author's knowledge, the results of the first study to compare the financial performance of private and state-owned banks in Poland during two significant global crises. It could be an important contribution to the ongoing debate surrounding the potential sale of some banking assets by the Treasury.
Keywords: bank, state ownership, crisis, risk, financial result.
Category of work: research article.

1. Introduction

One of the consequences of the global financial crisis of 2007-2009 was a shift in the perception of foreign capital within the Polish banking sector. Prior to the onset of the crisis, it was regarded as a favourable phenomenon by both consumers and economists. The reason for this shift in perception was the dynamic development of the banking sector in Poland following the influx of capital, the notable enhancement in the quality of financial services, and the infusion of both capital and technology into the sector (Godula, 2001). However, with the advent of the crisis, concerns emerged regarding the potential outflow of foreign capital from Poland to its home countries. This could result in a transfer of the sector's liquidity issues, akin to those observed during the global financial crisis in other countries, a reduction in the level of enterprise financing, and a subsequent deceleration in the country's economic growth (Kawalec, Gozdek, 2012).

The global financial crisis did not result in a recession in Poland, which was an exceptional phenomenon on a European scale. This afforded politicians the opportunity to portray Poland as a green island of economic growth. The favourable portrayal of the Polish economy in comparison to the less optimistic outlook for other EU countries led politicians, publicists and some economists to advocate a reduction in the proportion of foreign capital in the banking sector and an increase in the share of Polish capital (Mleczko, 2016; Pyka, Pyka, 2017; Pyka, Nocoń, 2018). Specific solutions in this regard were presented, among others, by Stefan Kawalec, who stated, among other things, that: "an acceptable alternative to foreign control of banks may be dispersed private ownership, while it is not a desirable alternative to increase direct or indirect state ownership control" (Kawalec, Gozdek, 2012, p. 6). However, this recommendation has not been fully taken into account by politicians, who have admittedly increased the share of Polish capital in the banking sector, but precisely by having the Treasury take control of banks sold by their existing foreign owners.

The process of increasing the share of state capital in the banking sector commenced during the tenure of the PO-PSL coalition government in 2014, with the acquisition of Nordea Bank Polska's assets by PKO Bank Polski, which is under the control of the Ministry of Finance through a 30% stake. Another transaction occurred during the tenure of the Prawo i Sprawiedliwość (PiS) government in 2015, when PZU (34% of shares owned by the Treasury Ministry) repurchased shares in Alior Bank from the Carlo Tassara Group. Two years later, in 2017. PZU repurchased a 20% stake, while the Polish Development Fund (99.87% of shares owned by the Prime Minister's Office) repurchased a 12.8% stake in Bank Pekao from Uni Credit (Gostomski, Lepczynski, 2019; Orbis, 2024). A further expansion of the state's holding in the banking sector occurred in late 2020 and early 2021, when the Bank Guarantee Fund announced the commencement of a compulsory restructuring of Idea Bank and its subsequent acquisition by Bank Pekao (Jastrzębski, Machalski, 2022). The final bank to be nationalised was Getin Noble Bank, which underwent a resolution process overseen by the Bank Guarantee Fund and was subsequently transformed into VeloBank and sold to a foreign investor in 2024 (Zaleska, 2023).

The repolonization of the banking sector, which constituted a form of nationalization, resulted in a transformation of the sector's ownership structure. In 2008, the largest share in the sector was held by foreign investors, who controlled 72.3% of assets (Mierzwa, Jankiewicz, 2017). Subsequently, state-controlled capital assumed an increasingly pivotal role. In December 2019, the Treasury held 40% assets (Informacja na temat sytuacji..., 2021), in December 2020 44.2% (Informacja na temat sytuacji..., 2021), in December 2021 46.2% and in December 2022, it held 47.5% (Informacja na temat sytuacji..., 2023).

The state's significant involvement in the banking sector has prompted concerns among numerous economists, who have highlighted potential inefficiencies in the management of the sector. The group of experts includes Jan Krzysztof Bielecki, former chairman of Pekao Bank; Stefan Kawalec, who was one of the proponents of repolonization of the banking sector; Wojciech Kwaśniak, former inspector general of banking supervision; Sławomir Lachowski, former chairman of BRE Bank; and Andrzej Reich, former member of the Committee of European Banking Supervisors (Goniszewski, 2023). The aforementioned economists highlight several potential issues with the current state of banking supervision in Poland. Firstly, they argue that the supervision of banks may be ineffective when both the bank and the supervisor are subordinate to the same state-owned institution. Secondly, they suggest that managers may be susceptible to political influence if they are recruited along party lines rather than on competence. Thirdly, they raise concerns about the potential risk of financing investments that are not economically justified but politically justified. Finally, they point out that the competition between banks controlled by the same owner may be weakened.

The 2020s commenced with the advent of two crises that presented significant challenges to the financial sector. The initial challenge was the emergence of the SARS-CoV-2 virus, which became known as the novel coronavirus disease (Covid-19) in early 2020. The second event was the outbreak of war in Ukraine in early 2022. This study will undertake a comparative analysis of the efficiency, profitability and commitment to lending of Polish banks with state and private capital ownership during the period encompassing both events. The principal aim of this study is to ascertain whether the hypothesis that state-controlled banks played a stabilising role in the banking sector and the Polish economy during the two crisis periods is indeed valid. Second-order objectives to achieve the primary objective are as follows:

1. To ascertain whether banks under state control achieved efficiency and profitability that differed from private banks, thus affecting the stability of the entire banking sector in a positive or negative manner.
2. To determine whether banks under state control conducted lending that differed in size and volatility from private banks, thus affecting the stability of the overall economy in a positive or negative manner.

In order to achieve the stated goals, three hypotheses will be verified. These are as follows:

H1: Banks under state control did not differ in efficiency from private banks in 2019-23.

H2: Banks under state control did not differ in profitability from private banks in 2019-23.

H3: Banks under state control did not differ in their lending activity from private banks in 2019-23.

The following section will commence with a review of the extant literature on the impact of state-controlled banks on the performance of the banking sector and the national economy. Subsequently, the findings of previous research on the impact of the Coronavirus Disease 2019 (Covid-19) pandemic and the war in Ukraine on the performance of the banking sector will be presented, with a particular focus on the Polish banking sector. The following section will present a comparison of the value and dynamics of change in efficiency, profitability and lending ratios of Polish state-dependent banks to Polish banks dependent on private shareholders. The study will conclude with a presentation of the conclusions and a verification of the hypotheses posed in the introduction.

2. Literature review

2.1. An examination of the literature concerning the evaluation of state-controlled banks

The studies carried out in the 21st century on the efficiency of banks under state control and their impact on the country's economy can be divided into two main groups. The first group of studies presents a clear argument that state banks are less efficient and have a detrimental impact on economic development. In contrast, the second group of studies offers a more complex picture, suggesting that the financial performance and the impact of state banks on the economy are influenced by a range of factors, including the stage of the business cycle, the type of crisis affecting the country, the efficiency and level of economic development of the state, and the strength of political interference.

James R. Barth, Gerard Caprio Jr. and Ross Levine showed in a 2001 study (Barth, Caprio Jr., Levine, 2001) that state ownership of banks is associated with low efficiency for these institutions and lower levels of financial development for the country. Low efficiency for Argentine banks under state control was also shown in a study by Allen N. Berger and others in 2005 (Berger et al., 2005).

In their 2002 study, Rafael La Porta, Florencio Lopez-de-Silanes and Andrei Shleifer identified a correlation between government ownership of banks and a number of economic and political factors. They found that countries with low per capita income, underdeveloped financial systems, interventionist and inefficient governments, and weak protection of property rights tend to have higher levels of government ownership of banks. The study found that higher government ownership of banks in 1970 is associated with slower subsequent financial development and lower per capita income and productivity growth (La Porta, Lopez-de-Silanes, Shleifer, 2002).

In 2005, Serdar Dinc posited that government-owned banks increase lending during election years at a higher rate than private banks. This observation points to the possibility that the decisions of these institutions' managers are influenced by factors beyond purely economic considerations. Dinc's calculations indicate that the increase in lending amounted to approximately 11% of the government-owned bank's total loan portfolio, which represented approximately 0.5% of the country's GDP (Dinc, 2005). The consequences of such action were elucidated in a study conducted in 2007. Alejandro Micco, Ugo Panizz, and Monica Yañez. The study revealed that state-controlled banks in developing countries tend to exhibit lower profitability and higher costs than their private counterparts, with the discrepancy becoming more pronounced during election years (Micco, Panizz, Yañez, 2007). A 2013 study also demonstrated the realisation of political goals by state-controlled banks. The following authors contributed to this field of study: Giuliano Iannotta, Giacomo Nocera and Andrea Sironi. It was observed that government-dependent banks exhibited a lower insolvency risk but a higher operational risk than private banks, with both indicators demonstrating an increase during election years (Iannotta, Nocera, Sironi, 2013). The subsequent year saw Daniel Carvalho present evidence that politicians in Brazil utilise the lending of government-dependent banks to influence job growth, directing it towards politically favourable regions at the expense of less politically attractive ones (Carvalho, 2014).

In a 2007 study, Thorsten Beck, Asli Demirguc-Kunt and Maria Soledad Martinez Peria found that state ownership of banks can have a negative impact on access to bank branches and ATMs. However, this does not result in a reduction in access to loans and deposits (Beck, Demirguc-Kunt, Martinez Peria, 2007).

In their study of Asian banks in the aftermath of the 2010 financial crisis, Marcia Millon Cornett, Lin Guo, Shahriar Khaksari and Hassan Tehranian observed that "...state-owned banks operated less profitably, held less core capital, and had greater credit risk than privately-owned banks prior to 2001, and the performance differences are more significant in those countries with greater government involvement and political corruption in the banking system" (Cornett et al., 2010). This finding is consistent with the results observed for Indian banks by Shawn Cole in 2009, who identified a higher proportion of non-performing loans in banks under state control (Cole, 2009). Furthermore, Alessandro Carretta and colleagues (2012) also observed this phenomenon in Italian banks. The study revealed that the proportion of politicians on a bank's board of directors had a substantial negative effect on net interest income, loan portfolio quality and capitalisation levels. However, it also demonstrated a positive impact on bank performance (Carretta et al., 2012). In 2013, Chunxia Jiang, Shujie Yao and Genfu Feng provided an illustrative example of how the politicisation of banks can have a detrimental impact on their performance. During the 2008-2009 period, the Chinese government, through the banks under its control, encouraged local governments to make investments without conducting adequate credit risk assessments. This resulted in the generation of $4.8 trillion in lending, which now represents a significant risk to the stability of China's banking sector. Additionally, the authors' findings highlight the inefficiency of state-dependent banks, suggesting the need for further privatisation of Chinese banks (Jiang, Yao, Feng, 2013).

In the year 2021 in an analysis prepared for the Forum Obywatelskiego Rozwoju on banking and investment threats to the development of the Polish economy, Kawalec and Katarzyna Blazuk identified the state as the most vulnerable type of bank owner. They put forth the proposition that capital may be allocated in an economically inefficient but politically advantageous manner through lending, and that limitations may be placed on the supervision of state-dependent institutions. As evidence, they cited a 2008 directive from the Financial Supervisory Commission (pol. Komisja Nadzoru Finansowego – KNF) recommending that no dividends be paid. Foreign-controlled banks whose parent companies suffered from a lack of capital during the global financial crisis complied with the directive, whereas state-controlled PKO BP paid a dividend to its shareholder, the state budget (Kawalec, Blazuk, 2021).

In 2022, Sahil Chopra published an article in which he discussed the shortcomings of banks under state control in India. Following an analysis of data from 2004 to 2020, he concluded that they were demonstrating a less favourable financial performance than that observed in private banks. He identified the following factors as contributing to this outcome: "The considerable number of loans approved in priority sectors, unfair practices due to interest groups, corruption, and staff inefficiency in public sectors" (Chopra, 2022). Similarly, Peter Njagi Kirimi reached comparable conclusions in 2024 after a comparative analysis of the efficiency of private and state-owned banks in Kenya. His study revealed that the country's state-owned banks exhibited suboptimal efficiency, and he identified deficiencies in corporate governance and government interference in bank management as the underlying causes (Kirimi, 2024).

Notwithstanding the unfavourable appraisals of the operations of state-owned banking institutions previously referenced, just prior to the global financial crisis, the stabilising function of banks during periods of economic turbulence and their capacity to mitigate business cycle volatility commenced to be acknowledged. As early as 2006, Alejandro Micco and Ugo Panizza presented evidence indicating that state-owned banks can contribute to the equalisation of the credit cycle and are less susceptible to macroeconomic shocks than private banks. Concurrently, two significant inquiries remained unanswered: whether augmented lending by state-controlled banks is allocated optimally to the economy and whether this lending displaces credit by private banks (Micco, Panizza, 2006). In the following year, Levy Yeyati, Alejandro Micco and Ugo Panizza reached a similar conclusion regarding the countercyclical action of state-owned banks. The authors highlighted that while their study corroborated the assertion that public banks do not allocate credit optimally, the evidence indicating that state ownership impedes financial development and growth was already less certain than previously thought. Additionally, evidence emerged suggesting that public banks may play a role in reducing credit procyclicality

(Yeyati, Micco, Panizza, 2007). These findings were corroborated in 2013 by Michael Brei and Alfredo Schclarek in a sample of 764 major banks based in 50 countries from 1994 to 2009 (Brei, Schclarek, 2013).

In 2012, Chung-Hua Shen and Chih-Yung Lin employed a two-group classification system for state-owned banks. Utilising banking data from 65 countries between the years 2003 and 2007, the researchers divided banks under state control into two categories: those that experience political interference and those that do not. The criterion for the division was the replacement of the bank's board of directors one year after the elections that took place in the country. If such an exchange took place, the bank was classified as experiencing political interference. If not, it was classified as a bank not experiencing political interference. The result of the study was a clear finding that state banks experiencing political interference perform worse financially than state banks not experiencing political interference (Shen, Lin, 2012).

The impact of state-dependent banks on the smoothing of the business cycle may vary across different geographical regions. Robert Cull and María Soledad Martínez Pería demonstrated that, during the global financial crisis, state-dependent banks in Latin America exhibited countercyclical lending behaviours, whereas the same institutions in Eastern Europe did not. Furthermore, prior to the crisis, the latter acted pro-cyclically, increasing lending at the same time as private banks, whereas those in Latin America did not (Cull, Martínez Pería, 2013).

A further study, published in 2015, provides confirmation of the countercyclical capabilities of state-dependent banks. In a study conducted by Atıcı Can Bertay, Asli Demirgüç-Kunt and Harry Huizinga, the financial performance of 1633 banks from 111 countries was analysed over the period 1999-2010. The findings indicated that state-owned banks are better placed to allocate credit in a less pro-cyclical manner, thereby playing a stabilising role during crises. However, the authors cautioned that, given the poor history of credit allocation by state banks, the use of such institutions as a short-term countercyclical tool is not advisable. Furthermore, the characteristics of the state apparatus itself represent an additional limitation, as evidenced by their research. The pro-cyclical behaviour of state-controlled banks is less pronounced in well-governed countries, characterised by the provision of effective public services, a high degree of independence from political pressures and a government that is perceived as being committed to the effectiveness of its policies. In high-income countries, state-controlled banks may even engage in countercyclical lending (Bertay, Demirgüç-Kunt, Huizinga, 2015). The same conclusions were reached in 2016 Yan-Shing Chen, Yehning Chen, Chih-Yung Lin and Zenu Sharma. A sample of banks from 58 countries was used to examine the provision of credit by state-dependent banks during the global financial crisis. The researchers discovered that these banks engaged in more extensive lending during this period. In countries with minimal corruption, this resulted in enhanced performance for these banks and accelerated GDP growth and reduced unemployment. Conversely, in countries with elevated corruption, augmented lending led to a decline in the performance of state banks and had no impact on GDP and employment (Chen et al., 2016).

In the year 2018. Robert Cull, Maria Soledad Martinez Peria and Jeanne Verrier conducted a further examination of the impact of different forms of ownership on the performance of banks and their contribution to the national economy. The research concentrated on three key areas: the efficiency of banks and the level of competition between them, the stability of the financial sector and the availability of credit to the wider economy. The findings revealed that state ownership in the banking sector can help to stabilise the supply of credit during a crisis. However, it has a negative impact on competition and banking efficiency, and can affect the availability of banking services in different ways (Cull, Martinez Peria, Verrier, 2018).

The shift in economists' perceptions of state-owned banks is evidenced by a 2020 report by the European Bank for Reconstruction and Development (EBRD) that delineates the role and efficacy of the state in various countries and sectors. In the section on state-dependent banks, EBRD analysts conclude that state-owned banks, by accepting higher levels of risk, can mitigate the negative consequences of crises for households and small and medium-sized businesses. However, the cost of such policies is lower levels of business innovation and productivity due to political interference in state banks' lending decisions, especially during election periods (State banks on the rise..., 2020).

A study was conducted in 2020 to confirm the countercyclical nature of lending by banks under the control of the State Treasury, which forms part of the Polish banking sector. In their study, Marcin Borsuk and Oskar Kowalewski demonstrate that during the 2008-2009 global financial crisis, state-owned banks in Poland extended loans at a rate 7.6 percentage points higher than that observed in other commercial banks (Borsuk, Kowalewski, 2020).

In recent years, two studies of banks under state control have been conducted by Ugo Panizza. In the first study, conducted in 2023, no negative correlation was found between state ownership of banks and economic growth. Additionally, it was observed that instances of banking crises result in an increase in state control of banks. However, no evidence was found to suggest that this increase in state control causes further crises. Additionally, no distinction was observed between the profitability of private and public banks situated in emerging and developing economies. Instead, the findings confirmed that banks under state control exhibit less procyclical behaviour in these countries (Panizza, 2023). However, in a subsequent study conducted in 2024, Panizza corroborates earlier findings by other researchers that these banks are less profitable and have a higher share of non-performing loans. Furthermore, he reiterates that they serve to stabilise lending in the event of domestic shocks. He posits that the lower profitability is a consequence of a riskier loan portfolio and higher non-interest expenses, particularly personal expenses (Panizza, 2024).

In conclusion, the results of studies conducted in the 21st century on the impact of state ownership on the efficiency of banks and its impact on economic development indicate that this form of ownership is associated with considerable risks. These are primarily manifested in the form of inadequate corporate governance and an inefficient distribution of capital within the economy. This results in the assumption of a higher level of risk in lending, less well-prepared personnel to manage the bank, which in turn undermines economic development and innovation, and a worse profitability of state-owned banks than private banks. This ultimately undermines the stability of the banking sector as a whole. Nevertheless, there are circumstances in which the majority of these risks can be mitigated. The first and foremost condition for the success of state-owned banks is the absence of political interference in their management. This condition is most often met in countries with developed economies. State-owned banks can also play a positive role in dampening business cycle fluctuations by lending less than private banks in good times and more in crisis periods. This impact has been noted mainly in the case of negative external impulses, and during these periods state banks can play a stabilising role in the banking sector.

2.2. The Effect of the Coronavirus Pandemic and the War in Ukraine on the Polish Financial Sector

On 11 March 2020, the World Health Organization (WHO) declared a pandemic due to the novel coronavirus, SARS-CoV-2, which causes the disease known as coronavirus disease 2019 (Covid-19). On 20 March, Poland was placed in an epidemic state, although as of 12 March, educational institutions had already transitioned to remote learning and cultural activities had been suspended. Further restrictions were subsequently introduced, including a directive limiting all non-essential travel. This resulted in the cessation of numerous services and significant economic disruption, ultimately leading to an economic recession.

The initial shock to the banking system was a substantial decline in economic activity. Furthermore, the actions of the National Bank of Poland, which were designed to mitigate the economic impact of the pandemic, imposed additional burdens on the banking sector. Despite the persistence of inflationary pressures and market expectations of an imminent interest rate hike, the Monetary Policy Council opted to reduce interest rates. Three reductions, on 18 March, 9 April and 29 May, resulted in interest rates in Poland reaching their lowest level to date. The reference rate was set at 0.10%, the Lombard rate at 0.50%, and the deposit rate at 0. Such low interest rates prompted banks to modify their asset and liability management models, leading to a decline in interest margins and interest earnings. Additionally, the aforementioned circumstances prompted an exodus of capital from deposit accounts, as customers sought alternative avenues for the preservation of their savings, preferring the accessibility of funds in current accounts. Concurrently, there was a notable reduction in the volume of loans granted, which was also attributable to a decline in demand. From a business perspective, this was due to a cessation of planned investments. From a consumer standpoint, it was due to a cessation of planned spending and an increase in savings in anticipation of potential future risks. In order to cope with the resulting excess liquidity, banks increased their investments in fixed-rate securities issued by the Polish Development Fund. Consequently, during the period of low interest rates, they became susceptible to subsequent interest rate increases, while simultaneously undergoing a significant reduction in the return on assets and equity (Cichowicz, Nowak, 2021). Additionally, there was a risk of internal conflicts of interest arising from excessive government involvement. This was not merely a matter of controlling half of the banking sector's capital and simultaneously influencing the authorities of supervisory institutions, namely the KNF and the NBP. It also involved acting as both the main borrower of the banking system and the main guarantor of financial support for entities most severely affected by the pandemic (Ostrowska, 2021).

The year of the pandemic outbreak was distinguished by a notable decline in the overall efficiency of the banking sector. The ratios of ROE, ROA, interest and commission margins exhibited a decline in value, which was attributable to a number of factors, including the reduction in interest rates. This resulted in a corresponding reduction in the profits earned by banks. Additionally, unfavourable increases in the C/I (cost-to-income) ratios and the charge to total operating income were observed, resulting from impairment. This was caused by elevated costs associated with the deterioration of the quality of the loan portfolio and the necessity to augment provisions and write-offs for non-performing loans (Ostrowska, 2021).

The outbreak of the pandemic and the significant reduction in business activity of companies gave rise to concerns that banks might reduce lending to a greater extent than was necessary, thereby precipitating a credit crunch, this is "an extraordinary, excessive reduction in the supply of credit, a mismatch between the supply of credit and rational demand" (Czechowska et al., 2022). Nevertheless, this risk has not materialised. Despite a temporary cessation in the growth of credit extended to households, by the end of 2020 there was already a discernible increase in housing loans (the consequence of low interest rates), which subsequently had an adverse impact on banks due to the government's credit vacation programme when interest rates subsequently rose. Prior to the pandemic, loans to businesses were already at a low level due to the low level of investments made by businesses. During the pandemic period, the percentage of applications rejected decreased, which was an effect of the Bank of National Economy's (pol. Bank Gospodarstwa Krajowego – BGK) guarantee for businesses. In 2020, loan loss write-offs increased, but this was not a phenomenon of a scale that could threaten lending. Following the conclusion of the initial three-month period of 2021, the outlook for the banking sector was already characterised by a notable degree of optimism. The risks identified as potential threats were not the consequences of the pandemic itself, but rather the legal risks associated with foreign currency mortgages (Czechowska et al., 2022) and the accumulated tax and contribution burden imposed on the banking sector. Furthermore, the banking sector exhibited a higher level of exposure than other European Union countries to increases in Treasury bond yields, which could potentially trigger a government-banking loop limiting the ability of some banks to meet capital requirements (Lusztyn, 2022).

The impact of the outbreak of war in Ukraine on financial markets has been likened by Krzysztof Borowski to the impact of other significant historical events, including the eruptions of World War I and World War II, the 1986 Chernobyl nuclear reactor explosion, the September 11, 2001 terrorist attack on the World Trade Center, and Britain's exit from the European Union (Borowski, 2022). The aforementioned geopolitical factors resulted in a decline in stock market indices and an increase in commodity prices. However, it is notable that these changes were not uniform. In the context of the stock market, for instance, the valuation of companies operating within the arms industry may experience an increase, whereas the rise in commodity prices has had a more pronounced impact on those originating from countries affected by conflict. In Poland, following the Russian troop incursion into Ukraine on 24 February 2024, a similar pattern emerged. Six months after the outbreak, the indexes of the Warsaw Stock Exchange exhibited a notable decline relative to the day before the outbreak of the war. The WIG 20, WIG, WIG 40, and WIG 80 all demonstrated a reduction in value, with the WIG 20 declining by 25%, the WIG by 19%, the WIG 40 by 17%, and the WIG 80 by 10%. However, the declines were not uniform across all companies. On 7 March, the nadir of the initial decline was reached. At this juncture, the banking sector was the most adversely affected - Millennium (-20.79%) since 23 February, Alior (-9.59%), Pekao (-7.36%), and PKO BP (-7.09%). In contrast, coal companies experienced notable price increases over the same period, with Bogdanka rising by 98.54% and JSW by 87.55%. The prices of other commodity companies also exhibited growth, albeit to a lesser extent than the aforementioned two (Borowski, 2022).

In the precious metals market, the price of gold, after an initial rise since 8 March, entered a medium-term downward trend, diverging from the experience of previous geopolitical crises. This trend was observed in other metals, with the exception of nickel, of which Russia is the main producer and whose quotations have been suspended. In the energy commodities market, the most significant price increases over the six-month period following the outbreak of the war were observed in the case of natural gas, with prices reaching 100% higher than those recorded prior to the war. The price of diesel fuel increased by approximately 35%, while the prices of crude oil and heating oil, after a period of increases, returned to their pre-war levels in August 2022. In the agricultural products market, the outbreak of war resulted in a notable surge in the prices of wheat, corn, and rice. The prices of these commodities fell below the level recorded in early February only in early summer, coinciding with the commencement of the harvesting season. However, by the end of August, they had risen once more to reach the level recorded on the day the war commenced. The war also had an impact on the value of the Polish currency. In accordance with the principle that the closer a country is to a conflict, the greater the risk investors assign to it, the Polish Zloty weakened by approximately 20% against the US Dollar, by approximately 13% against the Swiss Franc and by approximately 4% against the Euro over a six-month period (Borowski, 2022).

The level of deposits recorded by banks in the six months following the outbreak of war was lower than would have been the case had a forecast been made that did not take the outbreak of war into account. Conversely, the value of loans granted was slightly higher than what the forecast would have indicated. Pawel Wegrzyn and Anna Topczewska employed a vector autoregression model to ascertain the projected value of the deposit-to-loan ratio in the absence of war, which they determined to be 1.34. In reality, the ratio was 1.27. Therefore, the shift did not endanger the stability of the banking sector. However, there was a discernible decline in bank customers' savings and an uptick in their indebtedness, which may have been driven by the surge in energy resource and fuel prices (Wegrzyn, Topczewska, 2023). In response to this situation, banks in Central and Eastern Europe demonstrated heightened risk sensitivity, evidenced by a shift towards safer investments and a deterioration in financial condition (Karas, 2024).

3. Research methodology

The following comparative analysis encompasses 19 banks that operated as joint-stock companies in Poland throughout the period from 2019 to 2023. These banks were not specialised in the sense that they did not focus on specific areas such as car or mortgage banking. Furthermore, banks that were undergoing the bankruptcy process were excluded from the analysis. The objective was to create a group of banks that were experiencing a similar set of circumstances. This approach helps to isolate the impact of external factors, such as market shocks caused by pandemics and war, on the financial performance of the banks under consideration.

The two association banks, BPS and SGB, and Deutsche Bank Polska, which is a bank that caters exclusively to business clients, stand out as the most distinctive in the group under examination.

Of the aforementioned group, five banks were under state control, 11 were under the control of a foreign investor, and three were under the control of a Polish non-state investor. A comprehensive list of the banks included in the survey, accompanied by detailed information regarding their principal owners, is provided in Table 1. It should be noted that the following non-specialist banks operating as joint-stock companies during the period under review are not included in this group: Bank BPH, for which financial results are absent for the majority of the years in question in the Orbis database; Bank Nowy, which was undergoing a period of restructuring during the period under analysis and whose data is also not in the Orbis database; Getin Noble Bank, which was in a state of bankruptcy at the time; and Velo Bank, which was formed during the forced restructuring process of Getin Noble Bank.

A comparative analysis was employed to substantiate the hypotheses, with two indicators considered for each hypothesis. The efficiency of the financial institution was gauged by employing cost efficiency ratios (C/I) and the amount of interest margin (NIM). The profitability of the institution was evaluated at the level of equity (ROE) and assets (ROA). The commitment to lending was assessed through the loan-to-deposit (L/D) ratio and the non-performing loan (NPL) ratio, which provided insight into the quality of the lending activity conducted.

Table 1.
Banks and their owners included in the comparative analysis

no.	Bank	Major shareholder 2019-2024	Characteristics of the main shareholder
1	**Alior Bank**	**PZU (share: 31.91-31.93%)**	**State Treasury Company**
2	Bank BPS	Zrzeszenie Banków Spółdzielczych	Polish cooperative institution
3	Bank Handlowy w Warszawie	Citibank Overseas Investment Corporation	Private company from the US
4	Bank Millennium	Banco Comercial Português	Private company from Portugal
5	**Bank Ochrony Środowiska**	**Narodowy Fundusz Ochrony Srodowiska i Gospodarki Wodnej (share: 58.05%)**	**State institution**
6	**Bank Pocztowy**	**Poczta Polska (share: 75%)**	**State Treasury Company**
7	**Bank Polska Kasa Opieki**	**PZU (share: 20%), Polski Fundusz Rozwoju (udział: 12.80%)**	**State Treasury companies**
8	BNP Parisbas Bank Polska	BNP Paribas	Private company from France
9	Credit Agricole Bank Polska	Crédit Agricole	Private company from France
10	Deutsche Bank Polska	Deutsche Bank	Private company from Germany
11	DNB Bank Polska	DNB Bank	Private company from Norway
12	ING Bank Śląski	ING Bank	Private company from the Netherlands
13	mBank	Commerzbank	Private company from Germany
14	Nest Bank	Porto Group Holdings Limited	Private company from Malta
15	Plus Bank	Zygmunt Solorz through the Cypriot company Karswell	Private Cypriot company with Polish owner
16	**PKO Bank Polski**	**Ministerstwo Finansów (share: 29.43%)**	**Polish Government**
17	Santander Bank Polska	Banco Santander	Private company from Spain
18	Santander Consumer Bank	Banco Santander	Private company from Spain
19	SGB Bank	Banki spółdzielcze	Polish cooperative institution

Note: bold - banks under state control.

Source: own compilation based on: KNF. Banking Sector Entities, https://www.knf.gov.pl/podmioty/Podmioty_sektora_bankowego/Banki_w_formie_spolek_akcyjnych, 10.08.2024, and the Orbis database, https://login.bvdinfo.com/R0/Orbis, 10.08.2024.

4. Results

4.1. Comparison of effectiveness

In 2019, the mean value of the cost efficiency ratio for the group of banks under analysis was 64.06%. The mean value for banks under state ownership and control was found to be 59.40%, while the mean value for private banks was 65.73%. Notwithstanding the discrepancy in the mean value, the individual state-owned banks did not exhibit any distinctive characteristics within the entire analysed group, as evidenced by the markedly disparate results. The most cost-efficient banks at the time were those included in the Santander group and ING Bank Slaski, while the least efficient were Plus Bank, Deutsche Bank Polska and Bank BPS. In terms of efficiency, state-owned banks were ranked fifth, sixth, seventh, twelfth and fourteenth. Table 2 presents the L/D ratio for all banks under analysis from 2019 to 2023.

Table 2.
Values of the cost-effectiveness index for the period 2019-2023

no.	Bank	Cost effectiveness C/I (%)				
		2019	2020	2021	2022	2023
1	**Alior Bank**	**53.25**	**59.67**	**52.51**	**54.13**	**41.96**
2	Bank BPS	87.87	82.11	76.35	98.88	71.63
3	Bank Handlowy w Warszawie	59.71	65.94	56.73	42.57	36.35
4	Bank Millennium	58.42	60.6	57.32	61.39	33.75
5	**Bank Ochrony Środowiska**	**64.99**	**119.18**	**70.32**	**69.86**	**80.91**
6	**Bank Pocztowy**	**70.32**	**75.49**	**76.58**	**67.51**	**48.73**
7	**Bank Polska Kasa Opieki**	**55.74**	**58.05**	**56.43**	**55.97**	**41.36**
8	BNP Parisbas Bank Polska	71.74	63.21	61.85	66.36	50.13
9	Credit Agricole Bank Polska	72.56	80.89	75.3	75.51	77.47
10	Deutsche Bank Polska	88.25	184.91	268.74	158.1	201.97
11	DNB Bank Polska	69.17	62.38	140.36	119.54	211.08
12	ING Bank Śląski	50.83	52.32	51.12	55.73	40.95
13	mBank	59.98	51.84	51.83	53.27	37.03
14	Nest Bank	51.58	55.61	57.3	53.32	62.93
15	Plus Bank	91.12	125.9	102.34	81.35	68.33
16	**PKO Bank Polski**	**52.68**	**94.11**	**49.22**	**64.37**	**59.83**
17	Santander Bank Polska	50.43	52.86	49.19	58.23	51.12
18	Santander Consumer Bank	43.76	48.03	40.66	37.89	37.42
19	SGB Bank	64.76	67.67	73.23	74.41	73.64
	Average	64.06	67.64	62.25	62.99	53.74
	State averages	59.40	81.30	61.01	62.37	54.56
	Private average	65.73	61.96	62.77	63.24	53.40

Note: bold - banks under state control, shaded - outlier observations not included.

Source: own compilation based on data from the Orbis database.

Following the onset of the pandemic in 2020, the mean value of the cost efficiency ratio increased to 76.88%. The rate of change was markedly higher in the group of state-owned banks, reaching an average value of 81.30%, compared to the group of private banks, which reached 75.31%. Bank Ochrony Środowiska was among the three banks with the highest cost-to-income ratio, at 119.18%. This was closely followed by PKO BP, which had a ratio of

94.11%. Both banks were among the three institutions exhibiting the most rapid growth in the C/I ratio. The ratio increased by 78.64% for PKO BP and by 83.38% for BOŚ, with Deutsche Bank Polska exhibiting the highest percentage increase at 109.53%. Not a single state-controlled bank was among the four that managed to reduce their cost/income ratio during this challenging period. The aforementioned process did not occur until the following year, when PKO BP and BOŚ were the banks that exhibited the most pronounced reduction in the value of the cost efficiency ratio. PKO BP demonstrated a reduction of 47.70%, while BOŚ exhibited a reduction of 41%. However, in the subsequent year, 2022, PKO BP was once again at the opposite end of the ranking, with the most significant increase in the C/I ratio, at 30.78%. Such considerable fluctuations in the ratio's value over subsequent years positioned both banks within the top five institutions exhibiting the highest degree of volatility.

Since 2021, the average value of this indicator remained lower in the group of state-owned banks, which was influenced by two private banks whose results significantly lagged behind the rest of the examined group. These are Deutsche Bank Polska and DNB Bank Polska, where the values of the indicator exceeded not only 100%, but also 200%. After the removal of these two outlier observations, the discrepancy between state-owned and private banks is reduced to one percentage point. In both 2021 and 2022, state-owned banks demonstrated superior performance, while in 2023, private banks exhibited enhanced performance.

In 2022, when the war in Ukraine commenced, the values of the indicator exhibited the least significant change over the entire analysed period. Based on the aforementioned analysis, it is not possible to conclude that this event had an impact on the cost efficiency of banks.

Prior to the advent of the pandemic at the conclusion of 2019, the mean interest margin for the surveyed cohort of banking institutions was 3.52%. The mean value was found to be 3.38% for banks under state control and 3.57% for private banks. However, the margins of Nest Bank and Santander Consumer Bank were markedly higher than those of the other institutions and were identified as outlier observations in 2019, 2020 and 2021. In 2022, only Nest Bank's margin should be considered an outlier; in 2023, there are no outlier observations. Following the removal of the outlier observations, the average margin in 2019 was found to be 2.93%, with private banks exhibiting a lower average margin of 2.75%. Table 3 presents the margins of all banks analysed from 2019 to 2023.

Prior to the advent of the pandemic, BOŚ exhibited the lowest interest margin among state-controlled banks, at 2.39%, and was the fifth lowest in the group under analysis. The remaining state-owned banks were situated between 10th and 15th on the list, with Alior Bank exhibiting an interest margin of 4.49%. The lowest value recorded at the time was observed in Deutsche Bank Polska at 1.01%, while the highest was observed in Nest Bank at 9.11%. The highest not-outlier value of the interest margin was observed in Credit Agricole Bank Poland, reaching 5.31%.

Table 3.
The amount of interest margin in 2019-2023

no.	Bank	Interest margin (NIM)				
		2019	2020	2021	2022	2023
1	**Alior Bank**	**4.49**	**3.88**	**3.68**	**4.57**	**5.81**
2	Bank BPS	1.35	1.22	1.04	1.01	1.24
3	Bank Handlowy w Warszawie	2.69	2.00	1.47	4.57	4.79
4	Bank Millennium	2.86	2.76	2.83	3.40	4.87
5	**Bank Ochrony Środowiska**	**2.39**	**2.00**	**1.94**	**3.81**	**3.93**
6	**Bank Pocztowy**	**3.63**	**2.83**	**2.44**	**5.01**	**5.91**
7	**Bank Polska Kasa Opieki**	**3.00**	**2.51**	**2.45**	**3.30**	**4.36**
8	BNP Parisbas Bank Polska	3.09	2.86	2.66	2.61	3.55
9	Credit Agricole Bank Polska	5.31	4.37	3.80	4.27	5.27
10	Deutsche Bank Polska	1.01	0.92	0.64	2.39	3.23
11	DNB Bank Polska	1.54	1.45	1.23	1.31	4.37
12	ING Bank Śląski	2.92	2.68	2.61	2.75	3.66
13	mBank	2.86	2.52	2.35	3.23	4.79
14	Nest Bank	9.11	7.34	6.49	7.59	7.25
15	Plus Bank	4.73	3.17	2.79	6.43	7.46
16	**PKO Bank Polski**	**3.37**	**3.06**	**2.64**	**2.89**	**4.22**
17	Santander Bank Polska	3.41	2.86	2.68	4.12	5.23
18	Santander Consumer Bank	7.95	6.47	6.29	7.17	6.46
19	SGB Bank	1.21	1.14	1.02	1.05	1.09
	Average	2.93	2.48	2.25	3.55	4.60
	State averages	3.38	2.86	2.63	3.92	4.85
	Private average	2.75	2.33	2.09	3.41	4.52

Note: bold - banks under state control, shaded - outlier observations not included.

Source: own compilation based on data from the Orbis database.

In 2020, the outbreak of the pandemic was not the sole factor responsible for the decline in interest margins across the entire group of banks under analysis. Additionally, the decision of the National Bank of Poland, taken in an effort to mitigate the economic impact of the pandemic, resulted in interest rates being lowered to an unprecedentedly low level. The most modest decline in the interest margin was observed in the case of Bank Millennium, amounting to 3.5%. Conversely, Plus Bank exhibited the most pronounced reduction, with a 32.98% decrease. Among state-owned banks, the interest margin exhibited the least pronounced decline at PKO BP, with a reduction of 9.20%, representing the seventh lowest rate of decline. The decline dynamics of Alior Bank were 13.59%, while BOŚ declined by 16.32%, Pekao by 16.33%, and Bank Pocztowy by 22.04%. State-owned banks, which were among the higher-margin banks prior to the pandemic, subsequently exhibited the most pronounced margin shrinkage following the onset of the pandemic.

The mean margin for the entire analysed group, excluding outliers, was 2.48% in 2020. For state-owned banks, the mean was higher at 2.86%, while for private banks it was lower at 2.33%.

In the year 2021, the interest margin of Bank Millennium exhibited a 2.54% increase, representing the sole instance of such an increase among the sampled banks. The remaining banks exhibited a decline in their interest margins, with the greatest reduction observed at Deutsche Bank Polska (30.43%) and the smallest at Pekao (2.38%). In addition to Pekao, the remaining state-owned banks can be divided into two groups in terms of the decline in interest margin. BOŚ and Alior Bank exhibited a slight decrease in the margin, with reductions of 3% and 5.15%, respectively. In contrast, PKO BP and Bank Pocztowy demonstrated a continued dynamic reduction in the interest margin, with declines of 13.73% and 13.78%, respectively. When considering the absolute values of the margin, state-owned banks did not exhibit any distinctive characteristics compared to private banks, with varying values observed.

The year of the outbreak of war was characterised by a rapid increase in interest margins at all banks with the exception of BNP Paribas and Bank BPS. This was a consequence of the National Bank of Poland's decision to increase interest rates in response to the rise in inflation, which accelerated as a result of rising commodity and fuel prices. The growth in interest margins was more pronounced among state-owned banks other than PKO BP. The Postal Bank achieved the fourth highest growth rate at 105.33%, while BOŚ attained the fifth highest growth rate at 96.39%. Pekao and Alior Bank achieved the eighth and ninth highest growth rates, at 34.69% and 24.18%, respectively. PKO BP, with a growth rate of 9.47%, was in 14th place in terms of interest margin growth. The growth rate of average values in both groups was higher in private banks.

The mean margin level for the group of banks surveyed in 2022 was 3.55%. The mean value for state-owned banks was higher at 3.92%, while that for private banks was lower at 3.41%. Over the past year, banks have observed a further increase in interest margins, with the mean rising to 4.60 for the entire group, 4.85 for government-controlled banks, and 4.52 for private banks.

A comparison of the values and dynamics of changes occurring on the two efficiency indicators in 2019-2023 allows us to conclude that, with regard to the cost efficiency indicator, state-owned banks did not demonstrate a superior performance compared to private banks. However, the average value of the interest margin was consistently higher in state-owned banks throughout the period. A comparison of the subsequent years reveals further differences in the dynamics of change. State-owned banks exhibited higher volatility than private banks in the cost efficiency ratio, as evidenced by the larger increases following the outbreak of the pandemic and the more dynamic decreases the following year. Similarly, in terms of the interest margin after the outbreak of the pandemic, banks under state ownership control were among those in which the margin fell more dynamically.

4.2. Profitability comparison

Prior to the advent of the pandemic in 2019, the mean return on assets (ROA) of the banking institutions under examination was 0.45%. The mean value for state-owned banks was higher, at 0.65%, while that for private banks was 0.38%. However, the value of the indicator for two banks exhibited characteristics that were inconsistent with the overall distribution, suggesting that they may represent outlier observations. Notably, Nest Bank exhibited a high negative profitability of -2.81%, while Santander Bank Consumer demonstrated a high positive profitability of 2.60%. Excluding the two outliers, the average profitability of the study group prior to the pandemic increased to 0.52%, with private banks reaching 0.46%. This indicates that the average profitability of the state-owned bank group remained higher. The superior profitability of state-owned banks relative to private banks was largely attributable to the performance of two specific institutions: PKO BP (1.2%) and Pekao (1.10%). These two institutions were the second and fourth most successful performers within the analysed group. The profitability of the remaining three state-owned banks positioned them among those with low but nevertheless positive ROA values. In addition to Nest Bank, two other banks, namely Plus Bank and Bank BPS, exhibited negative profitability prior to the pandemic. Table 4 presents the ROA values for all banks over the period 2019-2023.

Following the onset of the pandemic, the return on assets of 17 of the 19 banks under analysis exhibited a decline. Only Nest Bank, which reduced its negative yield from 2.81% to 2.01%, and BNP Paribas, whose yield rose from 0.56% to 0.64%, demonstrated resilience by avoiding the declines. The asset yield declines observed among state-owned banks were particularly pronounced. The largest decline within this group was recorded by BOŚ, which declined by 502.56%, representing the third largest decline. Alior Bank experienced a decline of 221.21%, PKO BP a decline of 157.17%, and Bank Pocztowy a decline of 145.83%. Among the state-owned banks, only Pekao exhibited a decline in its return on assets that did not exceed 100%, at 53.64%. Consequently, this bank was the sole member of the group of state-owned banks to record a positive return on assets in 2020, at 0.51%, which was the fifth best result.

This was reflected in the average return on assets of the group under study. In the period under analysis, the only year in which the average return on assets of state banks was lower than that of private banks was 2020. The average profitability of the entire group was -0.24%, with state-owned banks exhibiting a lower average of -0.46% and private banks a higher average of -0.16%. No outlier observations were identified.

In the subsequent year, state-controlled banks were among the institutions that exhibited the most rapid growth in asset efficiency. The Postal Bank exhibited the second highest rate of return on assets (ROA) growth, with a growth rate of 409.09%. PKO BP and Alior Bank demonstrated the fourth and fifth highest growth rates, at 273.24% and 250%, respectively. BOŚ exhibited the seventh highest growth rate, at 114.65%. Pekao demonstrated the ninth highest growth rate, at 76.47%.

The mean ROA for the entire group, after the exclusion of one outlier observation (i.e., Deutsche Bank Polska's negative margin of 2.62%), was 0.24%. The corresponding figures for banks under state control and for private banks were 0.66% and 0.07%, respectively. The dynamic increases in the profitability of state-owned banks' assets resulted in elevated values of this indicator in 2021 in comparison to the analysed group. PKO BP achieved the highest profitability at 1.23%, while Pekao attained the fourth-highest result at 0.90%. Alior Bank was in sixth place with a profitability rate of 0.60%, and Bank Pocztowy was in eighth place with a rate of 0.34%. BOŚ was in ninth place with a rate of 0.23%. Among private banks, five institutions had negative profitability.

Table 4.
Return on assets (ROA) ratios for 2019-2023

no.	Bank	ROA %				
		2019	2020	2021	2022	2023
1	**Alior Bank**	**0.33**	**-0.40**	**0.60**	**0.82**	**2.35**
2	Bank BPS	-0.21	0.02	0.16	-0.15	0.27
3	Bank Handlowy w Warszawie	0.95	0.31	1.17	2.35	3.15
4	Bank Millennium	0.63	0.02	-1.32	-0.94	0.49
5	**Bank Ochrony Środowiska**	**0.39**	**-1.57**	**0.23**	**0.61**	**0.36**
6	**Bank Pocztowy**	**0.24**	**-0.11**	**0.34**	**1.19**	**2.55**
7	**Bank Polska Kasa Opieki**	**1.10**	**0.51**	**0.9**	**0.65**	**2.24**
8	BNP Parisbas Bank Polska	0.56	0.64	0.14	0.31	0.65
9	Credit Agricole Bank Polska	0.29	-0.54	0.12	0.13	0.39
10	Deutsche Bank Polska	0.03	-1.83	-2.62	-2.19	-3.26
11	DNB Bank Polska	0.58	0.44	-0.46	-0.65	-5.85
12	ING Bank Śląski	1.10	0.77	1.19	0.82	1.92
13	mBank	0.66	0.06	-0.62	-0.34	0.01
14	Nest Bank	-2.81	-2.01	0.03	0.74	0.09
15	Plus Bank	-0.35	-2.16	-0.94	4.62	4.63
16	**PKO Bank Polski**	**1.20**	**-0.71**	**1.23**	**0.78**	**1.18**
17	Santander Bank Polska	1.17	0.56	0.53	1.20	1.85
18	Santander Consumer Bank	2.60	1.46	0.89	2.07	0.36
19	SGB Bank	0.12	0.03	0.05	0.09	0.09
	Average	0.52	-0.24	0.24	0.57	1.33
	State averages	0.65	-0.45	0.66	0.81	1.71
	Private average	0.46	-0.16	0.07	0.47	1.16

Note: bold - banks under state control, shaded - outlier observations not included.

Source: own compilation based on data from the Orbis database.

In the subsequent years, state-owned banks exhibited elevated return on assets (ROA) ratios relative to the surveyed group. However, this distinction was not as pronounced as it had been in 2021, with the rankings shifting towards the midpoint. In both 2022 and 2023, no state-owned banks recorded a negative return on assets, whereas some private banks did so. The highest return on assets among state banks was achieved by Bank Pocztowy, and the lowest by BOŚ. With regard to the rate of change of the ratio in 2022, 2023 and its volatility throughout the period, state banks did not exhibit any distinctive characteristics in comparison to private banks.

With regard to the return on equity (ROE) ratio, the circumstances were comparable to those observed in the ROA during the period under examination. The profitability of state-owned banks was higher on average in all years except 2020, when it was lower. In addition, they reacted more dynamically to the outbreak of the pandemic than private banks, both in terms of decline and increase. As with ROA, the impact of the outbreak of war in Ukraine is not visible in terms of the value of the indicator or its changes. Table 5 presents the ROE values for all banks over the period 2019-2023.

Table 5.
Return on equity (ROE) ratios in 2019-2023

no.	Bank	ROE (%)				
		2019	2020	2021	2022	2023
1	**Alior Bank**	**3.76**	**-4.68**	**7.72**	**11.30**	**26.33**
2	Bank BPS	-5.73	0.72	4.86	-4.38	9.07
3	Bank Handlowy w Warszawie	6.80	2.35	9.59	20.15	25.51
4	Bank Millennium	6.47	0.25	-16.87	-16.64	9.29
5	**Bank Ochrony Środowiska**	**3.32**	**-14.92**	**2.51**	**6.70**	**3.81**
6	**Bank Pocztowy**	**3.12**	**-1.47**	**5.98**	**25.58**	**36.32**
7	**Bank Polska Kasa Opieki**	**9.38**	**4.51**	**8.82**	**7.37**	**24.78**
8	BNP Parisbas Bank Polska	5.66	6.32	1.51	3.90	8.39
9	Credit Agricole Bank Polska	2.35	-4.80	1.25	1.56	4.18
10	Deutsche Bank Polska	0.25	-15.22	-27.06	-32.12	-52.87
11	DNB Bank Polska	3.73	3.20	-3.10	-2.62	-13.71
12	ING Bank Śląski	11.62	7.91	14.36	14.99	34.04
13	mBank	6.45	0.63	-7.76	-5.32	0.18
14	Nest Bank	-29.78	-22.67	0.37	8.15	1.03
15	Plus Bank	-54.7	-152.71	-116.08	88.99	34.60
16	**PKO Bank Polski**	**10.00**	**-6.29**	**12.56**	**9.02**	**13.60**
17	Santander Bank Polska	9.12	4.45	4.48	10.81	15.92
18	Santander Consumer Bank	15.65	8.39	4.50	9.68	1.69
19	SGB Bank	3.63	0.98	1.66	2.63	2.62
	Average	5.62	-0.45	3.08	6.05	13.20
	State averages	5.92	-4.57	7.52	11.99	20.97
	Private average	5.50	1,27	1.24	3.58	10.22

Note: bold - banks under state control, shaded - outlier observations not included.

Source: own compilation based on data from the Orbis database.

In calculating the average values of the indicator for the group of banks under analysis for the period 2019-2022, two outlier observations were excluded from each year and one observation in 2023. The banking institution whose return on equity (ROE) performance exhibited the greatest divergence from the median within the group was Plus Bank. It exhibited the highest negative ROE in 2019-2021 and the highest positive ROE in 2022, and was only included in the calculation in 2023. Deutsche Bank Polska also demonstrated a high negative ROE and was classified as an outlier in 2021-2023. Similarly, Nest Bank's result in 2019-20 was not included for the same reason.

Prior to the advent of the pandemic, the mean yield for the cohort of banks under consideration was 5.62%. Following a decline due to the pandemic and associated shifts in interest rate policy, the mean yield reached a higher level in 2022. In the case of state-owned banks, the average before the pandemic was higher, at 5.92. There was a significant decline in 2020, reaching -4.57%. However, it subsequently rose above the baseline in 2021, reaching 7.52%. Over the following two years, it continued to rise, reaching 20.97%. In the case of private banks, attaining a return on equity above the baseline of 5.50% was a considerably lengthier process, occurring only in 2023 when the level reached 10.20%, which was half that of state-owned banks.

A comparison of the profitability ratios of state-controlled and private banks reveals that, during the period of two significant economic stimuli, state-owned banks exhibited higher profitability. However, they demonstrated less resilience to the initial stimulus, namely the pandemic, than their private counterparts.

4.3. Comparison of lending

Prior to the advent of the pandemic, the mean ratio of loans granted to deposits acquired by banks (L/D) was slightly higher in state-owned banks, at 82.25% compared to 81.65%. In the following years, this ratio in both groups of banks exhibited a gradual decline, albeit at a more pronounced rate in private banks. The disparity between the averages of the two groups, which was 0.60 p.p. in 2019, widened to 7.60 p.p. in 2023.

The banking institutions that demonstrated the least propensity to extend credit throughout the observation period were those established by cooperative associations, namely SGB Bank and Bank BPS. At the opposite end of the spectrum was Santander Consumer Bank, which, with the exception of 2021, exhibited the highest L/D ratio values. Among banks under state control, the initial leader, PKO BP, was replaced by Alior Bank, which exhibited the lowest reduction in the loan-to-deposit ratio. Throughout the period, Bank Pocztowy and BOŚ maintained the lowest ratio among state-owned banks. The full set of indicator values is shown in Table 6.

The most pronounced decline in the mean values of the L/D ratio was observed in 2020 and 2022, which coincided with the onset of the pandemic and the war in Ukraine. The mean value for the entire group decreased by 12.61% in 2020 and by 10.90% in 2022. By way of comparison, the decline in 2021 was 4.11%, while in 2023 the percentage change was 6.39%. In the initial year of the pandemic, state-owned banks reduced their loan-to-deposit ratio by 10.54%, while private banks reduced theirs by 12.61%. In the second year of the pandemic, there was a greater reduction in the average loan-to-deposit ratio for state banks than for private banks, with the former reducing theirs by 4.21% and the latter by 4.02%. However, a notable discrepancy in banks' capital allocation to lending emerged in the year of the war in Ukraine. In 2022, the mean L/D ratio in state-owned banks decreased by 5.81%, while in private banks it declined by 12.96%.

Table 6.
Ratios of loans granted to deposits acquired (L/D) in 2019-2023

no.	Bank	Loans to deposits L/D (%)				
		2019	**2020**	**2021**	**2022**	**2023**
1	**Alior Bank**	**85.05**	**83.08**	**80.36**	**81.22**	**80.94**
2	Bank BPS	36.31	31.25	34.61	27.77	21.86
3	Bank Handlowy w Warszawie	52.34	41.57	41.92	36.87	32.32
4	Bank Millennium	84.33	88.92	85.74	77.60	68.31
5	**Bank Ochrony Środowiska**	**77.39**	**68.74**	**65.98**	**58.67**	**57.76**
6	**Bank Pocztowy**	**72.03**	**59.69**	**54.22**	**51.69**	**47.14**
7	**Bank Polska Kasa Opieki**	**87.55**	**78.26**	**80.02**	**72.21**	**68.38**
8	BNP Parisbas Bank Polska	84.90	81.44	83.18	73.06	66.89
9	Credit Agricole Bank Polska	83.11	75.38	74.14	74.54	78.20
10	Deutsche Bank Polska	63.92	60.01	59.73	33.51	39.63
11	DNB Bank Polska	77.56	68.06	112.62		
12	ING Bank Śląski	88.82	79.51	82.55	80.10	75.64
13	mBank	89.25	78.60	73.21	67.54	60.25
14	Nest Bank	83.12	75.20	66.46	55.80	44.45
15	Plus Bank	69.87	55.71	44.06	51.57	46.69
16	**PKO Bank Polski**	**89.25**	**78.11**	**71.84**	**68.14**	**61.04**
17	Santander Bank Polska	90.03	81.03	79.15	75.84	75.13
18	Santander Consumer Bank	112.56	110.94	104.19	103.70	96.42
19	SGB Bank	20.12	18.59	17.24	17.02	15.02
	Average	81.83	71.97	69.01	61.49	57.56
	State averages	82.25	73.58	70.48	66.39	63.05
	Private average	81.65	71.36	68.49	59.61	55.45

Note: bold - banks under state control, shaded - outlier observations not included.

Source: own compilation based on data from the Orbis database.

The considerable discrepancy observed may be attributed to the elevated risk profile associated with Poland as a market situated in proximity to countries engaged in armed conflict. In light of these considerations, it may be anticipated that banks with foreign shareholders will curtail their involvement in financing both companies and households. The bank that reduced its loan-to-deposit ratio the most in 2022 was Deutsche Bank Polska, which provides banking services exclusively to companies, with a reduction of 43.90%. The ratio was reduced to 33.51%, which constituted the lowest L/D ratio observed in the analysed group, with the exception of the two banks established by cooperatives, which maintained this ratio at the lowest level throughout the analysed period. The next bank to decrease the L/D ratio the most in 2022 was Bank BPS, a cooperative-dependent institution, which reduced its ratio by 19.78%. This was followed by three foreign-dependent banks: Nest Bank, which decreased its ratio by 16.04%; BNP Parisbas, which decreased its ratio by 12.17%; and Bank Handlowy, which decreased its ratio by 12.05%. However, the subsequent two banks were already state-dependent institutions: BOŚ, with a reduction of 11.08%, and Pekao, with a reduction of 9.76%. The banks that increased their loan-to-deposit ratio in 2022 were Plus Bank, whose main shareholder is registered in Cyprus but is owned by Polish businessman Zygmunt Solorz, by 17.04%; state-dependent Alior Bank, by 1.07%; and Credit Agricole with a French shareholder, by 0.54%. The modest fluctuations in the index for the final two banks suggest that neither institution modified its credit policy during that period. Furthermore, even after the index increase, Plus Bank remained within the lowest index level group.

Additionally, the elevated loan-to-deposit ratio observed in state-owned banks was accompanied by a notable increase in the proportion of non-performing loans within the overall loan portfolio, as indicated by the ratio of non-performing loans (NPL) to total loans. In 2019, the mean ratio for the entire group of banks under analysis was 7.88%. The ratio was higher in state-owned banks (9.83%) than in private banks (6.98%). Subsequently, each of these averages exhibited an increase following the advent of the pandemic, with the private bank group demonstrating a more pronounced surge of 9.31%, in comparison to the state bank group, which exhibited a more modest increase of 4.17%. In the subsequent year, the mean proportion of non-performing loans declined by over 11% in both groups. However, the situation in both groups diverged significantly in 2022 and 2023. In 2022, the average NPL in state-owned banks increased by 2.43%, whereas in private banks it decreased by 21.97%. In 2023, the average NPL in state-owned banks decreased by 11.09%, while in private banks it remained relatively stable, with a slight decrease of 0.89%. The NPL values are presented in Table 7.

The bank with the poorest quality loan portfolio was Plus Bank, where the majority of loans were non-performing, and the value of the ratio increased consistently throughout the analysed period, from 54.62% in 2019 to 79.52% in 2023. This was an extremely anomalous observation and was thus excluded from the calculation of the mean value. Furthermore, in the 2022-23 period, the ratio value at Nest Bank, where it was 25.28% and 27.68%, respectively, was also classified as an anomalous observation.

The NPL ratio values of state-owned banks did not exhibit a distinctive profile compared to private banks. However, in 2020, there was a discernible trend whereby these banks were among those with higher ratio values, with the exception of PKO BP, which had the third lowest score.

With regard to the rate of change of NPLs, banks under state control in 2020 exhibited the lowest rate of change of the indicator, with the exception of Bank Pocztowy, where it increased by 13.09%, representing the fifth highest rate of change. In 2021, the proportion of non-performing loans decreased across all state-owned banks. In 2022, state-owned banks demonstrated a comprehensive diversification, exhibiting results across the full range of values observed in the entire group of analysed banks. This included a decrease of 16.65% in Alior Bank, representing the second-largest decline in NPLs, and an increase of 24.40% in Pekao, representing the second-largest increase in the entire group. In 2023, the value of the index declined for half of the banks, while the other half experienced an increase. State-owned banks were among those reducing the share of non-performing loans. However, Pekao was an exception, with the indicator showing minimal change due to a recorded increase of only 0.30%. Furthermore, state-owned banks demonstrated no distinctive performance in terms of the volatility of the indicator throughout the analysed period when compared to private-owned banks.

Table 7.
Credit portfolio quality indicators (NPL) in 2019-2023

no.	Bank	Non-performing loans / Gross loans to customers				
		2019	2020	2021	2022	2023
1	**Alior Bank**	**14.53**	**14.51**	**11.83**	**9.86**	**8.63**
2	Bank BPS	13.19	12.63	12.12	12.69	12.52
3	Bank Handlowy w Warszawie	3.72	3.94	4.38	4.20	4.19
4	**Bank Millennium**	**4.47**	**4.85**	**4.30**	**4.39**	**4.54**
5	**Bank Ochrony Środowiska**	**15.21**	**15.64**	**13.45**	**14.82**	**13.45**
6	**Bank Pocztowy**	**9.78**	**11.06**	**10.81**	**11.37**	**8.99**
7	Bank Polska Kasa Opieki	5.55	5.72	5.41	6.73	6.75
8	BNP Parisbas Bank Polska	5.75	5.42	3.68	3.28	3.01
9	Credit Agricole Bank Polska	7.36				
10	Deutsche Bank Polska	3.37	5.01	6.17	4.93	6.30
11	DNB Bank Polska			1.23	2.11	2.44
12	ING Bank Śląski	2.92	3.24	2.54	2.26	2.64
13	mBank	4.01	4.44	3.79	3.89	4.16
14	Nest Bank	17.41	19.77	20.39	25.28	27.68
15	Plus Bank	54.62	62.93	68.59	73.30	79.52
16	**PKO Bank Polski**	**4.10**	**4.26**	**3.84**	**3.68**	**3.49**
17	Santander Bank Polska	5.12	5.69	4.91	4.86	4.53
18	Santander Consumer Bank	9.51	11.36	11.12	10.33	8.14
	Average	7.88	8.50	7.50	6.63	6.25
	State averages	9.83	10.24	9.07	9.29	8.26
	Private average	6.98	7.64	6.78	5.29	5.25

Note: bold - banks under state control, shaded - outlier observations not included.

Source: own compilation based on data from the Orbis database.

A comparison of the indicators of banks' asset exposure to lending and the quality of the loan portfolio reveals, in line with existing literature, that state banks play a stabilising role during periods of market shocks. State banks demonstrated a lesser capacity to reduce asset exposure to lending throughout the period, particularly during the emergence of negative impulses, which was most evident following the outbreak of war in Ukraine. This resulted in a deterioration in the quality of the loan portfolio, which is also in line with previous research indicating that state-dependent banks may be more inclined to take higher risks.

5. Conclusions

A comparison of the efficiency, profitability and lending ratios of state-controlled banks to those of privately-owned banks allows us to reject the initial hypothesis that there are no differences in efficiency. Banks under state control demonstrated a higher average net interest margin and a more dynamic response to the pandemic stimulus. Following the onset of the pandemic, both analysed efficiency indicators deteriorated more rapidly in state-owned banks than in private banks, and subsequently improved more rapidly.

Furthermore, an examination of the values and dynamics of changes in profitability ratios indicates that the hypothesis that there are no differences can be rejected. On average, state-owned banks exhibited higher profitability for four of the five years under analysis, both at the level of assets and equity. However, in the year 2020, state banks demonstrated a notable decline in profitability, which then rebounded with equal dynamism in the subsequent year.

The study also permits the unambiguous rejection of the hypothesis that there were no differences between banks under state control and those under the control of private investors in terms of lending during the analysed period. State-owned banks reduced lending to a lesser extent during both the pandemic and the outbreak of the war in Ukraine, which resulted in a deterioration in the quality of their loan portfolio.

A negative verification of the stated hypotheses results in the stated second-order objectives. A distinction can be made between state-owned and private banks with regard to their efficiency and profitability. Nevertheless, it remains unclear whether this differentiation had a positive or negative impact on the stability of the banking sector. While state-owned banks exhibited higher average profitability for four of the five years under analysis, this represented a positive impact. However, the sharp decline in profitability observed in the year of the pandemic outbreak had a destabilising effect. In terms of efficiency indicators, only one consistently exhibited a more favourable average value over four of the years under analysis. However, both indicators exhibited a sharp deterioration in the year of the pandemic outbreak. Therefore, the differentiation in efficiency between banks under state control and those under private control is indicated by only one of the two efficiency indicators considered. Furthermore, the stabilising effect is observed in only its value for most of the period analysed, but not in its resistance to the impulse of the pandemic outbreak.

The second of the second-order objectives was achieved by demonstrating the differentiation between banks dependent on the state and those dependent on private owners in terms of lending. State-owned banks demonstrated a lesser capacity to extend credit during the period of crisis, which had a stabilising effect on the country's economy. However, this strategy had an adverse impact on the quality of the loan portfolio of state-owned banks, with a higher proportion of non-performing loans than in private banks. This had a detrimental effect on the stability of the banking sector.

The verification of the assumption that banks under state control had a stabilising effect on the banking sector and the Polish economy during the outbreak of the COIVD-19 pandemic and the war in Ukraine, which was the main objective of the study, yielded results that permit the assumption that state banks had a stabilising effect on the Polish economy. However, this same stabilising effect could potentially exert a negative impact on the stability of the banking sector. Therefore, when examining state capital in the banking sector as a means of implementing state economic policy, it is essential to consider the potential risks this capital may pose to the stability of the banking sector. A banking crisis is identified as one of the most significant threats to the economy.

In interpreting the results, it should be borne in mind that the survey was conducted on a limited number of banks due to its restriction to a single, national financial market. The restricted number of observations limited the possibility of applying advanced statistical analysis methods. In order to confirm the results, it would be beneficial to expand the group of analysed entities by increasing the geographical scope to include other CEE countries bordering or in close proximity to countries involved in the conflict in Ukraine.

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