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A COMPARISON OF THE FINANCIAL SECTOR AND MACROECONOMIC PERFORMANCE USING TURNING POINTS ANALYSIS

ABSTRACT
The paper aims to assess the financial sector's stability compared to the real economy's stability. The analysis is based on identifying turning points (peaks and troughs) in the process of the financial sector development. Five financial variables represent the financial system: non-performing loans, capital adequacy ratio of the banking sector, return on equity, domestic credit (% of GDP) and broad money (% of GDP). The analysis also compares the turning points of the financial variables with those of the real variables. The study covers seven European and two non-European countries and the 2010-2022 period. The results indicate that the financial behaviour was different from the real sector's. There is no resemblance in the distribution of turning points between the single financial variables and the financial and real variables within a given country. Financial variables may behave procyclically, countercyclically or acyclically compared to GDP.

Keywords: economy's stability, financial sector, turning points, peak, trough
JEL codes: E32, E51,G21, O47

Introduction

The stability of the financial sector development has been an important area of macroeconomic research for many years. This issue significantly increased its importance after the 2008-2009 global economic and financial crisis, when it turned out that instability in the financial sector highly affects the real economy and financial turbulence may lead to recessions comparable to those observed during the Great Depression at the beginning of the 20th century. The goal of the paper is twofold. Firstly, the study aims to assess the stability of the financial sector in seven European countries that adopted the inflation targeting (IT) strategy of monetary policy: Albania, Czechia, Hungary, Poland, Romania, Serbia and Turkey, as well as – for comparison purposes – in two non-European countries: Brazil and Canada. To achieve the goal, we identify turning points (peaks and troughs) in the process of the financial sector development. The distribution of turning points will allow inferring about the financial sector's stability.

The second goal is to compare the financial sector's stability with the real economy's stability. Comparing the distributions of financial and real variables' turning points will enable the identification of parallels between the financial and economic

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development pathways. Additionally, we are interested in inferring whether the financial variables are leading, coincident or lagging indicators against the output growth. The time distribution of peaks and valleys in the financial variables and their comparison with structural breaks in GDP growth will enable the assessment of the interdependencies between the variables under consideration.

The main research hypothesis is that analysing the distribution of turning points makes it possible to compare different countries' financial sectors and macroeconomic performance. Such outcomes shed new light on the nature of the behaviour of the financial sector – including variables measuring financial stability – compared to macroeconomic performance.

The additional hypothesis is that the financial sector can be characterised in many dimensions, and the complete assessment of its stability requires the analysis of numerous indicators that do not include redundant information. This hypothesis results from our initial expectation that the financial sector variables include many uncorrelated aspects, and it is not sufficient to choose a single financial variable as a proxy for the development of the whole financial sector. The individual financial variables behave differently, and it is necessary to use a broad range of them to fully assess the financial system's behaviour.

The analysis covers the 2010-2022 period. In 2008-2009, when the global crisis hit, most of the economies in the world were excluded to avoid significant biases in the distribution of turning points. However, the considered period is characterised by some disturbances, mainly from the COVID-19 pandemic, but also – although to a lower extent – by the Euro area crisis and the Russia-Ukraine war.

The sample of countries represents homogenous economies from the point of view of the study's goal; this is the main reason for the selection of countries. All the countries (both European and non-European) adopted the inflation-targeting monetary policy regime: Albania – in 2008, Czechia – in 1998, Hungary – in 2001, Poland – in 1999, Romania – in 2005, Serbia – in 2009, Turkey – in 2007, Brazil – in 1999 and Canada – in 1991. In terms of the official nature of monetary policy, the examined nations are, thus, relatively similar. During the 2010-2022 period, all of them were inflation targeters, and differences between financial sector stances in these countries caused by different goals and ways of conduct of monetary policy should have been limited.

The paper is composed as follows: 1) the next section, which appears after this introduction, includes the literature review; 2) later in the paper, the data and the research methodology are presented; 3) the main section includes a presentation and interpretation of the results; 4) the last section concludes.

Review of the literature

In empirical studies, financial sector stability and development are measured in various ways. We present here selected empirical studies in which the authors analyse multiple issues related to the financial sector. This literature review focuses on the type of variables treated as proxies for financial sector stability and development.

A prevalent indicator of financial sector stability is the volume of non-performing loans. For example, non-performing loans are used by Pawlowska [2016] to assess the effect of market structure and competition between the EU27 banking sectors on financial stability during the 2004-2012 period.

Another measure is Z-Score. This index is calculated as ROA + EA/s.d. (ROA). In the above formula, ROA means the rate of return on assets, EA is the ratio of equity to assets and s.d. (ROA) is the standard deviation of ROA. Diallo and Al-Mansour [2017] use the Z-score to analyse the relationship between the insurance sector and the financial stability of 26 countries during the 1998-2011 period.

Financial stability can also be measured by the interest rate spread. Such an approach was adopted – e.g., by Hallak [2013], who examined the impact between private sector debt and financial stability.

Due to the lack of one indicator that measures the financial sector's stability, many authors used an array of financial stability variables. For example, Cernohorska [2015] uses the following indicators in her study of the stability of the banking sector in the Czechia and the UK over the 2006-2013 period: interest spread, net interest margin, a ratio of loans to deposits, after-tax profits, a ratio of bank capital to assets, capital adequacy, ROE and ROA.

Some authors construct their own indices of financial stability. Elsayed, Naifar and Nasreen [2022] built a new composite financial stability index based on the following areas and indicators: the banking sector (banking sector beta coefficients derived from the Capital Asset Pricing Model, bank equities return, and bank volatility), the equity market (stock market returns and stock market volatility), the bond market (sovereign spreads) and the foreign exchange market (exchange market pressure index). The cited authors use this index to examine the relationship between monetary policy and financial stability for the Gulf Cooperation Council countries in the years 2006-2020.

Regarding financial development, the typical measures are the private credit-to-GDP ratio or stock market capitalisation as % of GDP [Svirydzenka 2016]. However, due to the shortcomings of the typically-used indices, the cited author compiled its own aggregate indicator of financial development that includes the depth, access and efficiency of both the financial institutions and financial markets. Svirydzenka [2016] consists of many single variables in calculating composite indicators (e.g., private-sector credit to GDP, lending-deposits spread, ROA, ROE and stock market capitalisation to GDP). These single indices can be used as measures of financial sector development. However, the other authors also employ the aggregated indices compiled by Svirydzenka [2016]. For instance, Khan et al. [2022] used these indices to examine the relationship between institutional quality and financial sector development for 85 emerging and developing economies during the 1996-2018 period.

Numerous authors employ a variety of financial sector development indicators to evaluate the reliability of their conclusions. In their study of 45 Sub-Saharan African economies from 1982 to 2018, Yiadom, Mensah and Bokpin [2022] use the financial development (FD) index from the International Monetary Fund FD Index database as well as domestic credit to the private sector, domestic credit provided by the financial sector, broad money M2 and stocks traded (all as a per cent of GDP) as alternative proxies for financial development. Xue [2020] presents three variables that represent the size of financial sector development: private credit by deposit money banks to GDP, bank credit to bank deposits and domestic credit to the private sector of GDP, in addition to four variables that approximate the quality of financial sector development: bank return on equity, bank regulatory capital to risk-weighted assets (capital adequacy ratio), bank non-performing loans to gross loans and bank Z-score. The cited author includes many of these

variables in the regression models to investigate the link between the financial sector development and the growth volatility for 50 countries from 1997 to 2014.

Data

Based on the review of the literature, we have selected the following variables to measure the financial sector stability and development:

1. Non-performing loans (% of total loans) [NPL];
2. Capital adequacy ratio of the banking sector (%) [CAR];
3. Return on equity of the deposit takers (%) [ROE];
4. Domestic credit (% of GDP) [CRED];
5. Broad money M3 (% of GDP) [MONEY].

The aforementioned factors indicate a wide range of financial sector aspects, including loan quality, the financial posture of banks, the size of the financial sector and the nature of monetary policy. We tried to choose variables which include different areas and are not directly mutually correlated.

The identification of turning points of the above financial variables will be confronted with the behaviour of the real economy. Three variables are used to represent the real economy:

1. Growth rate of real GDP (against a corresponding quarter of the previous year) (%) [GDPGR];
2. Real GDP (in million units of national currency at constant 2014 prices) [GDP];
3. Real GDP per capita (in national currency at constant 2014 prices) [GDPPC].

The analysis is based on quarterly data from the first quarter of 2010 to the second quarter of 2022 (in a few cases, data for the second quarter of 2022 is missing; in the case of ROE for Czechia, the time series ends in the third quarter of 2021).

Research methodology

Many methods are available for calculating macroeconomic phenomena's historical and predicted turning points. Some of them consider many factors simultaneously, like the HMM-based indicator [Bernardelli 2022]. Relatively few of these methods have been applied to financial time series. Due to the absence of econometric assumptions, it was decided to employ one of the most ubiquitous approaches in the study, namely the Christiano-Fitzgerald filter with the Bry and Boschan routine. The Christiano-Fitzgerald filter is a finite data approximation to the ideal bandpass filter [Christiano and Fitzgerald 2003]. The Bry-Boschan algorithm finds statistical extrema using censoring rules and phase and cycle-length constraints [Bry and Boschan 1971].

The turning point identification procedure is illustrated based on the variable MONEY for Poland. The raw values of this variable are presented in Figure 1.

The first step is to use Christiano-Fitzgerald asymmetric filter with the following parameters:

- 24 as a minimum period of oscillation for the desired component;
- 144 as a maximum period of oscillation for the desired component;
- drift and unit root in time series assumed.

As a result, we get the cyclical component defined as deviations from the trend – it is illustrated in Figure 2. The next step is using the Bry-Boschan routine of selecting

cyclical turning points – it is illustrated in Figure 3. This procedure has been repeated for each of the eight-time series of each of the nine countries to find the respective turning points of the variables representing the financial sector and the real economy.

Results

The analysis results are presented in Tables 1-2 and Figures 4-12. The tables show the turning points (peaks and troughs) for the individual countries for the financial sector variables (Table 1) and real variables (Table 2). In the tables, '03' indicates the first quarter, '06' the second quarter, '09' the third quarter and '12' the fourth quarter. The figures show the time distribution of turning points, making them easy to interpret in terms of cycle synchronisation. We will also make reference to the graphical behaviour of a particular time series – as shown, for example, in Figure 3 – when evaluating the result (the figures of this type are not presented in the article for the sake of conciseness).

The data presented in Table 1 indicates that the number and chronology of turning points in the financial sector variables were different across the countries and the variables. The countries usually recorded two to four turning points in the financial variables. However, the situation when one or five turning points were identified also occurs.

Before interpreting the results, it is worth noting that in most variables and countries, the first peak was already observed in the first quarter included in the analysis (03/2010). Such a peak has rather a statistical character and indicates that the value of the variable was falling after this time. In other words, a given variable was in a downward phase at the beginning of the analysed period.

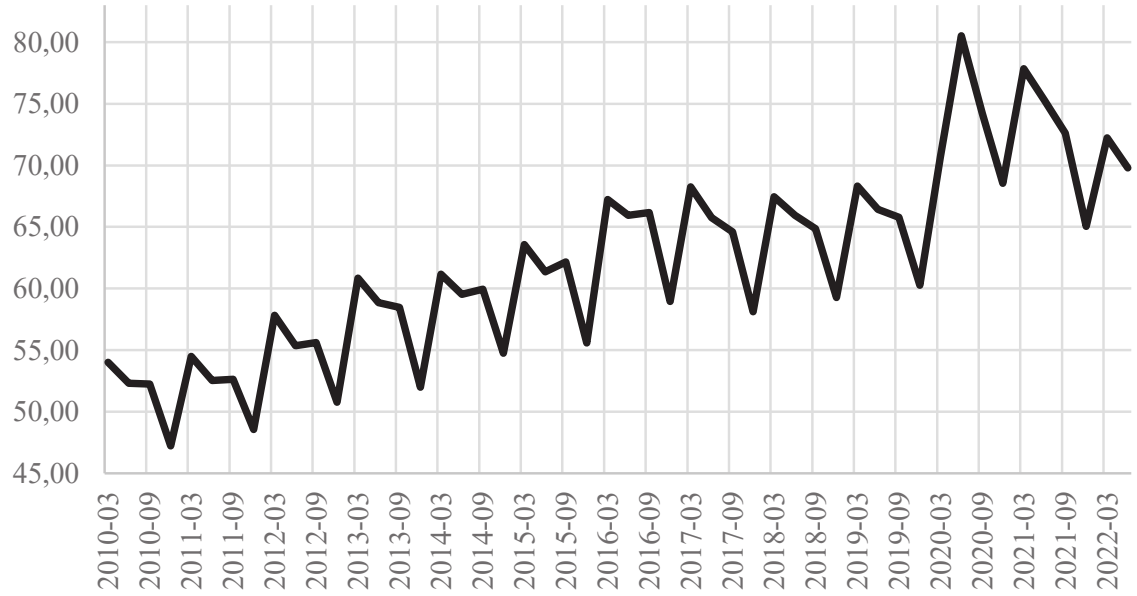

Figure 1. The ratio of broad money to GDP for Poland (MONEY variable)
Source: Own calculations.

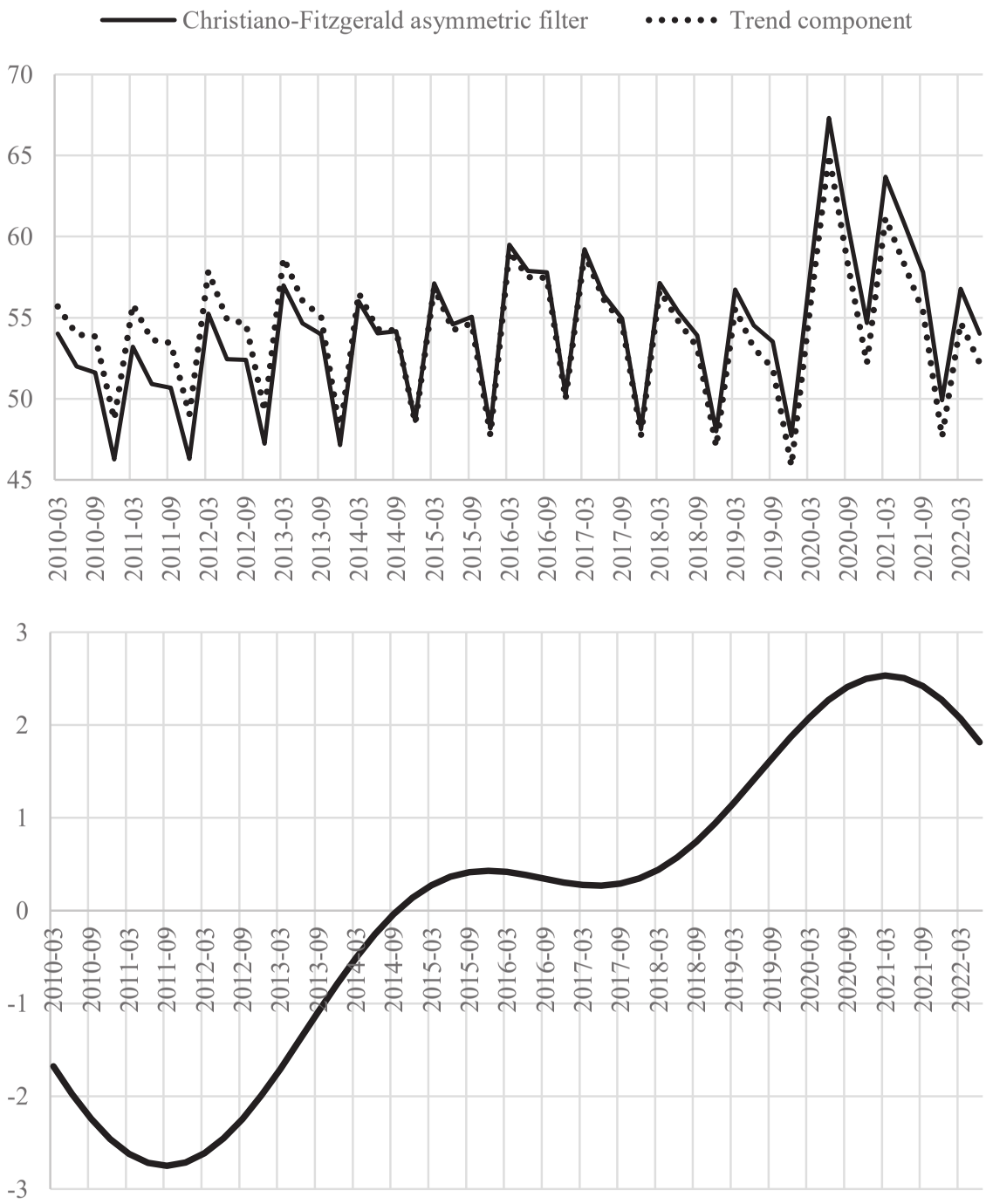

Figure 2. The Christiano-Fitzgerald asymmetric filter (upper panel) and the cyclical component (bottom panel) of the variable MONEY for Poland
Source: Own calculations.

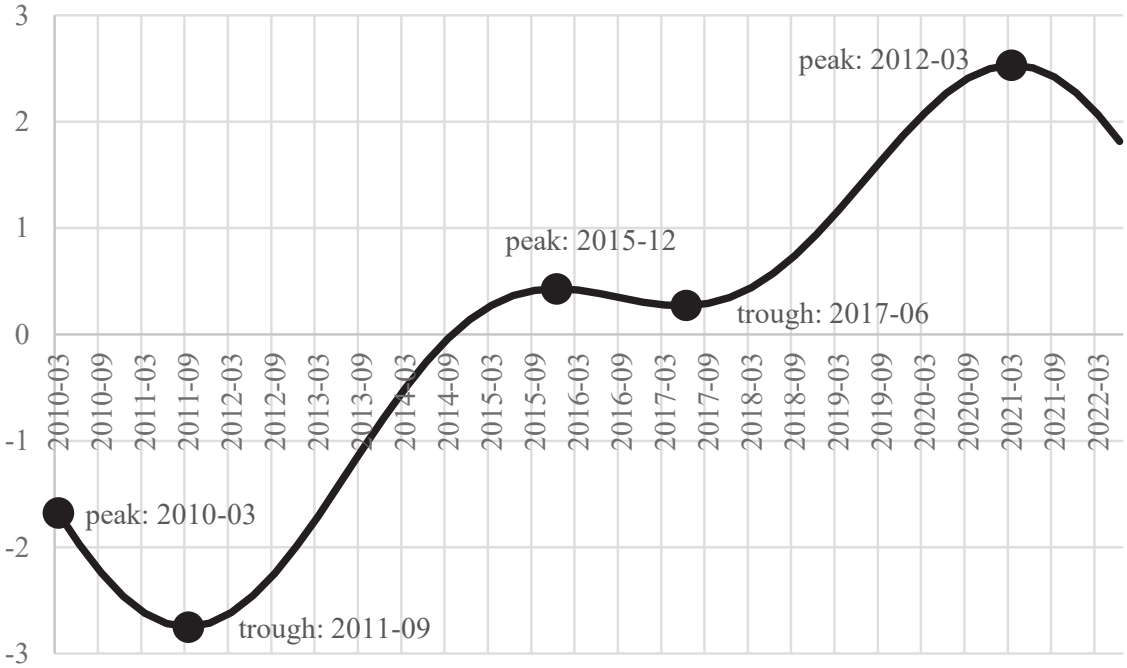

Figure 3. Turning points of the variable MONEY for Poland
Source: Own calculations.

Table 1. Timing of turning points (peaks and troughs) of the financial variables

Turning point	Albania	Czechia	Hungary	Poland	Romania	Serbia	Turkey	Brazil	Canada
Non-performing loans (% of total loans) [NPL]									
Peak	06.2014	12.2014	12.2013	06.2013	03.2014	03.2015	03.2010	03.2010	03.2010
Trough		03.2020	06.2019	06.2017	03.2019	03.2020	03.2013	06.2013	03.2014
Peak				03.2020			06.2020	09.2017	12.2021
Trough								09.2021	
Peak									
Capital adequacy ratio of the banking sector (%) [CAR]									
Peak	03.2010	06.2013	03.2010	03.2010	03.2010	03.2010	03.2010	03.2010	03.2011
Trough	06.2010	03.2017	06.2010	06.2013	06.2012	09.2012	12.2014	12.2013	09.2016
Peak	03.2013	06.2021	06.2015	06.2019	12.2020	03.2019		03.2019	
Trough	12.2016								
Peak	12.2020								
Return on equity of the deposit takers (%) [ROE]									
Peak	12.2010	03.2010	03.2010	09.2012	03.2010	03.2010	03.2010	03.2010	09.2011
Trough	12.2011	12.2013	09.2013	09.2021	03.2013	06.2014	03.2014	03.2015	12.2019
Peak	06.2017	06.2018	09.2018		09.2017	06.2018	06.2016	09.2020	
Trough					06.2021		09.2019		
Peak									
Domestic credit (% of GDP) [CRED]									
Peak	03.2010	06.2014	03.2010	03.2010	03.2010	03.2012	03.2010	03.2010	03.2010
Trough	09.2010	09.2018	12.2015	12.2010	03.2012	03.2016	06.2011	12.2011	12.2012
Peak	03.2014			09.2018	12.2013	03.2020	09.2019	03.2016	06.2020
Trough	03.2018				09.2017			09.2016	
Peak								03.2021	
Broad money M3 (% of GDP) [MONEY]									
Peak	03.2010	03.2010	03.2010	03.2010	03.2010	03.2010	03.2010	03.2010	03.2010
Trough	09.2010	06.2012	06.2016	09.2011	09.2012	09.2012	12.2011	06.2013	12.2012
Peak	09.2014	06.2021		12.2015		09.2015	09.2020	09.2020	09.2014
Trough	12.2018			06.2017		03.2016			09.2016
Peak				03.2021		09.2021			09.2021

Source: Own calculations.

Table 2. Timing of turning points (peaks and troughs) of the real variables

Turning point	Albania	Czechia	Hungary	Poland	Romania	Serbia	Turkey	Brazil	Canada
Growth rate of real GDP (against a corresponding quarter of the previous year) (%) [GDPGR]									
Peak	03.2010	03.2010	03.2010	03.2010	09.2015	06.2010	09.2010	03.2010	03.2011
Trough	09.2013	12.2012	09.2012	09.2013	03.2021	03.2014	12.2018	03.2015	06.2015
Peak	06.2016	09.2016	03.2016	12.2016		03.2018			12.2015
Trough	12.2019	09.2020	06.2020	09.2020		03.2021			06.2020
Peak									
Real GDP (in million units of national currency at constant 2014 prices) [GDP]									
Peak	03.2012	12.2010	12.2010	09.2011	03.2012	06.2011	12.2012	03.2013	09.2012
Trough	09.2015	09.2014	03.2015	06.2015	09.2015	06.2016	03.2021	03.2019	09.2015
Peak	12.2018	03.2018	12.2017	06.2019	09.2018				09.2017
Trough		12.2021	03.2021						
Peak									
Real GDP per capita (in national currency at constant 2014 prices) [GDPPC]									
Peak	12.2011	12.2010	12.2010	06.2011	12.2011	06.2011	03.2013	12.2012	09.2012
Trough	09.2015	09.2014	03.2015	06.2015	06.2015	06.2016	06.2021	09.2018	12.2021
Peak	03.2019	12.2017	12.2017	06.2019	09.2018				
Trough		09.2021	03.2021						
Peak									

Source: Own calculations.

Regarding non-performing loans, we can distinguish two countries with similar in-group variation but different cross-sectional differentiation. The first group includes the European countries apart from Turkey (i.e., Albania, Czechia, Hungary, Poland, Romania and Serbia). In this group, the volume of non-performing loans steadily rose starting from 2010, reaching a peak around 2013-2015. The global and Euro area crises, which impeded many European economies and impaired the credit position of many enterprises and people, were to blame for this behaviour. The data clearly shows an upward tendency in non-performing loans until a peak in the mid-2010s. After this peak, the volume of non-performing loans in these six European countries revealed a contractionary period with different behaviour around the COVID-19 pandemic. Apart from Albania and Poland, all four of these nations showed a trough before or around the onset of the pandemic, following which non-performing loans began to grow until the end of the study period. The trough was not found in Albania, and a downward phase also occurred during the pandemic. In contrast, Poland recorded an additional peak in the first quarter of 2020, meaning that during the pandemic era, the volume of non-performing loans in Poland was in a contractionary phase. On the other hand, two non-European countries (Canada and Brazil) – as well as Turkey – behaved differently. In the period's first years, non-performing loans decreased – achieving a downturn in 2013 or 2014 – followed by a shorter or longer upward tendency.

Regarding the capital adequacy ratio, we can also distinguish some common trends. Albania and Czechia behaved very similarly in terms of capital adequacy ratio (the first two turning points evidenced in 2010 for Albania can be neglected as confirmed by the graphical analysis). Albania and Czechia increased capital adequacy in the banking sector until 2013, followed by a downward tendency until the end of 2016 and early 2017, as well as a peak in the period of the coronavirus pandemic. Poland, Romania, Serbia and Brazil can also be classified as similar countries with the reverse behaviour of CAR (a trough in 2012 and 2013, and a peak in 2019 and 2020).

Poland may be treated as akin to Canada in terms of return on equity. Both countries started the second decade of the twenty-first century with an upward tendency

in ROE and a peak in 2011 and 2012. Afterwards, they recorded a long downward phase with a trough in 2021 (Poland) and 2019 (Canada). The remaining countries (except Albania) noticed at least three turning points with a decreasing behaviour of ROE from the beginning of the analysed period until around the mid-2010s.

Poland shares a high degree of resemblance with Turkey and two non-European nations – Brazil and Canada – based on the distribution of domestic credit turning points. In these countries, a trough had already emerged in 2010-2012, followed by a long expansionary period until the peak in 2018 or later (the two turning points occurring in Brazil in 2016 cancelled out and could be omitted). In Albania and Czechia, the path of credit expansion showed similar mutual fluctuations, with an evident peak in 2014 and a trough in 2018. Hungary and Romania recorded a downward trend until 2015 and 2017, when a deep trough was noted (turning points in Romania in 2012 and 2013 are negligible).

Regarding the monetisation rate (i.e., the ratio of broad money to GDP), the time series clearly shows that all the countries except Albania noticed an upward phase in this variable many years before the pandemic outbreak and at least at the beginning of the pandemic period. Czechia, Poland, Serbia, Turkey, Brazil and Canada evidenced a peak in 2020, 2021 and 2022; meanwhile, a former trough was recorded many years earlier. Hungary and Romania noticed similar behaviour except that the peak has not been recently identified. Such outcomes indicate that the expansionary phase in the monetisation rate was very long, covering at least many months of the COVID-19 pandemic. The results were caused, among other things, by highly expansionary monetary policy in the last years, fuelled by the aid programs implemented by many governments during the pandemic period. As a result, the money supply growth rate exceeded the GDP growth rate, leading to an increase of the monetisation ratio trend above.

The identification of turning points for real variables (GDP growth, GDP volume and GDP per capita) leads to the following four conclusions. Firstly, the trough was evidenced in about half cases in 2020 and 2021. It was caused by the recession and slowdown that took place during the COVID-19 pandemic. Even if the trough was not formally identified in many other cases, the countries revealed a downward phase in GDP path during 2020-2022, meaning a downturn could soon be found. Secondly, before the beginning of the pandemic, many countries noticed a peak in economic growth. The peak revealed the good economic condition of the analysed countries in the second half of the second decade of the twenty-first century. Thirdly, the turning points identified for GDP and GDP per capita volume are very similar. Fourthly, turning points for the GDP growth rate usually occur earlier than the turning points for both variables measuring the level of GDP.

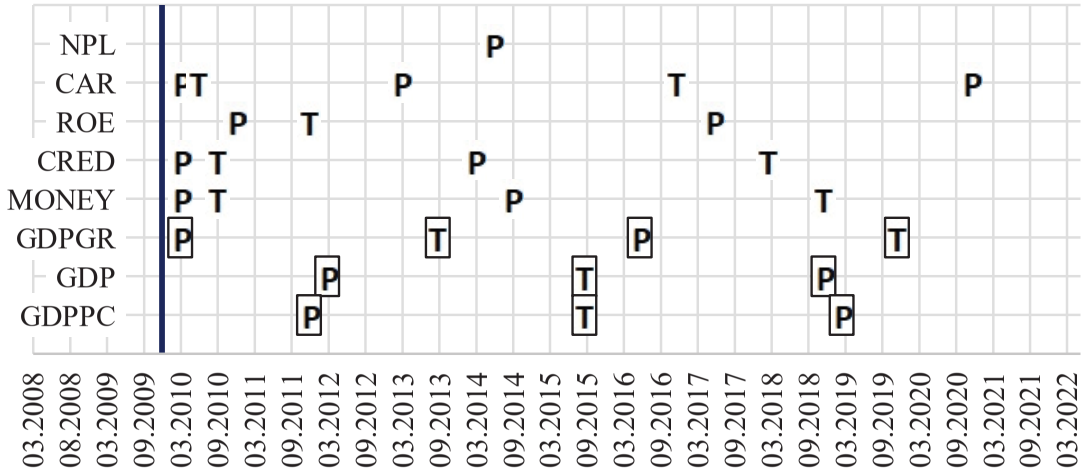

Figure 4. Turning points: peaks (P) and troughs (T) of the financial and real variables for Albania
Source: Own calculations.

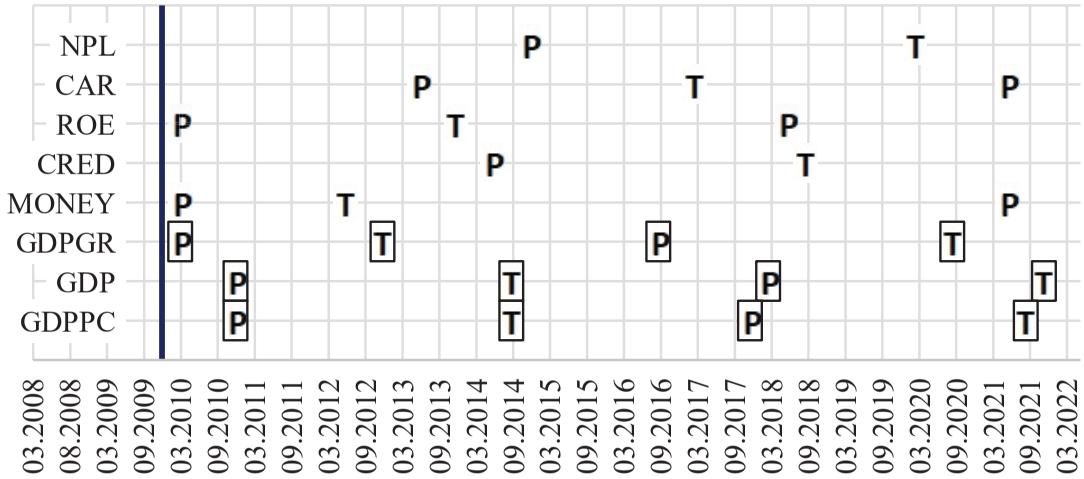

Figure 5. Turning points: peaks (P) and troughs (T) of the financial and real variables for Czechia
Source: Own calculations.

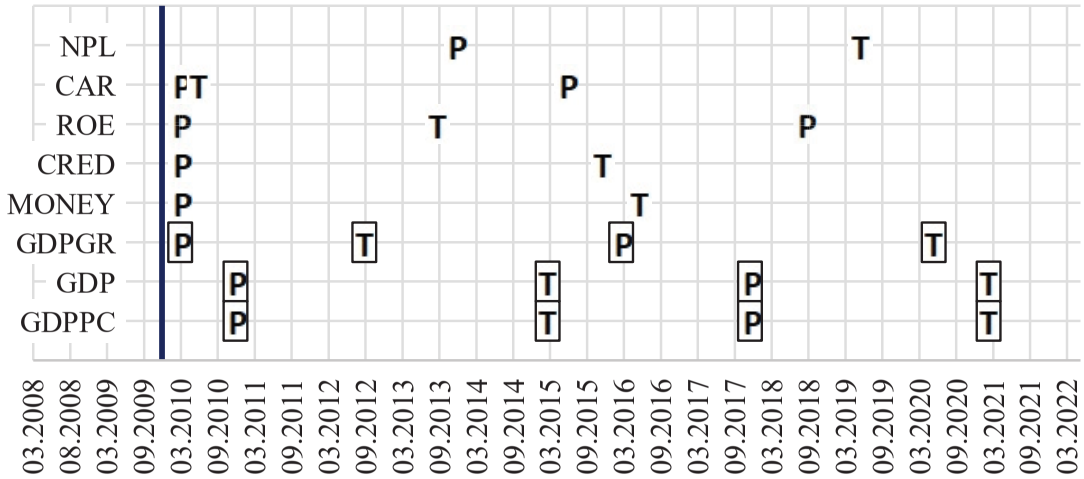

Figure 6. Turning points: peaks (P) and troughs (T) of the financial and real variables for Hungary
Source: Own calculations.

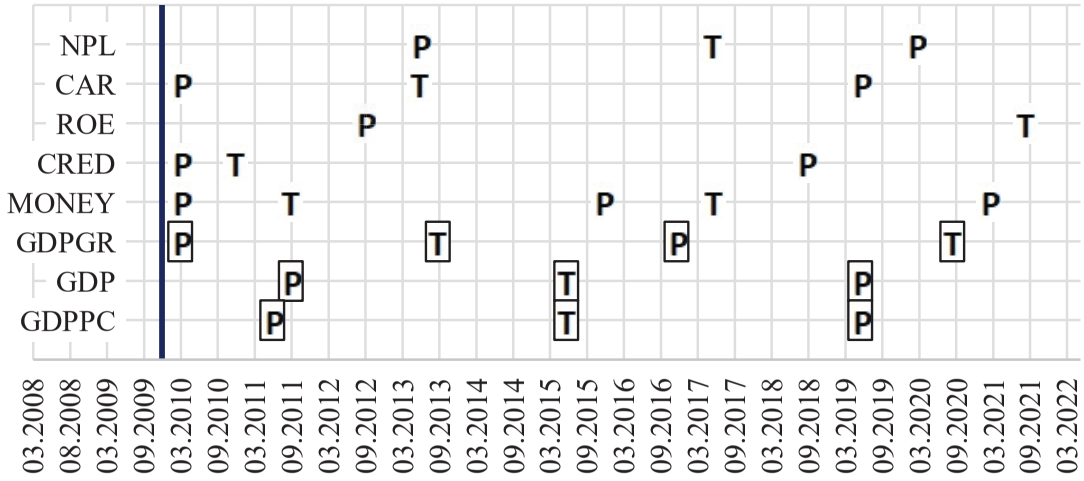

Figure 7. Turning points: peaks (P) and troughs (T) of the financial and real variables for Poland
Source: Own calculations

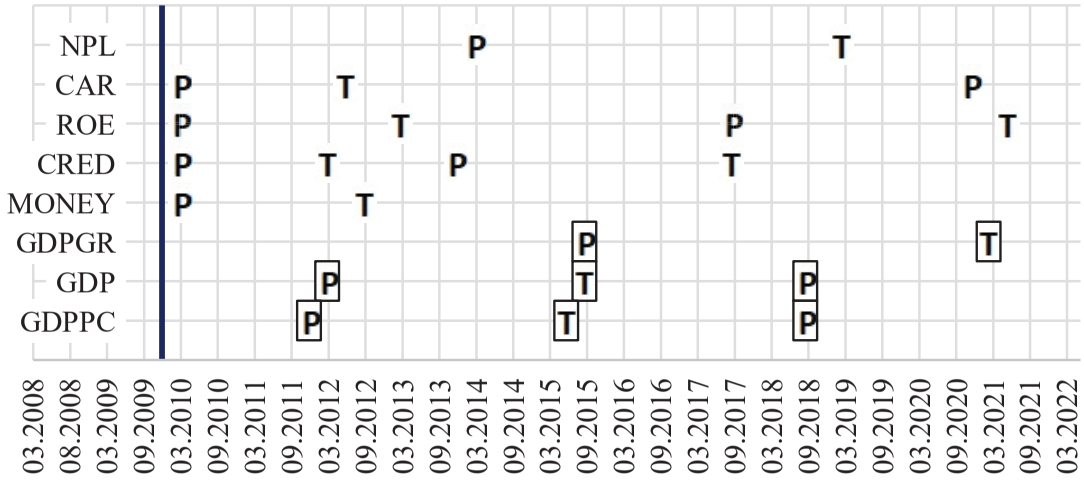

Figure 8. Turning points: peaks (P) and troughs (T) of the financial and real variables for Romania
Source: Own calculations.

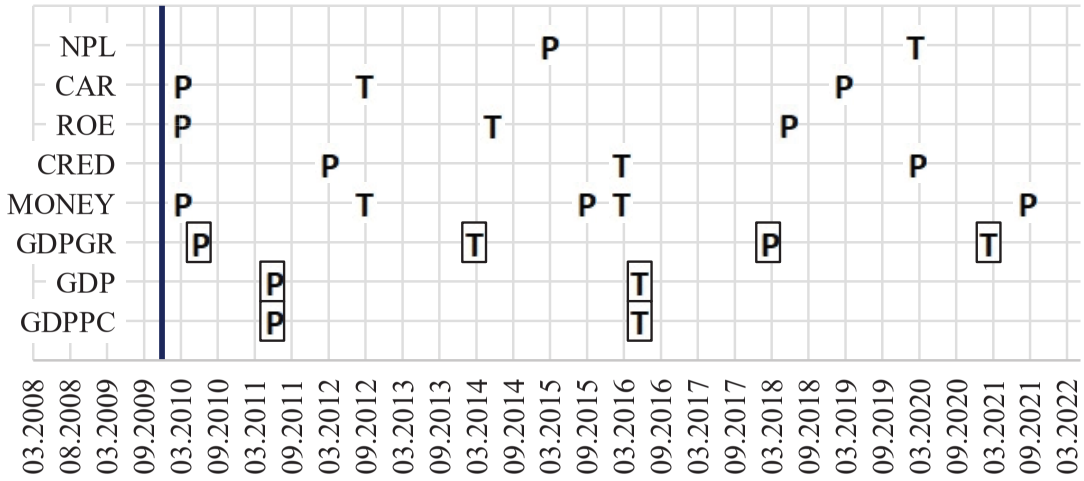

Figure 9. Turning points: peaks (P) and troughs (T) of the financial and real variables for Serbia
Source: Own calculations.

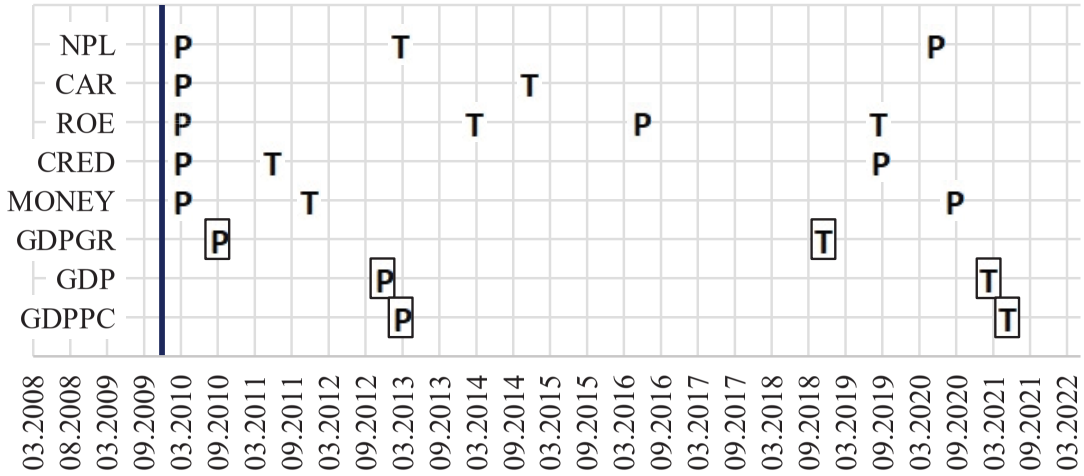

Figure 10. Turning points: peaks (P) and troughs (T) of the financial and real variables for Turkey
Source: Own calculations.

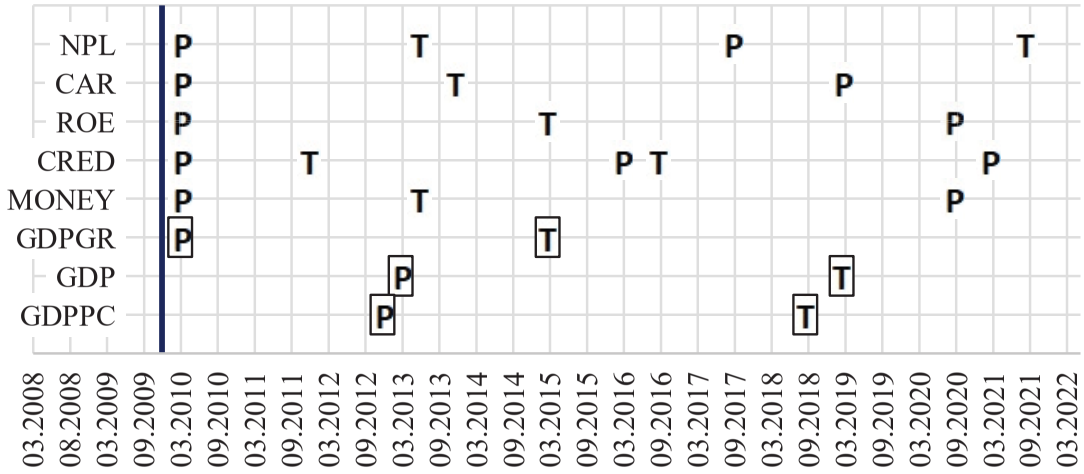

Figure 11. Turning points: peaks (P) and troughs (T) of the financial and real variables for Brazil
Source: Own calculations.

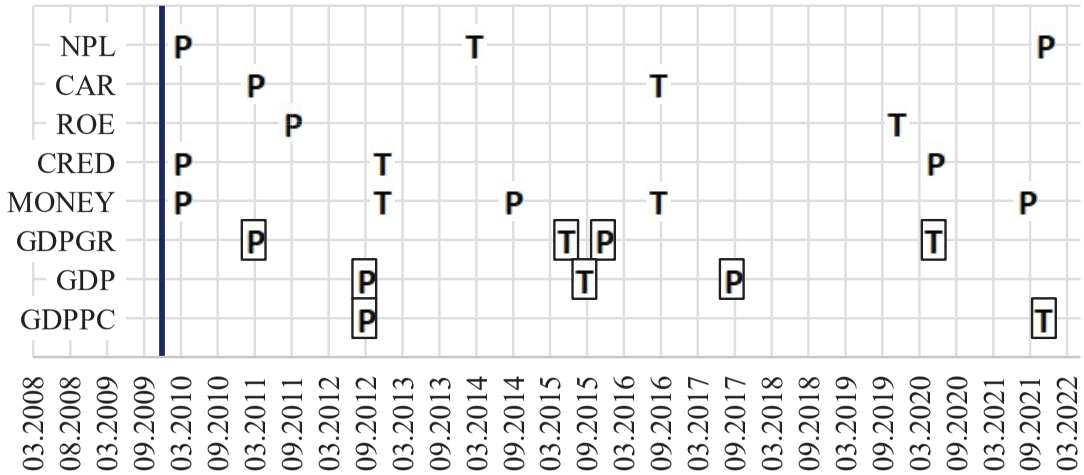

Figure 12. Turning points: peaks (P) and troughs (T) of the financial and real variables for Canada
Source: Own calculations.

Comparing the distribution of turning points for individual financial variables to that of real variables allows us to conclude that the financial sector behaved differently from the real sector. There is no similarity in the distribution of turning points across the single financial variables within a given country as well as between the financial and real variables. The length of the cycles for the individual financial variables differs across the countries. Moreover, for some countries, a given financial variable may behave pro-cyclically, whereas a countercyclical or acyclical path may be observed for another country.

These outcomes suggest that financial variables do not behave similarly. From the point of view of the whole sector, this behaviour indicates high instability in the financial sector. The coverage of the individual financial variables is largely differentiated and not mutually synchronised. Therefore, a full assessment of the financial system's stability should not focus on a single financial variable because such a narrow approach would omit many other aspects of financial sector development.

Our results suggest that the presented analysis has confirmed both research hypotheses. Moreover, the financial sector's high instability means that the financial sector's future situation is highly unpredictable. Regardless of the current situation of the real economy, numerous future development trajectories can be anticipated because of differences in cycle length and behaviour relative to the real economy.

Conclusions

This study assessed the financial sector's stability in seven European countries (Albania, Czechia, Hungary, Poland, Romania, Serbia and Turkey) and two non-European ones (Brazil and Canada). The research hypotheses are verified based on the identification of turning points (peaks and troughs) in the process of the financial sector development, with a broad range of variables measuring the financial sector. We also compare the financial sector's stability with the stability of the real economy based on turning points distribution.

As the result of the analysis, we identified peaks and troughs for five financial variables: non-performing loans, capital adequacy ratio of the banking sector, return on equity, domestic credit (% of GDP) and broad money (% of GDP), as well as three variables representing domestic output: GDP growth, GDP volume and GDP per capita. The distribution of turning points is presented in Figures 4-12.

The behaviour of the financial sector exhibited significant differences compared to the development of the real sector. It isn't easy to find substantial similarities between the distribution of turning points across the single financial variables within a given country and between the financial and real variables. Among the financial variables, we can find those that behave procyclically with output, those that exhibit a countercyclical behaviour and those with an acyclical path of change. Moreover, the length of the cycles of financial variables is different. Therefore, a comprehensive evaluation of the stability of the financial system should not be centred on a single financial indicator since this would exclude many other facets of the evolution of the financial sector. From the point of view of the whole sector, our outcomes indicate that the financial sector reveals a high degree of instability. Hence, it is challenging to predict the future development paths of the financial variables.

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Porównanie sektora finansowego i wyników makroekonomicznych na podstawie analizy punktów zwrotnych

STRESZCZENIE
Celem artykułu jest ocena stabilności sektora finansowego w porównaniu ze stabilnością realnej gospodarki. Analiza opiera się na identyfikacji punktów zwrotnych („szczytów i dołków") w procesie rozwoju sektora finansowego. System finansowy jest reprezentowany przez pięć zmiennych finansowych: kredyty zagrożone, współczynnik wypłacalności sektora bankowego, stopa zwrotu z kapitału własnego, kredyt krajowy (% PKB) i podaż szerokiego pieniądza (% PKB). Analiza porównuje również punkty zwrotne zmiennych finansowych i zmiennych dotyczących realnej sfery gospodarki. Badanie obejmuje siedem krajów europejskich i dwa pozaeuropejskie oraz lata 2010-2022. Wyniki wskazują, że zachowanie sektora finansowego różniło się od zachowania sektora realnego. Nie ma podobieństwa w rozkładzie punktów zwrotnych między pojedynczymi zmiennymi finansowymi w danym kraju oraz między zmiennymi finansowymi a realnymi. Zmienne finansowe mogą zachowywać się procyklicznie, antycyklicznie lub acyklicznie w porównaniu z PKB.

Słowa kluczowe: stabilność gospodarki, sektor finansowy, punkty zwrotne, szczyt, dołek

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RISK MANAGEMENT OF THE DEVELOPMENT OF FINANCIAL POTENTIAL OF BUSINESS ENTITIES

ABSTRACT
Loss of financial potential is one of the most serious risks enterprises face. The risk management system for the loss of financial potential helps enterprises identify, evaluate and manage risks that may affect their financial condition. This system allows enterprises to reduce the possibility of financial losses and ensures more efficient work with financial resources. The purpose of the article is to identify the main imperatives, which are the basis for ensuring the development of financial potential and the justification of measures to neutralise the risks of business entities in the agricultural sector in Ukraine. The main sources of loss of financial potential of enterprises in the agricultural sector of the economy of Ukraine have been identified. It has been established that currently, the biggest threats are: low business activity, a low level of technological equipment and innovation, negative profitability and slow turnover of capital, lack of access to credit for small- and medium-sized enterprises and climate changes. Agricultural enterprises are subject to various risks of loss of financial potential, which may be associated with changes in weather conditions, animal epidemics, changes in legislation, currency risks, etc. Neutralisation of these risks is an important element of effective management of an agricultural enterprise and ensuring its stability. It has been proven that one of the ways to neutralise risks is to create a reserve fund in case of unexpected events that may lead to the loss of financial potential. Such a fund may include funds that can be used for replanting crops, repairing infrastructure, reimbursing losses from animal epidemics and other needs. It is proposed to minimise the risks with the help of insurance. Insurance can be provided at different levels: from crop insurance to emergency insurance. Having insurance allows the company to reduce financial losses in case of unexpected events. In addition, the enterprise can use financial instruments to reduce currency risks. These tools will enable you to protect the company from changes in exchange rates.

Key words: risk, financial potential, financial security, business entities, agricultural sector
JEL codes: D81, G30

Introduction

The need for educated, reasonable managerial judgments regarding the efficient operation of businesses in the face of hostilities, uncertainty and consequent risk is becoming more and more urgent in today's world.

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The impact of risks on financial potential is contradictory: besides decelerating the processes that accelerate financial capacity development, they create positive synergies.

When faced with contemporary issues, it is necessary to compare the financial resources attracted for the company's running activity with the size of its financial result in order to accumulate the largest level of profit while also using the least amount of resources and capital. However, any type of operating activity consists of risks of additional unanticipated losses. The components of risk management for improving financial potential are the detection, identification and measurement of risks, as well as the development of algorithms aimed at reducing the likelihood of risk impact on the financial capacity and/or reducing the consequences of financial potential losses for the entity.

The source of risks includes all types of activities that the company provides, such as operational, financial and investment – and the result of the realisation is a loss (loss of income), which negatively affects the total financial result of the enterprise and the efficiency of using resources (and sometimes even their availability and quality) [Davydenko and Buryak 2022, p. 116].

Providing the efficiency of enterprises largely depends on the predictability of losses from risks by introducing rational methods of managing them. The enterprise actively, and occasionally unintentionally, manages risks in an effort to neutralise the destabilising disruptive components of the external and internal environment.

Currently, enterprises prefer scientifically confirmed, time-tested and strategically adequate levers of influence on risks.

Literature review

Risk is a negative factor that reduces the financial potential of any economic system, and the study of management tools is an urgent scientific task today.

New scientific research based on empirical data helped to scale up and justify the development of the Western theory of the economic substance of the risk of economic activity in Ukraine. It also became an important component of both theoretical and practical management. The modern understanding of the economic content of the risk of economic activity is related to considering it not only as a loss obtained due to a management decision, but also as a deviation from the planned result.

Analysis of the sources of scientific economic literature allowed us to single out three main directions of scientific research in the field of problems of modern risk management of economic activity of enterprises.

The first direction of scientific research highlights the problems of the theory, assessment and analysis of risks from the standpoint of probability theory approaches. The representatives of this direction were Hrabovy, Petrova, Romanov and Skrypnyk.

According to them, risk is the probability of an enterprise losing part of its resources, not receiving income, or incurring additional costs as a result of particular production and financial activities [Donets 2012, p. 64]. Risk is "the probability of losses or shortfall in profits compared to the predicted (expected) option" or "the amount of losses at a given level of significance (with a given probability)" [Skrypnyk and Nehrey 2015, p. 2]. Skrypnyk develops a methodology for assessing the risk of

decision-making at the level of an individual agricultural enterprise based on accounting reporting data.

The second direction of scientific research examines the theoretical and practical problems of applying economic and mathematical analysis methods to identify deviations from the planned results. Vitlinskyi, Velikoivanenko, Zbarskyi and Lipovyak-Melkozyorova became supporters of the second trend. In particular, according to the second direction, risk is an economic category that reflects the characteristic features of the perception by interested subjects of economic relations of objectively existing uncertainties and conflicts inherent in the processes of goal-setting, management, decision-making and evaluation, which are burdened by possible threats and unused opportunities [Vitlinskyi et al. 2004, p. 78] or a possible deviation from the goals set by subjects of economic activity [Zbarskyi et al. 2011, p. 61-65].

The third direction considers separate theoretical trends of risk research and proposes qualitative and quantitative measurement methods of risk factors. The author is Chepurko, and a generalised definition of the category of economic risk was supported as known in the infinite uncertainty of the relationship between the reality of the economic system and the possibilities of its transformation into some future reality identified by the subject, which can arise from the interactions of causes and consequences, accidental and necessary, as well as internal and external conditions. In his scientific works, he develops methodological approaches for quantitative identification, assessment and hedging of economic risks of agro-industrial enterprises [Chepurko 2000, p. 17-18].

Research methodology

The primary task of the methodology is to determine the imperatives of strategic development of the financial potential of economic entities. The purpose of the strategic development of financial potential is to achieve the strategic goals of the business entity, which directly affects the maximisation of profits and the minimisation of enterprise risks. According to the study of the strategic development of the financial potential, it is necessary to evaluate the impact of the imperatives on the change in the state of the financial potential. Economic imperatives are certain rules of behaviour of the rules of behaviour of all structural elements of the economic system, taking into account various factors affecting them [Magretta 2013, p. 51]. Imperatives require the definition of priority tasks, indicators, criteria and targets and ways to achieve them. The objective of the general strategy, the development of the concept of ensuring strategic development, the formulation and selection of a strategy for the development of financial potential, the implementation of the strategy while taking risk into consideration, and financial controlling for the implementation of the strategy are the tools for implementing imperatives.

Based on the need to assess the impact of imperatives on changes in the state of financial potential, a risk-oriented approach is important in strategic management of the financial potential of economic entities in the agricultural sector of the economy. Risk is a feature of the market economy inherent in the external and internal environment of the functioning of economic entities at various levels. To counteract risks, a risk management system is created in modern enterprises, which is considered a set of measures, methods and levers – the result of which is an anti-risk policy with a clearly formulated strategy

and tactics, unified tasks and target orientations [Poida-Nosyk 2012, p. 3]. Risk and uncertainty are unavoidable factors in agriculture that require careful management. Farmers face production risks due to weather, crop and livestock performance, pests and diseases, as well as institutional, personal and business risks [Portna 2017, p. 122-127]. Risks negatively affect all performance indicators of enterprises, including their financial potential as they cause funding deficits, insolvency, reduced creditworthiness and deterioration of asset quality. The mentioned risks can be transformed into the risk of non-profitability and, in the future, the risk of bankruptcy [Kozyk et al. 2014, p. 31]. The risks of developing the financial potential of business entities are divided into non-financial and financial. The main non-financial risks are (Figure 1): strategic, operational (including legal) and compliance risk (including the risk of business reputation). By risk, we mean "the probability of losses or additional losses or failure to receive income, or failure of the party to fulfil contractual obligations as a result of the influence of negative internal and external factors" [Panchenko 2019, p. 350-357]. Financial risks include market (currency, stock, commodity), credit, interest and liquidity risk [Plysa 2001, p.70]. The specified types of financial risks have different significance for individual economic entities of the agricultural sector of the economy: stock risk – for large agricultural holdings, the securities of which are in circulation on trading stock platforms, including foreign;

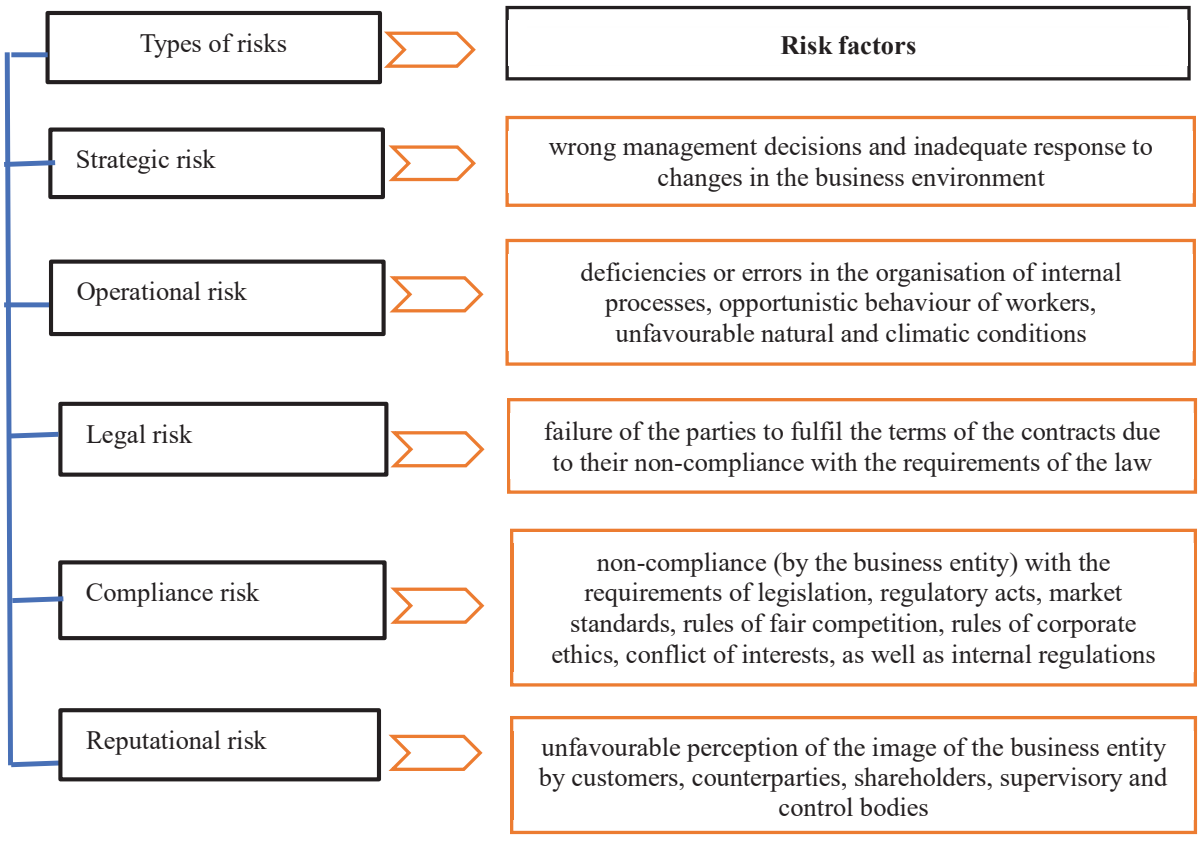

Fig. 1 Types of non-financial risks of the development of the financial potential of economic entities
Source: compiled by the authors.

currency risk – for enterprises that actively conduct foreign economic activity (export--import operations); commodity risk – it is inherent in almost all economic entities of the agricultural sector of the economy. It arises due to price fluctuations on agricultural exchanges, unfavourable changes in the market value of agricultural products, ready-made food products and other commodity stocks held on the balance sheets of enterprises. The source of currency risk is adverse fluctuations in foreign exchange rates that affect the assets and liabilities of business entities.

Stock risk arises due to adverse changes in the market value of shares and other securities with non-fixed income issued by business entities and corporate securities that are the object of investment. In domestic conditions, the stock risk of business entities is systemic due to the deformed nature of the financial market infrastructure – which, from the initial stages to the present, is an integral feature of its development. The indicated deformations are manifested in the low efficiency of the functioning of the securities market, excessive bank-centricity an inability to withstand external economic shocks.

Results and discussion

Financial potential forms the key development directions and instruments of financial activity and is responsible for efficiently providing cash flows from one enterprise to another. Today, financial potential is considered to be one factor that determines an enterprise's success, as the enterprise's competitiveness level and investment attractiveness depend on it. Undoubtedly, a sufficient level of financial potential and its effective use determine the enterprise's stable, sustainable, liquid and solvent state. Therefore, the development of a mechanism for effective management of financial potential is an important task for enterprises.

Risk is a market economy feature inherent in the external and internal environment of economic entities functioning at various levels. Risks negatively affect all performance indicators of enterprises, including their financial potential as they cause a shortage of funding, insolvency, non-creditworthiness, reduced financial stability and liquidity and deterioration in asset quality.

As an economic category, risk means the probability of unexpected losses (reduction or complete loss of profit, shortfall in planned income, unexpected expenses, loss of income part or all equity under uncertain conditions of financial and business activities environment).

Therefore, the close relationship between risk, probability and uncertainty is clearly visible. The risk factor affecting the enterprise's activity is rapidly increases in a market economy. Financial risks are a particular group of risks that are observed throughout the entire period of an enterprise's activity.

Financial risks have an objective basis due to the uncertainty of the external economic environment concerning the enterprise. Objective economic, social and political conditions characterise the external environment. The uncertainty of the external environment determines the effect of many factors that are difficult to predict. These include supply and demand for goods, funds, factors of production, alternatives for the use of capital, various investment options, insufficient and unreliable information, etc.

Economic decisions under uncertain conditions are made within the framework of the so-called decision theory (i.e., an analytical approach to choosing the most efficient solution). Depending on the degree of certainty of possible outcomes and consequences, decision theory considers the following three types of models:

- decision-making under certainty (i.e., each action is known for certain to lead to a particular outcome);
- decision-making under risk, where each action leads to one of many possible outcomes and has a calculable or estimated probability of occurrence;
- decision-making under uncertainty, when an action or their combination leads to a wide variety of outcomes but the possibility of their occurrence is completely unknown.

The impact of risks directly on the financial potential of enterprises is ambiguous: in addition to slowing down production and financial processes that ensure the stable development of financial potential, they also have positive synergistic effects [Kartuzov 2012, p. 115-124].

Risks can affect the financial potential of an enterprise in various ways.

First, the risks may lead to a decrease in the enterprise's profit. For example, if an enterprise depends on raw materials from a certain country and that country experiences political instability or natural disasters, this may result in losses for the enterprise due to a decrease in production volume or an increase in the cost of raw materials.

Second, risks may affect the financial stability of an enterprise. For example, if an enterprise has a significant amount of debt and a change in the interest rate may lead to an increase in interest payments, this may reduce the financial stability of the enterprise.

Third, risks can affect the financial attractiveness of an enterprise to investors. For example, if an enterprise has high risks, this may reduce investors' interest in the enterprise and lead to a decrease in the capital that can be raised for further development.

It means, risks can have a significant impact on the financial potential of an enterprise, and enterprises should carefully assess risks and take appropriate measures to reduce their impact on their activities.

The main risks affecting the financial potential of an enterprise include:

- financial risks such as changes in exchange rates, changes in interest rates on loans, changes in prices for goods and services used by the enterprise. These risks can reduce the enterprise's income and increase its expenses;
- production risks such as disruption of the production process, damage to equipment, loss of suppliers, etc. These risks can lead to a decrease in production and an increase in the cost of repairing and replacing equipment;
- liquidity risks such as payment system arrears, delays in payment from customers, inability to obtain loans, etc. These risks can lead to a decrease in the enterprise's liquidity and an increase in the cost of attracting additional resources;
- reputational risks such as scandals, allegations of legal violations, negative environmental impact, etc. These risks can lead to a decrease in the trust of customers and partners, which can cause a decrease in revenue and increase advertising and reputation restoration costs.

Therefore, enterprises should be prepared for risks and have appropriate risk management measures in place.

Let's assess the state of financial potential for the industry by groups of enterprises and indicators of solvency, independence and profitability (Table 1).

Table 1. Analysis of the dynamics of financial indicators of enterprises in the agricultural sector of the Ukrainian economy by their size

Indicator	Years						Deviation of 2020 compared to 2015
	2015	**2016**	**2017**	**2018**	**2019**	**2020**	
Large-sized enterprises							
Solvency ratio	0.90	0.70	0.75	1.44	1.30	1.29	0.39
Equity ratio	0.47	0.41	0.43	0.60	0.56	0.58	0.11
ROE:	0.41	0.20	0.13	0.17	0.06	0.12	-0.29
• return on sales	0.40	0.23	0.21	0.20	0.07	0.10	-0.30
• asset turnover	0.48	0.35	0.26	0.51	0.45	0.48	0
• financial leverage	2.12	2.44	2.34	1.70	1.80	2.11	-0.01
POCE	0.36	0.18	0.11	0.16	0.05	0.09	-0.27
Medium-sized enterprises							
Solvency ratio	0.69	0.66	1.02	1.16	1.15	1.12	0.43
Equity ratio	0.41	0.40	0.50	0.54	0.54	0.53	0.12
ROE:	0.36	0.24	0.17	0.15	0.28	0.27	-0.09
• return on sales	0.24	0.21	0.15	0.14	0.25	0.29	0.05
• asset turnover	0.61	0.46	0.57	0.58	0.60	0.70	0.09
• financial leverage	2.45	2.52	1.98	1.87	1.87	1.91	-0.54
POCE	0.28	0.20	0.15	0.14	0.25	0.27	-0.01
Small-sized enterprises							
Solvency ratio	0.79	0.16	0.88	0.70	0.84	0.81	0.02
Equity ratio	0.36	0.14	0.47	0.41	0.46	0.48	0.12
ROE:	0.36	0.27	0.15	0.13	0.11	0.14	-0.22
• return on sales	0.29	0.25	0.14	0.11	0.10	0.14	-0.15
• asset turnover	0.45	0.15	0.51	0.49	0.51	0.50	0.05
• financial leverage	2.78	7.18	2.13	2.42	2.19	2.23	-0.55
POCE	0.30	0.24	0.14	0.10	0.09	0.10	-0.20

Source: own calculations based on the data from [State Statistics Service of Ukraine].

The analytical study of changes in the financial indicators of enterprises in the agricultural sector of the economy revealed an increase in the financial potential of enterprises in the industry due to an increase in their solvency and financial independence in all three groups.

The solvency ratio of large- and medium-sized enterprises increased by 0.39 and 0.43, respectively, and in 2018-2020, reached the regulatory value. The solvency of small--sized enterprises also improved. Nevertheless, in 2020, the indicator was 0.81, 0.02 higher than in 2015, but did not reach the regulatory value.

In 2016, the financial independence (equity) ratio was the worst in all three groups of enterprises. In particular, among small-sized enterprises, it had the lowest value compared to medium- and large-sized enterprises and amounted to only 0.14. However, during 2017-2019, the value of the indicator increased and met the regulatory value. In 2020, for small-sized enterprises, the indicator was close to the regulatory value – 0.48; for large-sized enterprises – 0.58; for medium-sized enterprises – 0.53.

In the meantime, all three groups' metrics of capital use efficiency – both equity and total – have negative dynamics. The lowest efficiency of capital use is observed among large-sized enterprises. Medium-sized enterprises use capital most efficiently.

Agriculture is subject to various financial risks as it depends on natural conditions, product price fluctuations and other factors that may affect its income. In our opinion, the main financial risks associated with agriculture include:

- Product price fluctuation risk – prices for agricultural products are generally dependent on market supply and demand and may fluctuate from season to season. Such fluctuations may affect the income of agricultural enterprises and may lead to losses;
- Weather conditions risk – agriculture is dependent on natural conditions such as rain, droughts and other hazards. Adverse weather conditions can lead to lower yield, reducing revenues;
- Financing risk – securing financing for agriculture can be challenging as agricultural enterprises, especially small- and medium-sized ones, typically have limited access to loans. Excessive use of loans can lead to reduced financial stability if the necessary income is not generated;
- Technological change risk – agricultural-related technologies are constantly changing, which may result in the need for new investments and resources. The need for significant investments may increase the risk of investing in the enterprise.

In the agricultural sector, financial risks are closely related to the logistics sphere. Challenges for the logistics industry arose several years before the beginning of a new stage of the Russian-Ukrainian war.

It is common knowledge that Ukrainian agricultural product exports occupy one of the world's leading cities. Although the war destroyed many existing chains of cooperation with foreign partners, agribusiness is now active restores agreements.

The logistics system's efficiency is largely determined by rationalisation of the movement of financial flows and their harmonious combination with material, information and service flows. An increase in the efficiency of the movement of commodity flows is

achieved mainly due to the improvement of their financial service; hence control and minimisation of financial risks in this area should not be bypassed by management.

Today, in Ukraine and around the world, agricultural entrepreneurs insure future harvests and other results of their work that depend on weather conditions and other destructive factors, which will contribute to the strategic development of the financial potential of enterprises in the industry. It should be noted that there is no unified methodological and regulatory framework for agricultural insurance in Ukraine, which hinders its development. The most popular crop insurance products for agricultural enterprises are total loss + spring frost (40% of insurance contracts, 41.9% of insured areas, 50.8% of affected areas, 54.3% of insurance payments); multi-risk insurance of future crops (45.8% of insurance amounts and 57.6% of insurance premiums). In the case of multi-risk insurance, crops are insured against major weather risks, risks of damage to crops by wild animals, fire and some other risks (Table 2).

Table 2. Characteristics of crop and livestock insurance products, 2020

Programme	Share of					
	contracts	insured area (animals)	insured amount	premiums collected	affected areas (animals)	insurance payments
Crop						
Perennial planting	0.5	0.3	1.6	1.2	0.5	19.4
Total loss	11.0	12.0	8.0	12.0	0	0
Total loss + spring frost	40.2	41.7	14.0	15.0	51.0	53.3
Other (roses)	0	0	0	0.2	0	0
Multi-risk						
• insurance of future crops	26.0	21.0	45.8	57.1	21.5	12.3
• insurance of crops before harvesting	1.5	1.6	3.0	1.5	0	1.0
Named risks	15.6	12.0	25.6	11.0	27.4	14.0
Partial and total loss + spring frost (for winter crops)	5.2	11.4	2.0	2.0	0	0
Total	100.0	100.0	100.0	100.0	100.0	100.0
Livestock						
Named risks	0.1	64.8	23.4	24.3	0	0
Complexity of risks (fire, illegal actions by third parties, natural disasters, accidents, diseases (including infectious diseases), forced slaughter related to epizootic control measures)	0.1	29.1	60.5	23.0	0	0
Complexity of risks (natural persons)	99.8	6.1	16.1	52.7	100.0	100.0
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: based on data from [State Statistics Service of Ukraine].

Crop and livestock insurance is a critical component of agricultural insurance in Ukraine. The main insurance products in this area are the following:

– Crop insurance: this type of insurance covers crop losses caused by weather conditions, diseases, pests and other risks that may affect yield levels. The insurance payment is made depending on the amount of damage.

- Animal insurance: this type of insurance covers risks associated with the death, injury and disease of animals. The insurance payment is made depending on the cost of the animal and the amount of damage.
- Theft insurance: this type of insurance covers the risk of theft of animals or crops from the agricultural enterprise territory.
- Fire insurance: this type of insurance covers the risk of a fire at an agricultural enterprise, which may cause damage to property, crops, etc.
- Financial risk insurance: this type of insurance covers the risk of currency fluctuations, changes in product prices and other financial risks that may affect the profitability of the agricultural enterprise.

Insurance companies may offer additional coverage for an additional fee. This may include hail insurance (damage is assessed separately according to different principles), insurance against the inability to carry out sowing operations due to adverse weather and/or the inability to harvest. This type of insurance is one of the most expensive and complex, and tariff rates can vary significantly by region. Limits on risks and payouts may also be set by insurance companies if risks are regularly realised or if crop producers lack the appropriate knowledge of crop cultivation.

Insurance products can be differentiated for certain fruits and vegetables and allocated to separate programmes depending on how they are consumed (fresh or processed). A new trend is the development of insurance programmes for oilseeds (soya, rapeseed, etc.) and genetically modified crops, which usually have lower insurance rates due to their greater resistance to drought.

In the structure of livestock insurance products, the complexity of risks of natural persons accounted for 99.8% by the number of contracts, 50.7% by the share of collected insurance premiums and 100% by the share of affected animals and insurance payments. The named risks top the ratings by the share of insured animals (64.8%), the complexity of risks (fire, illegal actions by third parties, natural disasters, accidents, diseases (including infectious diseases), forced slaughter related to epizootic control measures) has the largest share in the insured amounts (60.5%).

The low level of agricultural insurance's influence on the strategic development of the agricultural enterprises' financial potential is explained by the insufficient level of development of this type of insurance due to the influence of several factors, including: mutual distrust of insurance companies and agricultural enterprises; perception of insurance not as an instrument of financial risk management, but as an additional financial burden when applying for bank loans; narrow line of insurance products that would meet the requirements of agriculturists according to the 'price-quality-reliability' criteria, difficulties and artificial obstacles in obtaining insurance compensation and inconsistency of state policy in providing insurance subsidies [Panchenko 2019, p. 350-357].

The use of new innovative insurance products by agricultural enterprises, such as index insurance, will help reduce their risks of losing financial potential. Agricultural insurance using weather data (weather index) is based on the deviation of the temperature or weather data from the average long-term level for the period most critical for the growing season. Index agricultural insurance is an alternative to the classic crop insurance based on a regional crop yield index.

The impact of risk on the agricultural enterprise's financial potential means an assessment of the extent to which possible risks may affect the enterprise's financial performance, such as profit, working capital, assets, etc. The risk may differ for each agricultural enterprise, depending on its size, type of activity, market situation, technical equipment and other factors.

Assessing the impact of risk on the financial potential of an agricultural enterprise involves analysing the risks that may arise in the course of the enterprise's activities. Various methods can be used for this purpose, such as SWOT analysis, Porter's analysis, PESTEL analysis, risk matrix, etc.

Based on the conducted analysis, various measures can be offered to reduce the impact of risks on the agricultural enterprise's financial potential. These measures may include developing a risk management plan, creating a reserve fund, reducing dependence on a single market or product, improving technical equipment, etc.

The choice of a financing sources' rational structure for agricultural enterprises' activities should be based on several factors, such as the enterprise's need for capital, risks and the cost of each source of financing.

The main sources of financing for agricultural enterprises are:

- equity capital – money invested in the enterprise by the owners. If an enterprise has enough equity capital, it can be used for business development. However, the use of equity capital may reduce the owners' profits;
- loans – an enterprise can receive loans from banks, financial institutions and other creditors. This is a fairly common source of financing as it allows obtaining the necessary funds for the enterprise's needs but requires repayment of obligations within the specified period and payment of interest for the funds used;
- leasing – a form of renting equipment or property for which the enterprise pays rent. Leasing may be beneficial for an enterprise that is unable to purchase the necessary equipment at one time but can pay for it in instalments;
- issue of shares – an enterprise can issue shares and sell them to investors, thus obtaining the necessary funds. Issuing shares can be beneficial if the enterprise has the financial potential to increase profits in the future.

The policy of the agricultural sector's financial support should be aimed at the best combination of sources and methods of financial support under different scenarios in the context of ensuring financial stability and profitability and acceptable risk of agricultural enterprises' activities.

The effectiveness of implementing the financial strategy of agricultural enterprises depends on many factors, including the following:

1. The financial position of the enterprise. If the enterprise has sufficient financial resources, implementing the financial strategy may be more successful.
2. The level of competition in the market. If the market is highly competitive, the enterprise must pursue a more aggressive financial strategy to ensure its competitiveness.
3. The enterprise's pricing policy. The right pricing policy can affect the enterprise's profitability and competitiveness.

4. The level of investment in fixed assets and technical re-equipment. Investing in fixed assets can provide an enterprise with the necessary resources to expand production and improve efficiency.
5. The speed of working capital turnover. The speed of working capital turnover can affect the enterprise's liquidity and ensure its financial stability.
6. Level of debt burden. If the enterprise's debt burden is excessive, it may be difficult to implement the financial strategy.
7. Risk management policy. A well-chosen risk management policy can help an enterprise reduce potential risks and increase the enterprise's efficiency.

Conclusion

Risk management in developing business entities' financial potential is a strategic and tactical process.

At the strategic level, risk management should determine the long-term strategy for the enterprise's financial potential development, considering financial goals, risks and opportunities arising from changes in the market and industry.

At the tactical level, risk management should consider specific financial risks and ensure appropriate management using various financial instruments and methods. Tactical tasks include tracking the enterprise's financial performance, budgeting and financial planning, liquidity management and financial structure optimisation.

Therefore, risk management in developing the business entities' financial potential is both strategic and tactical and is an important component of the enterprise's financial management.

In general, risk mitigation is the final stage of managing the risks of loss of financial potential and is carried out in the following ways: avoidance (termination of relevant operations or relations), reduction, minimisation, limitation, localisation, diversification (dispersion to avoid excessive concentration), risk sharing and hedging (compensation of losses from the hedged item by the profit from the hedging instrument arising under the same conditions or events). Risk mitigation tools include: the development of effective preventive measures against their occurrence; the creation of reserve (insurance) stocks; external insurance; obtaining legislative guarantees of protection against certain types of risks; other forms of risk insurance.

We are currently watching the Ukrainian financial system face the most difficult test in its history, a test of strength by war. As it shows world experience, even in a war economy you can survive and win, this needs to solve several new tasks.

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Zarządzanie ryzykiem rozwijania potencjału finansowego podmiotów gospodarczych

STRESZCZENIE

Utrata potencjału finansowego jest jednym z najpoważniejszych zagrożeń, na jakie narażone są przedsiębiorstwa. System zarządzania ryzykiem utraty potencjału finansowego pomaga przedsiębiorstwom identyfikować, oceniać i zarządzać ryzykami, które mogą mieć wpływ na ich kondycję finansową. Celem artykułu jest identyfikacja głównych czynników, które są podstawą zapewnienia potencjału finansowego oraz uzasadnienie działań neutralizujących ryzyka podmiotów gospodarczych w sektorze rolnym w Ukrainie. Obecnie największymi zagrożeniami w tym zakresie jest niska aktywność gospodarcza, niewystarczający poziom wyposażenia technologicznego i innowacyjności, brak rentowności i powolna rotacja kapitału, trudności w dostępie do kredytu dla małych i średnich przedsiębiorstw oraz zmiany klimatyczne. Przedsiębiorstwa rolne narażone są na różne ryzyka utraty potencjału finansowego, co może wiązać się ze zmianami warunków pogodowych, epidemiami wśród zwierząt, zmianami legislacyjnymi oraz ryzykami walutowymi. Jednym ze sposobów neutralizacji ryzyka jest tworzenie funduszu rezerwowego na wypadek nieoczekiwanych zdarzeń, które mogą doprowadzić do utraty potencjału finansowego przedsiębiorstw. Taki fundusz może obejmować środki finansowe, które można przeznaczyć na ponowny siew upraw, naprawę infrastruktury, pokrycie strat spowodowanych epidemiami zwierząt, itp. Proponuje się zminimalizować ryzyko, rozpoczynając od ubezpieczenia upraw, po różne formy ubezpieczeń awaryjnych, co pozwala przedsiębiorstwu ograniczyć straty finansowe w przypadku wystąpienia nieoczekiwanych

zdarzeń. Dodatkowym elementem minimalizacji ryzyka są instrumenty finansowe, stosowane w celu ograniczenia ryzyka walutowego, zabezpieczające przedsiębiorstwo przed zmianami kursów walut.

Słowa kluczowe: ryzyko, potencjał finansowy, bezpieczeństwo finansowe, podmioty gospodarcze, możliwości rozwoju, sektor rolniczy

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RESILIENCE IN AGRICULTURE: IS THERE THEORETICAL AND METHODOLOGICAL CHAOS?

ABSTRACT
The increasingly volatile conditions of doing business and the existence of societies are a clear reason to explore the category of resilience. The article aims to present and structure selected theoretical and methodological problems concerning resilience in agriculture. The results of a bibliometric analysis indicate a research gap referring to the category of financial resilience. The category of 'resilience' is based on relatively modern concepts from business management, particularly those close to risk management theory. Identifying and measuring capacities to build and strengthen resilience seems to be very important. Quantitative and qualitative methods may be used to explore the category 'financial resilience' in agriculture. There has been a noticeable research gap in agricultural finance to fill in. The indicator system for measuring the resilience of agricultural enterprises/farms has some limitations related to the aggregated nature of some financial categories. It would be advisable to develop a global measure of risk resistance in parallel (e.g., in the form of a synthetic index).

Key words: resilience, methodology of finance, risk management, agricultural finance
JEL codes: Q12, Q14, Q18

Introduction

The category of 'resilience' may be treated as a buzzword in social sciences [PWC 2021]. The increasingly volatile conditions of doing business and the existence of societies are a clear reason to explore the category of 'resilience'. The original meaning of resilience refers to bouncing back. Resilience has been applied in various areas of science with different approaches (engineering and life sciences – e.g., ecology and management, including supply chain management) [Pereira and Da Silva 2015]. According to Herrera [2017], "resilience is a flexible concept open to many different interpretations" – this implies several research problems, including designing a survey questionnaire for respondents). The concept of resilience may be treated as interdisciplinary. Nevertheless, its roots lie in neoclassical (i.e., risk measurement) and institutional economics

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(e.g., ex-post-public intervention). The concept of resilience incorporates some elements of public management and public policies. Results from bibliometric analysis, a meta overview, consent analysis and discourse analysis indicated abundant research papers, including an empirical analysis. A noticeable measurement and assessment gap can be seen in agriculture because "farming systems are faced with major risks and uncertainties; just think of the consequences of climate change" [Wageningen University and Research]. The article aims to present and structure selected theoretical and methodological problems concerning resilience in agriculture. The subsequent section reviews definitions of resilience in agriculture. The third section focuses on methodologies and methods of measuring and assessing resilience in agriculture, and the fourth section presents the concept of methodology for financial resilience in agriculture. The last section summarises and offers concluding remarks.

Review of the definition of resilience in agriculture

Resilience is a very broad category that has been adopted from engineering and ecology [Carpenter et al. 2001, Cumming and Peterson 2017] to social sciences [Walker et al. 2004], including economics and finance. According to the famous British Cambridge Dictionary, 'resilience' has two meanings [Resilience a]:

- "the ability to be happy, successful, etc. again after something difficult or bad has happened: trauma researchers emphasise the resilience of the human psyche";
- "the ability of a substance to return to its usual shape after being bent, stretched, or pressed".

The Merriam Webster dictionary offers two meanings of the word resilience, namely: (1) "the capability of a strained body to recover its size and shape after deformation caused especially by compressive stress"; (2) "an ability to recover from or adjust easily to misfortune or change". The first one refers to the physical features of a strained body, whereas the second one underlines the role of recovering (the change from a worse situation to a better state). Furthermore, a linguistic ambiguity may be described by a definition of 'resilience' that is provided by the Collins Dictionary [Resilience… b]: " (…) state or quality of being resilient", [ecology] the ability of an ecosystem to return to its original state after being disturbed", "[physics] the amount of potential energy stored in an elastic material when deformed". This shows that the category of 'resilience' in social sciences may refer to the dynamic manner.

There are several definitions of general resilience that are proposed by international organisations:

- United Nations Development Programme [UNDP 2020]: "The ability of individuals, households, communities, cities, institutions, systems and societies to prevent, resist, absorb, adapt, respond and recover positively, efficiently and effectively when faced with a wide range of risks, while maintaining an acceptable level of functioning and without compromising long-term prospects for sustainable development, peace and security, human rights and well-being for all";
- The International Panel on Climate Change [IPCC 2014]: "The capacity of social, economic, and environmental systems to cope with a hazardous event or trend or disturbance, responding or reorganising in ways that maintain their essential

function, identity, and structure, while also maintaining the capacity for adaptation, learning and transformation";

- United Nations Office for Disaster Risk Reduction: "The ability of a system, community or society exposed to hazards to resist, absorb, accommodate, adapt to, transform and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions through risk management".

Moreover, resilience from a social sciences perspective may be treated as "an ability" adopted from the life sciences. The essence of 'resilience' refers to the ability of the system/organisation/unit to recover from a difficult situation (e.g., stress, crisis, toughness). We propose our own definition of 'resilience' as the ability of the system or its element to cope with difficulties and recover after a shock/crisis situation. This may be useful for a detailed description of resilience at various levels of the agricultural system. We can add that resilience of organisation/system is not only a sum of the resilience of single units taking the various interrelations and synergy effects (if possible). There are several detailed definitions of resilience, including organisational, psychological, supply chain and community resilience (Table 1). We see that the agricultural system encompasses more than a collection of farms and appears to be more complex. Therefore, focusing on various areas of resilience (e.g., organisational, psychological) is increasingly important nowadays. Farms are surrounded by more and more complex socio-economic environments. This means that these entities should be able to manage supply chains. Community resilience is a useful and important category that may be applied to designing rural policy tools (e.g., safety nets for inhabitants of rural areas).

Table 1. Definitions of resilience in social sciences

The type of resilience	Description	Remarks related to agriculture (own author's remarks)
Organisational resilience	"the ability...to withstand changes in its environment and still function" [Mc Carthy et al. 2017].	The general concept that may be adopted to, for example, farming systems.
Psychological resilience	the ability to cope with a crisis or to return to pre-crisis status quickly, i.e., to recover quickly [de Terte and Stephens 2014].	This type of resilience may refer to farm operators or farm employees.
Supply chain resilience	"the capability of supply chains to prepare for unexpected events, and if it happens, they are able to respond to disruptions and recover from them so as to restore operations to the previous performance level or even to a better one" [Pereira and da Silva 2015, p. 2].	Farming systems consist of several food networks and chains.
Community resilience	The ability of communities to respond to/withstand/recover after disaster events; available resources of communities are important for building community resilience [Ayyoob 2016].	A farm is operating in rural areas. Underlining the significance of rural areas may be useful for a detailed analysis of farm resilience.

Source: own studies based on the literature review.

It should be noted that OECD [2020] incorporated the concept of resilience into holistic risk management (HRM) in agriculture. 'Extended' ERM should include:

- Focusing on ex-ante policies and prevention;
- Trade-offs;
- Participatory processes and deepening cooperation between actors of the food systems;
- Supporting investment activity of farm households to build important infrastructure related to 'resilience';
- "No-regret" policies.

Combining national agricultural policies with instruments important for strengthening general resilience in the county is important. Table 2 presents four various definitions of the resilience of agriculture at various levels of reference. First, most of them refer to the triad of capabilities (buffering, adaption and transformation), e.g., definitions that Darnhofer and OECD propose. The detailed definition that was formulated by Meuwissen et al. underlined the "ability to ensure the provision of the [food] system". De Oliveira et al. referred to the general idea of resilience as an ability to bounce back (returning to the original meaning of 'resilience').

Table 2. Definitions of the resilience of agriculture and their level of reference

Author(s)	Description	The level of reference
Darnhofer [2014, p. 461]	"encompassing buffer, adaptive and transformative capability"	a general concept
Meuwissen et al. [2019, p. 1]	"resilience of a farming system as its ability to ensure the provision of the system functions in the face of increasingly complex and accumulating economic, social, environmental and institutional shocks and stresses, through capacities of robustness, adaptability and transformability"	a farming system
OECD [2020, p. 11]	"the capacity to absorb the impacts of shocks, the capacity to adapt to an evolving risk environment, and the capacity to transform if the current system is no longer sustainable"	food systems
De Oliveira et al. [2022]	"A farm's resilience is its ability to cope with disturbances or to come back to a routine regime following these disturbances"	a farm

Source: own studies based on the literature review.

As presented in Table 3, 'resilience' at the farm level may be decomposed into three main capacities (i.e., buffer, adaptive and transformative ones). De Oliveira [2022] analysed their meaning, referring to the case of dairy farms. For example, buffer capacity describes "tolerating disturbances without moving away from its routine regime".

Table 3. Capacities related to the category 'resilience' at the farm level

Type of capacity	Description	Remarks related to practices of farm management (the case of a 'dairy farm')
Buffer capacity	"the farm can tolerate disturbances without moving away from its routine regime"	using fodder stocks by a dairy farm experiencing a drought
Adaptive capacity	"the farm can implement technical, organisational or commercial adaptations to cope with hazards and quickly return to a routine regime"	using diversification of crop rotations to spread climatic risks over different crops and thus increase the stability of production
Transformative capacity	"the farm is able to undergo significant transformations to remain prosperous"	• "changing the livestock breed" • "setting up a new production enterprise" • "modifying its marketing method"

Source: based on [de Oliveira et al. 2022].

A bibliometric analysis (Table 4) shows a large body of literature related to the resilience category. We used the combination TITLE ABS KEY (i.e., TITLE+ABSTRACT+KEYWORDS) search in the presented engines (Scopus, Web of Science and Econpapers). Furthermore, as for financial resilience regarding farms or agriculture, the number of papers was insignificant (less than 20). The ratios of the papers focused on financial resilience in agriculture and/ or farm to the number of papers on general resilience in agriculture was relatively low: Scopus – 0.3%; Web of Sciences – 0.2%; Econpapers – 0.7%. This indicates that financial resilience is in the operationalisation phase. There are many papers related to resilience and farm (search 'resilience and farm'), e.g., as for Scopus – 5,431 objects. This shows that a category of resilience at the micro level is explored in various scientific disciplines. On the other hand, a set of papers related to 'resilience' and the 'agricultural sector' is narrower. If we combine the results of the aforesaid analyses with the share of papers related to social sciences (including economics, business and management, public policies and other related sciences), we note that this share was not higher than 20%. The highest values referred to the set of papers on 'resilience' and the 'agricultural sector'. Furthermore, the share of American authors of papers to the total number of analysed papers (Scopus/Web of Science) is significant (about 25% – resilience and agriculture for Scopus). We note that the number of papers from emerging and developing economies is growing (in particular, China and India). To conclude, the results of bibliometric analysis indicate that there is a research gap referring to the category of financial resilience. The category of 'resilience' is based on relatively modern concepts from business management, particularly those close to risk management theory. Resilience in agriculture may be explored on various analytical levels (food systems, supply chains, farm households, even fields, etc.). This means that its operationalisation should be based on a set of methodological approaches, including operational research, economic and financial analyses and risk analysis. Our analyses indicated that there is a significant nexus between food security and resilience in agriculture. Anderies et al. [2013] underlined that the process of globalisation has strongly local social-ecological systems (SESs). They propose referring to three concepts, i.e., sustainability, resilience and robustness "to address the multi-scale and multi-level challenges associated with global

change". Resilience may be analysed at various levels (field, farm, regional and global) from the perspective of food security as "maintaining production of sufficient and nutritious food in the face of chronic and acute environmental perturbations" [Bullock et al. 2017]. Currently, resilience in agriculture is analysed more broadly, i.e., regarding the food systems; for example, Tendall [2015, p. 17] underlined "the complexity of whole food systems, including social, economic and biophysical processes operating at many scales". We consider that analyses focused on the problems of agricultural supply chains in the context of risk and resilience may be more popular [Lead and Revoredo--Giha 2013]. Exploring how farmers' attitude to risk and resilience is increasingly important from the perspective of designing new public policy instruments, particularly in the context of climate change [Herman et al. 2018].

Table 4. Results from a bibliometric analysis related to resilience in agriculture

Search engines	Resilience and farm*	Resilience and agriculture	Resilience and the 'agricultural sector'	'Financial resilience' and (farm* or agriculture*)
Scopus	5,431	5,018	297	16
Web of Science	5,140	4,405	234	11
Econpapers (including grey literature)	1,734	2,347	276	12
The share of papers related to social sciences [%]				
Scopus	16.1	13.9	19.2	20.0
Web of Science	9.6	8.9	23.5	45.5
The share of papers written by authors with affiliation in the US [%]				
Scopus	21.1	25.0	12.5	25.0
Web of Science	21.3	25.2	15.4	27.3

Results from search engines from April, 13, 2023. Detailed calculations of 'the share of papers related to social sciences' and 'the share of papers written by authors with affiliation in the US' were not available for Econpapers.
Source: own studies.

Methodologies and methods of measurement and an assessment of resilience in agriculture

Considering that the category of 'financial resilience' seems relatively modern, we should explore it using both types of methods, qualitative and quantitative (Table 5). First, qualitative methods include, among other things, case studies for selected entities and survey methods. Surveying has some significant advantages. Quantitative methods employ data from literature reviews or overviews that are analysed by text mining techniques, for example.

Table 5. Results from a bibliometric analysis related to resilience in agriculture

Qualitative methods	Quantitative methods
• case studies • survey method (including expert survey, focus groups, in-person interviews) • economic experiment	• text mining (TM) • statistical methods (including multi-dimensional comparative analysis, e.g., PCA) • data mining (DM) methods

Source: own studies

OECD's approach includes a detailed analysis of resilience capacities both at the farm and sector levels (Table 6). The first one may be based on static and dynamic methods

Table 6. Analysing resilience capacities – farm and sectoral level

Farm level	Sectoral level
Static: using various indicators and weights, statistical methodologies (including principal component analysis, panel regression techniques).	Descriptive statistics of the three dynamic resilience capacities at the sector level. Employing descriptive information on the size of the farm classes that best operate on each of the three resilience capacities is useful to describe or graph the sector's resilience.
Dynamic: the dynamics of farm adjustment e.g., for economic/financial performance (or other financial categories) aftershocks • Quantifying the impact of a shock on performance measures/indicators (e.g., income). The change in each of the variables are calculated for all farms in different phases that are interrelated with different resilience capacities. • Statistical identification of dynamic drivers for resilience capacities at farm level.	A detailed analysis of how the productivity dynamics of the sector reacts after the shock. Markov-type transition matrices may be used for better estimation of e.g., productivity dynamics [Antón and Sauer 2021, Sauer et al. 2021] before and after the shock.

Source: own studies based on [Sauer and Morreddu 2020, Sauer et al. 2021, OECD 2022].

The concept of methodology for financial resilience in agriculture

The subcategory of resilience, namely 'financial resilience' may be useful in designing evaluations for CAP measures. We present its operationalisation as an important challenge from the perspective of public policies. In the empirical studies related to 'financial resilience', a profound gap may be noted. Adaptation and transfer of measures indicators from SME/household finance in the case of farm households seem to be useful. Nevertheless, it should be noted that a farm household has a hybrid nature: i.e., family household + family firm (enterprise). The peculiarity of the family income category relates to difficulties measuring and assessing farm profitability. Furthermore, identifying objectives for farm managers is relatively complex, so the number of objectives is usually more than three or four. Operationalisation of the concept of financial resilience should be easier for agricultural enterprises than farms. Long-term experience in ESG reporting in the food industry helps design various tools such as dashboards, performance cards and balanced score cards underlining the resilience problems. A detailed distress analysis based on multiple discriminant analysis.

Table 7 presents a set of three categories (i.e., profitability, stability and financial liquidity) of indicators that are used for the measurement of resilience to risks. Frentrup et al. [2014] designed a system of financial measures and indicators to test field farm exposure to risk. It should be noted that the category of stability is significant and includes five indicators.

Table 7. Financial resilience to risk factors of farm households – the German case of field farms

Group of indicators	Remarks
Profitability ROE (entrepreneur profit + interests from borrowed capital)/total capital	The ability to accumulate own equity as the main risk buffer
Stability Entrepreneur profit/Operational revenues Equity/(Equity + Debt) Change in equity/Profit [%] Degree in specialisation Revenue income structure [%]	The ability to be profitable and liquid in the long term when radical threats or changes in the environment appear
Financial liquidity Debt/cash flow [%] Current assets/Short term debt	A dynamic approach to financial liquidity, CF used as a proxy for the financial strength of the enterprise

Source: own studies based on [Frentrup et al. 2014].

Furthermore, von Wendt [2022, pp. 27-28] presented a more complex proposal for measuring and assessing farms' economic resilience. It should be noted that 'economic resilience' is a significant part of the financial category. Wendt's proposal was based on "a practicable two-dimensional scoring approach", which resulted in "a matrix formation contrasting a static dimension, estimated as a composite index of farm indicators, with a dynamic dimension, calculated as the probability of default using a Monte-Carlo--Simulation" [von Wendt, pp. 27-28]. Combining static and dynamic dimensions in financial analyses of farms is an important methodological challenge.

Conclusions

Definitions of resilience in agriculture underline its dynamic features. Identifying and measuring capacities to build and strengthen resilience seems very important. Quantitative and qualitative methods may be used to explore the category of 'financial resilience' in agriculture. There has been a noticeable research gap in agricultural finance to fill in. The answer to the question posed in the article's title is positive. The analyses of previous empirical studies show that the resilience category is not clearly defined. In addition, the measurement of resilience in agriculture, and in particular the subcategory of financial resilience, is based on different methodological approaches. Currently, it is difficult to indicate a trend in the field of standardisation and uniformity of methodological approaches. The indicator system for measuring the resilience of agricultural enterprises/farms has some limitations related to the aggregated nature of some financial categories. It would be advisable to develop a global measure of risk resistance in parallel (e.g., in the form of a synthetic index). It is necessary to consider expert assessments (e.g., for weighing individual subcategories). Limitations of our studies are related to focusing

on a financial approach to the measurement of resilience. The category/concept dynamic resilience should be regarded as multi-faced. Therefore, a holistic methodology capturing the dynamic relationship between food system capacities and actors must be devised. We propose a further empirical study based on an aggregated indicator as a dependent variable in econometric models. A detailed empirical study should include a panel approach in order to detect the impact of time on dynamic resilience. Our article may be a base for a more detailed systemic review with an in-depth quantification of bibliometric analysis (e.g., in line with PRISMA requirements).

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Odporność w rolnictwie – czy występuje chaos teoretyczny i metodologiczny?

STRESZCZENIE
Coraz bardziej zmienne warunki prowadzenia działalności gospodarczej i funkcjonowania społeczeństw są istotną przesłanką do eksplorowania kategorii odporności (*resilience*). Celem artykułu jest przedstawienie i uporządkowanie wybranych problemów teoretycznych orazmetodologicznych dotyczących odporności w rolnictwie. Wyniki analizy bibliometrycznej wskazują, że istnieje luka badawcza odnosząca się do kategorii odporności finansowej. Kategoria *resilience* opiera się na stosunkowo nowoczesnych koncepcjach z zakresu zarządzania przedsiębiorstwem, w szczególności tych, które są bliskie teorii zarządzania ryzykiem. Identyfikacja i mierzenie zdolności do budowania wzmocnienia odporności wydaje się być bardzo ważne. Zarówno metody ilościowe, jak i jakościowe mogą być wykorzystane do badania kategorii odporności finansowej w rolnictwie. W finansach rolnictwa zauważalna jest luka badawcza związana z pomiarem i oceną odporności finansowej. System miar i wskaźników do pomiaru odporności przedsiębiorstw/gospodarstw rolnych ma pewne ograniczenia związane z zagregowanym charakterem niektórych kategorii finansowych. Wskazane byłoby równoległe opracowanie miary całkowitej odporności na ryzyko, np. w postaci syntetycznego indeksu.

Słowa kluczowe: odporność, metodologia finansów, zarządzanie ryzykiem, finanse rolnictwa

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SCOPE AND FINANCIAL IMPLICATIONS OF THE INTRODUCTION OF IFRS 9 USING THE EXAMPLE OF A COMMERCIAL BANK

ABSTRACT
The aim of the research was to identify the financial consequences of introducing IFRS 9 in a leading commercial bank in Poland. The research period was six years and covered the years 2015-2020. It was established, inter alia, that IFRS 9, compared to the previously applicable IAS 39, changed the method of measuring financial assets and thus led to changes in the balance sheet and financial results. The introduction of IFRS 9 also increased financial provisions for loans to be repaid in the bank's portfolio.

Key words: IFRS 9, commercial bank, provision, financial instruments, evaluation.
Jel codes: G21, G23, G24, G28

Introduction

The situation of the Polish banking sector in 2021 was mainly influenced by the recovery of the Polish economy from the COVID-19 pandemic and the legal risk related to the portfolio of foreign currency housing loans (RRE FX portfolio). In 2021, commercial banks in Poland achieved a financial result of PLN 6.121 million, and cooperative banks over PLN 703 million. Importantly, these results were clearly better than the year before (respectively: minus PLN 652.0 million and plus PLN 472.6 million). It is worth noting that the financial results of banks depend to a large extent on the volume, number and quality of loans granted [UKNF 2022]. From January 1, 2018, the method of classifying loans and calculating the loan write-down and provisions is governed by the International

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Financial Reporting Standard 9 (IFRS 9) [OJEU 29.11.2016, L 323/1], which replaced the International Accounting Standard No. 39 (IAS 39). The most important difference between the above standards is the consideration of a loss at the stage of identifying evidence of impairment of financial instruments and not, as was the case in IAS 39, only when the bank has already incurred such a loss [OJEU 9.12.2004, L 363/1]. This regulation is particularly important for investors because, as a result of adopting the Act on IFRS 9, the results of banks are more accurate, and it is possible to determine earlier whether a given bank has problems with obtaining repayments of its loans [Styn 2012]. The operating model introduced by IFRS 9 is based on three degrees of change in credit risk [Juszczyk and Balina 2019]:

- first degree are loans for which credit risk has not deteriorated compared to the
- initial recognition,
- second degree are such loans for which risk deterioration occurred to a significant
- extent from the initial recognition, but there are no premises for further risk
- deterioration,
- the third degree applies to loans where there has been an irreversible total loss of
- their value.

It should be emphasised that IAS 39 did not have the second degree. It showed only loans with a loss and loans that did not generate losses. However, it is important that when evidence of impairment is detected on a given loan, a credit write-down is made [Frendzel 2016]. Then the value of assets in the balance sheet decreases, and provisions are made for potentially negative events in the future, which in turn reduce the financial result [Szczerbak et al. 2021]. All in all, this shows how the bank is preparing for a future loss related to the emergence of evidence of impairment of loans granted.

An element that should be mentioned before the valuation of financial instruments is the prior valuation of assets in the so-called fair value [Barczyk 2018]. Fair valuation is the value for which a given credit liability towards the bank could be exchanged and the liability settled. In the bank, the fair value may be measured at amortised cost. The definition of amortised cost appears in IAS 39, and it is also known as adjusted purchase price [Gorzewska 2021]. It is the initial value which is entered first in the books of accounts, less principal repayments and increased or decreased by the cumulative amortisation determined using the effective interest rate of any differences between the initial value and the value at maturity, and less any write-downs (directly or through a reserve account) for impairment or uncollectibility [Czajor 2020]. When the costs of credits or loans are high, they should be amortised according to the principle of matching revenues and costs [Hasik and Nita 2018]. All costs caused by credit obligations towards the bank are assigned to accounting periods during the duration of the credit.

International Accounting Standard 39 and International Financial Reporting Standard 9

The intermediate aim of the research was to discuss two regulations. The first of them concerns IAS 39, which was adopted in April 2001, and IFRS 9, which replaced it on January 1, 2018. These regulations concern the establishment of rules for the recognition and appropriate measurement of financial instruments that are to present useful data

needed, among others, for investors and analysts of financial statements [Napierała 2017]. This data is useful for assessing whether financial instruments are profitable for the bank and whether the loan portfolio is struggling with quality problems.

International Accounting Standard 39

IAS 39 Financial Instruments, Recognition and Measurement, which came into force in 2001, was subject to continuous revision until the end of its validity in order to facilitate its application to financial statements. Pursuant to this regulation, the rules for classifying financial instruments into four categories were introduced:

- loans and receivables,
- financial instruments at initial recognition designated as measured at fair value as part of the financial statements, i.e. through the profit and loss account,
- available for sale,
- held to maturity.

However, focusing on the impact of asset valuation on the financial statements, impairment losses needed to be recognised only when there was precise evidence in this regard, i.e. the so-called impairment loss from significant financial difficulties of the debtor, failure to meet the terms of the repayment schedule or other agreement and high probability of the debtor's bankruptcy. This translated into a clearly delayed recognition and creation of the provision, and thus information for investors came too late.

Going further, over time, one can recognise the key changes brought to the standard of conduct in this area. In 2003, information was published on three shielding relationships: the fair value shield, the cash flow shield and the shield of shares in net assets in foreign entities and the rules for their settlement. In 2005, the first category of financial instruments, i.e. loans and receivables, was extended, and therefore permissions for using the fair value option were recorded. In 2008, modifications were added to the reclassification of financial instruments. In turn, since 2007, due to a large number of corrections and clarifications, it was necessary to apply the current standard. A decision was made to create a new, better standard specifying the appropriate valuation and regulation of accounting standard hedges, on which not only institutions such as the ASBA (American Standards Board Accounting) and IASC (International Accounting Standards Committee), but also representatives of the G20 Group were invited. One of the most important goals of establishing this group was to create a uniform standard that should regulate accounting and the real value of financial instruments.

International Financial Reporting Standard 9

On June 30, 2009, the first part of the principles of valuation and classification of financial instruments was presented under the name Financial Instruments: Classification and Valuation. The name of IFRS 9 itself was presented on November 12, 2009, with the change of classification from four groups to two, i.e.:

- financial assets measured at amortised cost and
- financial assets measured at fair value.

The standard in this regard, despite an incomplete version, could be used in the financial statements for 2009. Initially, it was agreed that IFRS 9 would be published in its entirety in 2013; however, the protracted works indicated 2015 as the date of completion of the works. As planned, in 2010, the first projects concerning hedge accounting and impairment of financial assets appeared. In 2012, the International Accounting Standards Board (IASB) issued a draft of new requirements related to impairment and hedges, and in 2013, the publication of hedges concerned:

- inclusion of a new general hedge accounting model,
- enabling earlier adoption of the requirement to present in other income as a result of a change in the fair value of their own loan on liabilities designated as measured at fair value through profit or loss. In 2014, IFRS 9 was issued as a complete standard covering the previous requirements and additional changes introducing a new impairment model, expected loss and changes in the requirements for the classification and measurement of financial assets. The above changes completed the IASB's draft; therefore, the standard became effective on January 1, 2018, allowing for early application.

In 2016, the IASB published the regulation of IFRS 9 together with IFRS 4 on insurance contracts. The entity that decided to use the so-called overlay approach retrospectively in relation to financial assets did so at the time of the first application of IFRS 9. In turn, the entity deciding to apply the so-called deferred approach did so for annual periods beginning on or after January 1, 2018. As a result, in 2020, the changes concerned the "10 percent" fees for the derecognition of financial liabilities from the balance sheet. The amendment clarifies which fees a financial entity considers when applying the "10 percent" in paragraph B3.3.6 of IFRS 9 when assessing whether a financial liability should be derecognised. However, it is worth adding that, in this case, the financial entity only includes fees paid or received between the borrower and the lender, including fees paid or received by the entity or lender on behalf of the other party. At the same time, the deadline for all entities to comply with IFRS 9 was set on January 1, 2022. The last change concerned the distinction between IFRS 9 and IFRS 17; it is a narrow change of transition requirements for entities that first applied both standards at the same time.

Methodological issues

The purpose of the research was to identify the differences between the International Financial Reporting Standard No. 9 (hereinafter IFRS 9) and the International Accounting Standard No. 39 (hereinafter IAS 39) and to check whether the new guidelines for the classification and valuation of debt instruments used by the audited commercial bank affect its balance sheet and financial result. The following research hypothesis was adopted for verification: the introduction of IFRS 9 increased provisions for credit write-downs of the examined commercial bank in Poland. The paper identifies changes in the levels of established provisions resulting from differences between legal acts. However, it should be added that changes in the level of provisions were probably not only the effect of IFRS 9 but also changes in other economic factors, including the quality of the loan portfolio. The bank's

analysis was carried out based on annual reports for the years 2015-2021, with analysis of ratios calculated based on financial statements. This is the case study; the subject commercial bank is among the 5 largest in Poland. It offers investment, corporate and retail banking and offers financial services such as leasing and factoring. The bank has over 30 years of history in Poland. Also, as one of the first banks, it became an institution fully based on Internet activity as well as telephone and mobile services. It has over 5 million customers in retail banking and over 25,000 customers in corporate banking.

The analysis of changes in legal regulations was carried out on uniform texts available on the website containing the database of legal acts of the European Union: exposure classification, effective interest rate, cumulative amortisation and measurement at amortised cost. The study also used comparative analysis, including indicators of the dynamics of individual financial categories, as well as regression and determination coefficients, and statistical methods were used to determine the trend line of the discussed financial phenomena.

Findings

The documentation that was used to prepare the financial data are consolidated reports from 2015-2020. The lists allowed us to determine the change in the presentation of loans and advances granted by the bank between IAS 39 (years: 2015, 2016 and 2017) and IFRS 9 (years: 2018, 2019 and 2020).

The data presented in Table 1 were used to calculate and check the level of loan reservations and to determine the trend line in this respect. The level of provisioning is the ratio of the accumulated impairment to the gross carrying amount by customer group.

Table 1 presents the level of accumulated loan impairment to loans held. There was a visible decrease in the percentage for all loans in 2016, while the decreases are getting lower year on year, while in 2020, the highest growth dynamics were recorded compared to previous years.

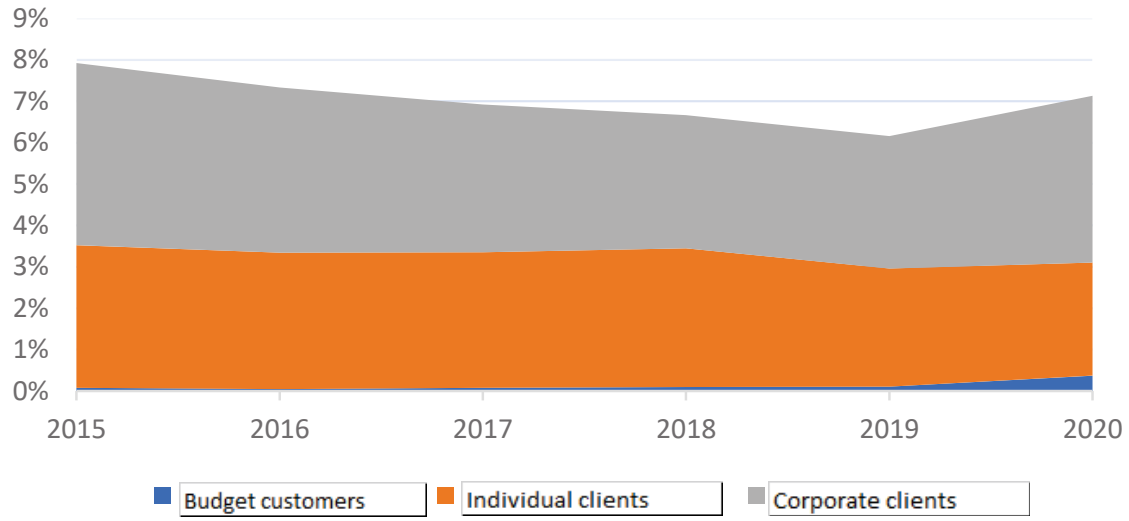
Table 1. Value of accumulated impairment of loans to the total value of loans [%]

	Years					
Wallet type:	2015	2016	2017	2018	2019	2020
Budget customers	730,571	457,094	7,530	10,048	0,102	0,369
Individual clients	3,449	3,295	3,281	3,351	2,855	2,737
Corporate clients	4,401	3,989	3,564	3,218	3,200	4,029

Source: own study based on the bank's annual consolidated statements.

Figure 1 presents the proportions of the accumulated impairment of loans and advances measured at amortised cost to gross value. The reporting standard in accordance with the requirements of IFRS 9 has resulted in a decrease in the value of loans for all groups of the bank's customers since 2019.

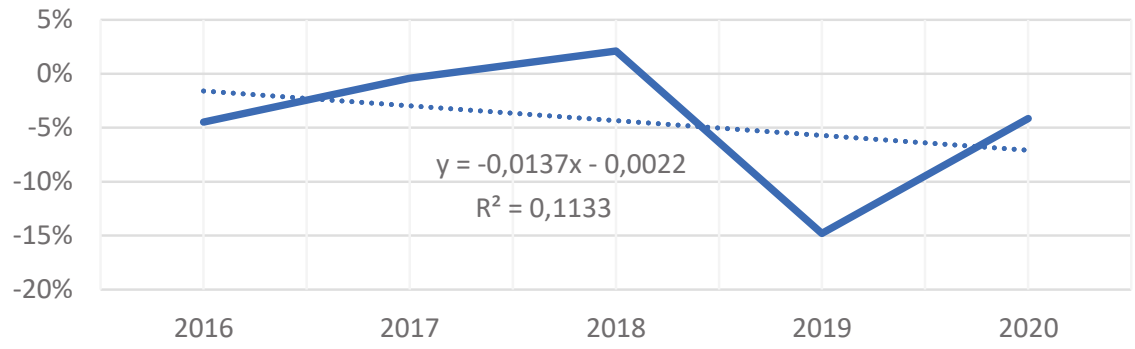
Figure 1. The proportions of the accumulated impairment of loans and advances measured at amortised cost to gross value



Source: own study based on consolidated reports in 2015-2020.

Figure 2 shows the growing level of provisions in 2017-2018; it coincides with the introduction of IFRS 9, and then we notice a decrease in 2019 and a clear increase in provisions in 2020. The characteristics of individual clients indicate that the portfolio provision is calculated, among others, using statistical models that are appropriately applied to the entire portfolio. A change from 2018 to 2019 of more than 17% may be a characteristic change, as the time coefficient of determination was 0.1133. This shows that IFRS 9 did not significantly change the amount of accumulated impairment of the bank's portfolio, which can generally be assessed positively.

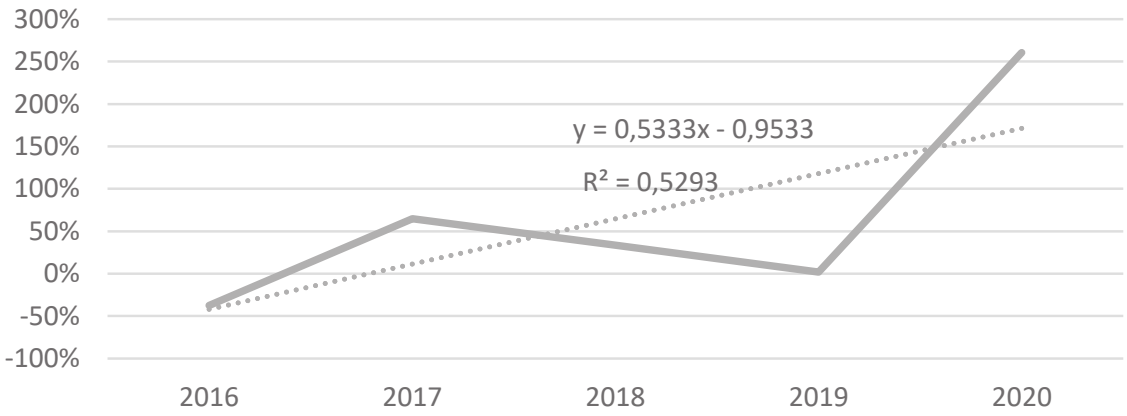
Figure 2. Growth level of the cumulative impairment ratio of loans to individual customers in 2016--2020 [%]



Source: own study based on consolidated reports in 2015-2020.

The portfolio of budget customers is specific and is usually treated individually by analysts, especially when the loans exceed the contractual value in internal regulations. Usually, however, all budget customers are treated individually due to the changes that occur in the social sphere and due to the diversification of the volume of monitored loans. Figure 3 shows the increases in provisions in 2017-2020, reaching even 260% in 2020. It can therefore be concluded that due to a significantly different treatment of this portfolio than the portfolio of individual clients, IFRS 9 has been applied in this respect, and by recognising impairment indicators for budget customers, this standard increased the level of provisions established in the audit period. The linear trend function shown in the figure indicates an increase in loan write-downs in the budget portfolio. The coefficient of the determination reached the value of 0.5293, and therefore nearly 53% of the volatility of the accumulated impairment of loans to budget customers resulted from the time factor, including the introduction of IFRS 9, and therefore the bank's situation in this respect deteriorated during the research period.

Figure 3. Growth level of the accumulated impairment of loans to budget customers in 2016-2020

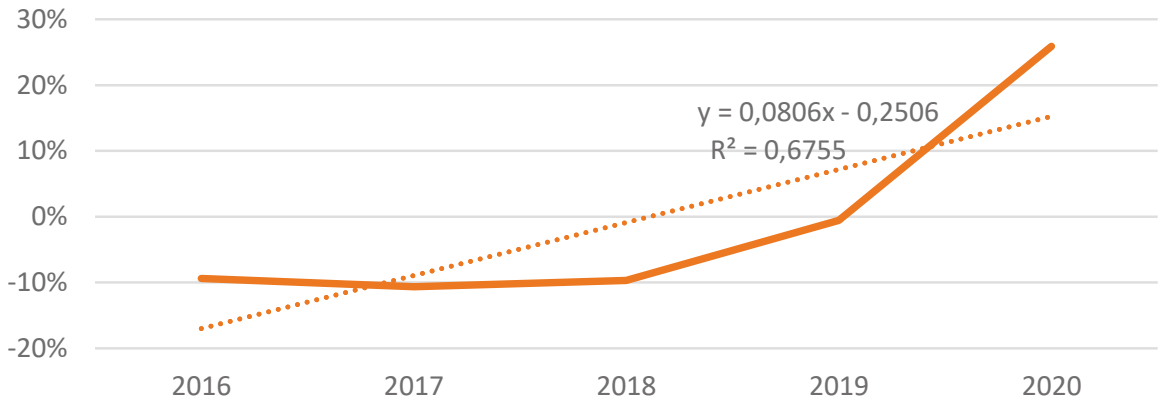


Source: own study based on consolidated reports in 2015-2020.

The last portfolio examined was loans granted to corporations. These loans are most sensitive to the requirements of IFRS 9. During the assessment of these loans, the PD (Probability of Default) parameter is determined, which constitutes the level of the calculated provision. It is worth noting that the positive level of the indicator was observed only in 2020; moreover, its change has been steadily increasing to 25.89% since 2017. The linear trend function is also increasing and has a regression coefficient of 0.0806.

With regard to corporate clients, IFRS 9 was associated in 2017-2020 with an estimated impairment ratio that was constantly growing. The time factor accounted for over 67.5% of the volatility of the cumulative impairment of corporate loans and the amount of write-downs. This confirms that IFRS 9, introduced on January 1, 2018, led to an increase in the estimated impairment of corporate clients' loans, which worsened the financial situation of the audited bank.

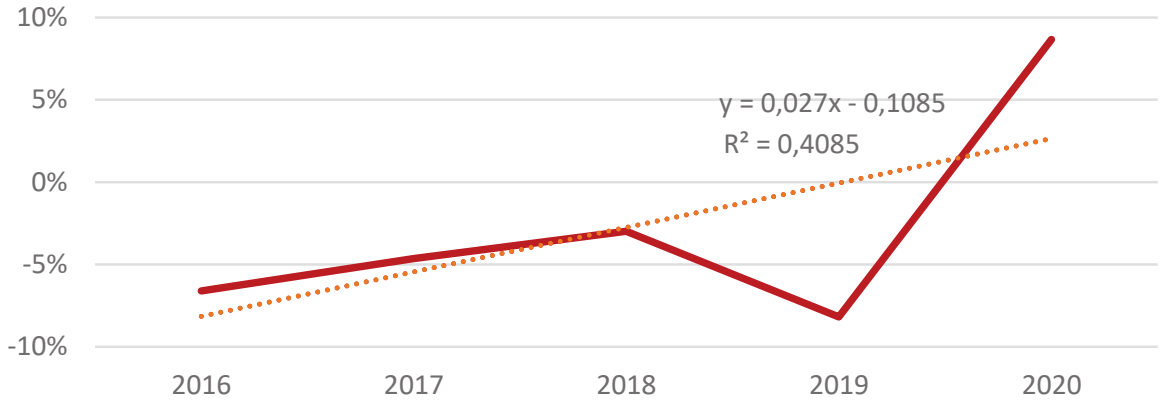
Figure 4. Growth level of the cumulative impairment of loans to corporate clients in 2016-2020 [%]



Source: own study based on consolidated reports in 2015-2020.

The level of the cumulative loan impairment ratio in total is similar to the same measure of individual customers, as the majority of the portfolio belonged to individual customers. However, the negative values that are in Figure 2 are, in turn, inhibited in Figure 5, thanks to budget and corporate clients. This creates a cumulatively increasing linear trend function, which confirms that IFRS 9 contributed to the increase in the loan provision for the bank in 2017-2020. The coefficient of determination was 0.04085. Thanks to this, it can be concluded that each subsequent year affected the cumulative impairment of total loans. Therefore, the introduction of IFRS 9 significantly contributed to the increase in the calculated amount of accumulated loan impairment, and thus the financial situation of the bank deteriorated as a result.

Figure 5. Growth level of the total accumulated impairment of loans in 2016-2020 [%]



Source: own study based on consolidated reports in 2015-2020.

Calculation of provisions by the bank in accordance with the regulations of IFRS 9

Statistical models are used to calculate the provision for individual customers. The bank manages credit risk based on supervisory requirements, market practices and own experience. The bank's policy in this regard defines, among others:

- division of clients into groups,
- credit rating levels defined by expected loss on credit,
- rules for accepting the objects of financing and collateral,
- concentration risk mitigation criteria,
- rules relating to selected industries.

The process of calculating the provision for corporate clients is related to such elements as:

- debtor's rating (PD-rating, Probability of Default), is an indicator of the probability of default by the counterparty,
- the Loss Given Default model is marked as LGD (Loss Given Default) and covers portfolios of exposures without evidence of impairment. The EAD (Exposure at Default) model, which also includes CCF, i.e. the Credit Conversion Factor that occurs when the loan is taken in a currency other than PLN,
- limit consumption component; it is based on elements specific to the customer,
- credit rating (EL-rating, Expected Loss), specifying the potential loss. It takes into account the client's risk (PD) and the specificity of LGD transactions. It is expressed as the product of LGD and PD. It is used at various stages of making a credit decision.

It is worth noting that the ratings provide relative measures of credit risk in percentage terms (PD% and EL%) and for companies on a contractual scale from 1.0 to 6.5 (PD, EL rating) when it concerns a loan amount above PLN 50 million and for small and medium enterprises. Calculating PD is a defined process that includes steps such as:

- financial analysis of annual reports,
- financial analysis of periodic data,
- timely assessment of the presentation of financial statements,
- risk assessment of qualitative red flags,
- assessment of the degree of integration of a group of debtors,
- adding arbitrary criteria.

Based on the expected loss (EL) credit score generated by imposing risk analysis on the client's risk assessment, depending on the exposure size (EAD) and the nature and extent of collateral, the transaction is or is not concluded with the client. The rating system creates the probability of default as PD expressed as a percentage (Probability of Default).

Qualification of loans in the bank's procedures according to IFRS 9 regulations

Loans granted by the bank are classified into three baskets; the first one includes exposures for which the risk has not increased significantly from the initial recognition since the loan was concluded. The second stage includes loans whose risk has increased significantly, and therefore a significant deterioration in the quality of the loan since its conclusion was found. To move from the first to the second basket, it is necessary to meet the so-called

soft premises, which were introduced in the regulations of IFRS 9. Exposures are assigned to stage 2 at the bank in accordance with the so-called "transfer logic", which defines the qualitative and quantitative grounds for a significant increase in credit risk. The third stage includes loans for which, from the beginning of the loan agreement, evidence of impairment was found and confirmed, resulting from a significant deterioration in the company's financial results or deterioration of the market on which the bank's counterparty operates. These are cases where, for example, an instalment payment is overdue for more than 30 days and when the counterparty's liability is at least PLN 500 in the case of a retail exposure or PLN 3,000 in the case of a corporate exposure. Therefore, these amounts are relatively low, which makes the bank highly sensitive to even a slight deterioration of the borrower's financial situation. The last qualitative criterion is inclusion on a special list of clients for closer observation, which increases the frequency of monitoring during the term of the loan. The entry of the borrower on the monitoring list is determined by means of internal bank documents that specify the conditions for entry on this list. The loans in the third stage are usually not repaid in full; therefore, the unpaid part is written off the balance sheet due to the impossibility of collecting them using the debt collection method. In the POCI (Purchased or Originated Credit-Impaired Asset) category, there are loans purchased by the bank that had evidence of impairment at the beginning of the loan agreement. They are usually purchased from other banks for the purpose of debt collection, which for various reasons, the previous bank could not afford. The reasons for the impairment of the corporate portfolio are:

- overdue payment of exposures by more than 90 days, with analogous limits being the premise for moving to the second stage;
- forced restructuring of the exposure by the bank;
- the client's filing for bankruptcy;
- disposal by the bank of exposures with a significant economic loss related to the lowering of the debtor's creditworthiness;
- fraud (extortion) of the client, which the bank considers a loss on a given exposure.

Making provisions for credit write-offs

It is worth noting that the established provision affects the bank's financial result. Table 3 shows the share of the established provision for loans granted to the analysed bank in the research period.

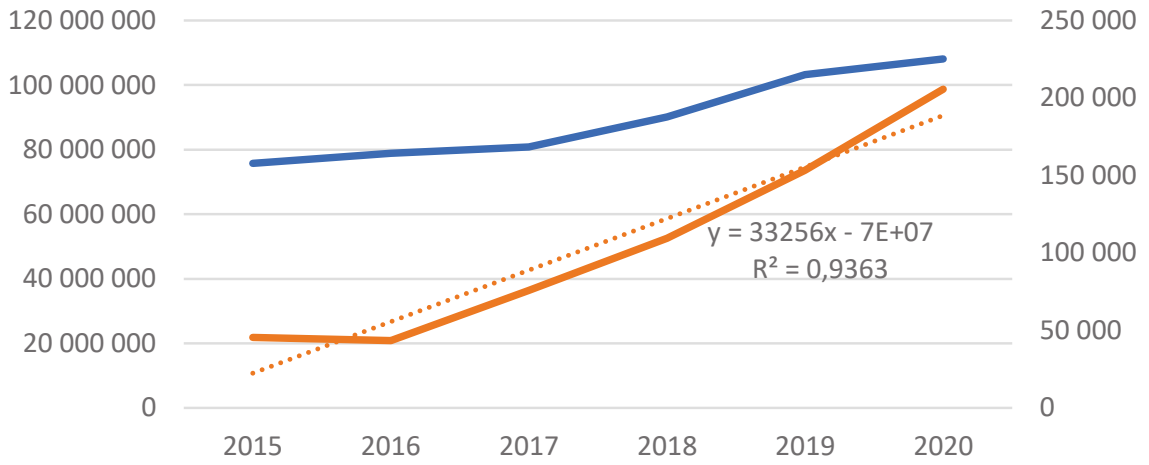
Table 3. The value of credit exposures, provisions and the level of provisioning

Years	Value of credit exposures [thousand PLN]	Provisions for credit items [thousand PLN]	The level of provisioning [%]
2020	108 092 810	205 661	0.1903
2019	103 203 254	153 432	0.1487
2018	90 117 432	109 409	0.1214
2017	80 871 285	75 715	0.0936
2016	78 829 513	43 435	0.0551
2015	75 749 039	45 606	0.0602

Source: Own study based on consolidated reports in 2015-2020.

Based on the data in Table 3, one can see increasing values in nominal terms. Also, the level of provisions to total exposure was increasing during the research period, and since 2018 the increase in provisions has accelerated, which supports that IFRS 9 resulted in an increase in provisions relative to credit exposures. Figure 6 also shows that since 2018 there has been an increase in the inclination of the provisioning trend line, and, crucially, this increase can be associated with the introduction of IFRS 9.

Figure 6. Volume of bank loans in relation to established provisions [thousand PLN] in 2015-2020



Blue line – value of credit exposures, brown line – provisions for credit positions.
Source: own study based on consolidated reports in 2015-2020.

The increase in the amount of provisions made in the audited bank has been ongoing since 2017, in 2018 and 2019, and the slope to the horizontal axis was constantly increasing. High values of the regression and determination coefficients indicate an increase in provisions is associated with the introduction of IFRS 9, which, as we know, came into force in 2018. Taking into account the results of the research, it should be stated that the introduction of IFRS 9 resulted in an increase in provisions for loan write-offs in the bank.

It is worth noting that there are accounting differences between the financial reporting standards, as IFRS 9 defines a new category of assets purchased or granted with impairment, the so-called Purchased or Originated Credit-Impaired Asset. These are loans that the bank purchased from another financial institution with impairment for their restructuring or recovery on their own. Crucially, such loans are purchased at a significantly lower value than their net carrying amount. On the other hand, IAS 39, in relation to the financial statements, lists two basic types of loans: healthy loans (incurred but not reported: IBNR) and loans with identified evidence of impairment (non--performing loan: NPL). Moreover, the banks used two methods of calculating provisions, i.e., individual analysis, which manifested itself in the portfolio of significant NPL exposures, and the group (statistical) method, which was used for significant and immaterial exposures from the IBNR portfolio and immaterial exposures from the NPL portfolio. It is important that in IFRS 9, the above division has been replaced by baskets, "healthy loans" have been divided into two baskets: the first, which is assessed with a twelve-month credit loss, is the ECL (estimated credit loss) calculation method, and in

the second basket there are loans with SICR (Significant Increase in Credit Risk), but for which no evidence of impairment was identified. Basket 3 includes bad loans classified as NPL, i.e. with recognised evidence of impairment. Stages 2 and 3 calculate the total expected credit losses. The concept of loans with a significantly increased credit risk is a clearly different look at the classification of loans; moreover, it allows one not only to create a security against entering the third stage of the loan, but also allows one to assess the bank's situation in terms of loans of various quality.

Conclusions

1. The conducted research was fragmentary, as it concerned only one leading commercial bank in Poland in terms of the balance sheet total. Therefore, the obtained results cannot be generalised to the entire population of commercial banks in Poland; however, they may be helpful and useful for managers of other banks.

2. It should be emphasised that until IAS 39 was in force, banks created write-downs only when the borrower had financial problems or could have had them before they were disclosed in the financial statements. Meanwhile, from January 1, 2018, i.e. from the entry into force of IFRS 9, the new procedure requires transforming an unidentified credit loss into an expected one, and the provision is made for an event that is likely in the future. This is a key change affecting the bank's financial statements.

3. It can be said that IFRS 9 has changed the existing model of classification and valuation of the bank's financial instruments. Moreover, banks applying international financial reporting standards were required to make disclosures in their financial statements for 2017 regarding the expected impact of applying new accounting standards on their financial position and financial result.

4. The introduction of IFRS 9 at the beginning of 2018 with regard to the valuation of loans increased the accumulated impairment of loans granted. Trend line research shows that the introduction of IFRS 9 in 2018 had an impact on increasing the level of provisions for credit exposures. Moreover, the bank's situation in this respect deteriorated every year. The introduction of this standard also resulted in an increase in provisions for expected credit losses in 2018-2020, which in turn reduced the bank's financial results in individual years of the research period.

5. In the coming years, a further increase in the level of loan provisioning can be expected due to, among others, the effects of the COVID-19 pandemic and the increase in interest rates on loans in 2022. However, there may have been a deterioration in the quality of the bank’s loans in 2018-2020 that would have resulted in an increase in the impairment of loans even without the adoption of IFRS 9.

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Zakres i skutki finansowe wprowadzenia MSSF 9 w banku komercyjnym

STRESZCZENIE

Celem badań było rozpoznanie skutków finansowych wprowadzenia MSSF 9 w wiodącym banku komercyjnym w Polsce. Okres badawczy był sześcioletni i obejmował lata 2015-2020. W toku badań ustalono m.in. że MSSF 9 w porównaniu do obowiązującego wcześniej MSR 39 zmienił sposób wyceny aktywów finansowych, a co za tym idzie, doprowadził do zmian w bilansie i wyniku finansowym. Wprowadzenie MSSF 9 spowodowało również wzrost rezerw na kredyty do spłacenia będące w portfelu banku.

Słowa kluczowe: aktywa finansowe, MSSF 9, wycena, rezerwy, bank komercyjny

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STRATEGY OF PUBLIC SUPPORT FOR AGRICULTURE AND RURAL DEVELOPMENT. ASSUMPTIONS AND PRACTICE

ABSTRACT
The aim of the article is to confront the arrangements of official strategy papers concerning agricultural and rural development, including the performance indicators, with the data illustrating the real policy pursued in this area and the effects of this policy. The content of key strategy papers as well as relevant data from the Central Statistical Office and the Ministry of Finance were also analysed. As a result, it was found that: (1) the indicators of objectives focused on supporting agriculture and rural areas adopted in analysed strategies cannot be used to interpret a coherent concept of the policy towards rural areas and agriculture; (2) there are inconsistencies between the arrangements of different strategies; (3) public support was aimed primarily at improving the income situation of farmers, to the detriment of achieving such objectives as improvement of agrarian structure and efficiency of farms, improvement of living conditions in the countryside and more effective environmental protection.

Key words: public policies, agricultural support, development policies, EU funds, regional development, local government finance
JEL codes: Z18, O13, H72

Introduction

The purpose of the article below is to assess the effectiveness of using public funds to support agriculture and rural development. The importance of this problem is determined primarily by the role played in the economy by agriculture, whose task is primarily to ensure the state's food security and which, moreover, significantly affects the condition of the natural environment.

An equally important problem, inextricably linked to the necessary modernisation of Polish agriculture, is the support for developing rural areas, which constitute – according to the applicable definitions – over 95% of the country's area and are inhabited by about 40% of the Polish population. Despite repeated declarations of the need to support the development of rural areas, the areas in which agriculture is the main type of economic activity are still undeveloped in terms of social and technical infrastructure, and thus also in terms of living conditions compared to larger cities and

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their neighbourhoods. We would also like to remind the reader that in recent years, amounts of PLN 50-55 billion have been allocated to support agriculture and rural development, i.e. approx. 7-8% of all public expenditures. As it will be presented below, the effects of such large expenses could be – with more reasonable use – much better.

The above list does not include expenditures financed with the administrative institution's own (other than budget subsidies) income for servicing agriculture. However, the amounts of these expenses are insignificant compared to those presented in Table 1.

Table 1. Public expenditure on agriculture and rural development in 2010-2021

Specification	2010	2013	2018	2019	2020	2021
	PLN million					
Total	**44,880.7**	**52,522.4**	**49,531.7**	**50,521.6**	**55,570.9**	**53,834.3**
State budget	27,097.3	27,199.4	26,810.6	27,647.0	30,136.8	30,078.9
including:						
subsidy for KRUS (Agricultural Social Insurance Fund)	15,671.0	16,464.8	17,466.5	18,859.2	18,919.9	18,666.7
institutional environment	1,886.5	2,498.6	2,658.0	2,760.2	2,873.8	3,104.0
co-financing	6,249.9	5,313.1	2,659.8	2,607.8	4,029.3	3,494.1
Budget of European funds	14,305.4	22,391.4	19,714.9	19,983.5	22,770.9	20,827.9
including:						
direct payments	12,582.6	14,133.3	14,599.6	15,000.3	15,179.6	15,461.6
Local government unit budget	3,478.0	2,931.6	3,006.2	2,891.1	2,663.2	2,927.5

[a] Without expenditure financed with subsidies from the state budget.

Source: own calculations based on the data of the [Sprawozdania budżetowe...].

The fact that the Agricultural Social Insurance Fund (KRUS) expenditure is almost entirely financed with budgetary resources and is entirely allocated to people related to agriculture speaks in favour of including budget subsidies for this fund in agricultural expenditure. As a result, subsidies to the farmers' social insurance system constitute budgetary subsidies for agricultural households.

In studies on public expenditure, expenditure meeting the efficiency criterion is defined as ensuring the achievement of the assumed objectives (and thus meets the effectiveness criterion) with the lowest possible expenditure, thus meeting the "economy" criterion [NIK 2006]. Therefore, it is clear that the effectiveness assessment may differ depending on the definition of objectives, which should be achieved by spending the analysed public funds. Therefore, it is possible that the same expenses will be effective for a certain set of assumed goals and ineffective when these goals are formulated differently.

Regarding the expenditures supporting the development of agriculture and rural areas analysed in this paper, we considered two alternative ways of formulating the public intervention objectives. The first one assumed that the objectives of supporting agriculture and rural areas were recognised as the achievement of the values of indicators related to the countryside and agriculture set out in the applicable strategy papers; the second one –

referred to the necessity to achieve (as a result of public intervention) such long-term goals like:

- ensuring food security, which means the need to ensure the largest possible share of food supply from domestic sources and, at the same time, ensuring the proper quality of food,
- implementing the constitutional principle of bequeathing to future generations all that is valuable from our heritage going back over a thousand years, which also means preserving the natural environment in the best possible condition, requiring agriculture and processing of agricultural products to adapt to the requirements of sustainable growth,
- ensuring equal treatment by public authorities, which in particular should mean equal (not only formally) access to public services,
- increasing agricultural productivity, which requires, first of all, improving the agricultural structure, strengthening the technical infrastructure and equipment of farms, and finally – providing agriculture with highly qualified personnel, which in turn requires the improvement of living conditions in the countryside.

Both methods have strengths and weaknesses. The reference to the strategy indicators as a way of defining the objectives of support for agriculture and rural areas makes it easy to determine whether the assumed objectives have been achieved. However, the adequacy of the indicators adopted in government documents may raise doubts. In other words – achieving the planned indicators does not have to mean that social expectations towards agriculture and rural areas have actually been met. Thus, the assessment of the effectiveness of the actions taken becomes unclear.

When using the second method of defining the goals of an intervention, the problem turns out to be the lack of an objective basis for the quantification of goals. Efficiency must then be understood a bit differently – as a statement of a positive correlation between the effects of actions financed with public funds and the degree of implementation of the above-described strategic goals.

Taking these arguments into account, we attempted to use both methods of defining goals.

The article uses the results of both published[2] and unpublished research on public support for agriculture and rural development carried out since 2020 at the Institute of Research and Financial Analyses of the University of Information Technology and Management in Rzeszów. This research focuses on formulating detailed recommendations to improve the effectiveness of the so far applied principles and instruments for supporting agriculture and rural areas. This requires, first of all, a critical assessment of the current state of affairs.

[2] The results of these works can be found in: [Misiąg et al. 2020, Pomianek et al. 2021, Misiąg (W.) et al. 2022, Misiąg et al. 2022].

Shaping the development policy – current state

The legal basis for programming the socio-economic policy of the state is the Act of December 6, 2006, on the principles governing the conduct of development policy [Dz.U. z 2021 r., poz. 1057, as am.]. Until now, it has been amended almost 30 times and significantly differs from its original content. On October 29, 2018, the government adopted a document entitled "Development Management System in Poland" [Uchwała nr 162/2018], which was to become the basis of a new act defining the principles of development policy. The intention to adopt a new act was abandoned, while – in 2020 – a far-reaching amendment [Dz.U. 2020, poz. 1378] to the act of 2021 was made.

After the 2008 amendment to the Act of 2006 [Dz.U. nr 216, poz. 1370], the development policy management system consisted of the following hierarchically arranged strategy papers:

- long-term national development strategy and the national spatial development concept,
- medium-term national development strategy,
- other strategies, defining the basic conditions, goals and directions of development in given areas indicated in the medium-term national development strategy, relating to the region, spatial, sector or field development,
- programmes defining instruments for the implementation of the above-mentioned strategies.

The 2020 amendment resulted in significant changes in the document structure outlined in this way. The preparation of the long-term national strategy was abolished and replaced with the concept of national development, which is also intended to replace the concept of national spatial development. Municipality development strategies and sub-regional development strategies were added to the strategy system.
Based on the amended act on the content of the national development concept specified in its Art. 8a, which includes:

- conclusions from the analysis of development trends taking place in the country,
- conclusions from the analysis of development trends taking place in the world and their potential impact on development trends,
- development scenarios and development challenges of the country in the social, economic and spatial dimensions;

it is clear that this document is only intended to be a reflection paper, allowing the creation of future strategies. The concept of national development should be adopted by October 12, 2022 [Dz.U. 2020, poz. 1378, art. 34]. The current state of work on this document[3] indicates that it is likely that this deadline will not be met, or that it will be adopted without in-depth discussion.

Therefore, the development programming horizon has been shortened to the 10-15 year perspective established for the medium-term strategy. By the way, considering the changes in the layout of strategy papers, it is worth noting that in the amendment of 2021, the current content of Art. 11-12 of the Act on the Rules of Development Policy

[3] To date, not even a preliminary draft of the "Concept" has been published.

Implementation, which was indicated in the resolution of the Council of Ministers on adopting the Strategy for Responsible Development and formally having a role of a medium-term strategy, formally means that this resolution loses its legal force.
Regardless of the formal problems indicated above, in recent years, there has been far-reaching devastation of the entire management system of national development. As examples, we can primarily consider:

- "Silent replacement" of the applicable – in the opinion of the government – Strategy for Responsible Development with other government programmes, including – the "Polish Order" programme,
- the almost five-year process of adopting sector strategies formally related to the Strategy for Responsible Development,
- the delays described above in preparing and adopting the concept of national development.

The more and more frequently applied practice of transferring the management of public funds to government-related institutions outside the public finance sector and managing these funds according to unclear, often unpublished rules undoubtedly contributed to the decomposition of standard procedures for national financial management. As an example, it is worth mentioning the sub-division of funds among municipalities managed by Bank Gospodarstwa Krajowego (BGK) for the Governmental Fund for Local Investments[Flis and Swianiewicz 2021], as well as funds from the Local Government Investments Programme [Flis and Swianiewicz 2021].

Agriculture and rural areas in strategy papers

Agriculture and rural areas development are important parts of national development policies and are inextricably linked. It is for this reason that it is necessary to coordinate and complement the development activities undertaken in both of the areas mentioned above. However, such an approach is difficult due to two, distinctly separate ways of conducting development policy, as well as internal contradictions between the adopted strategies. In the Polish legal system, we can distinguish:

- development strategies adopted based on the act for the principles governing the conduct of development policy and covering national, sectoral, regional and local strategies,
- programming documents specifying the rules for using funds from the European Union budget, which include the Partnership Agreement, the 2023-2027 Common Agricultural Policy (CAP) Strategic Plan[4], as well as national and regional operational programmes, and finally – the Rural Development Programme.

It should be recalled that the provisions of the act on the principles governing the conduct of development policy do not apply to the funds from the EU budget and those allocated to the financing of the Common Agricultural Policy. It should also be noted that both the Partnership Agreement and the Common Agricultural Policy Strategic Plan must

[4] Until the end of 2022, the rules established for the 2014-2020 financial perspective were in force in the CAP.

be consistent with the EU strategies, which means that they cannot provide financing for all projects included in the national programmes. This applies in particular to energy issues, the impact of agriculture on the environment and, more broadly, to environmental protection.

As part of this study, we will not deal with regional and local strategies in the area of support for agriculture and rural development; local governments do not have the appropriate tools to implement the proposed changes. However, the National Recovery and Resilience Plan (NRP) will be analysed. In June 2022, the NRP was approved by both the European Commission and the Council of the European Union. Under this plan, Poland may receive EUR 107 billion of non-returnable aid and up to PLN 52 billion in loans. Due to the EU's reservations about the rule of law in Poland, the prospects for receiving these funds and, thus – launching the NRP – are difficult to define.

It is also necessary to pay attention to the current geopolitical situation related to both the changes in the economy caused by the COVID-19 pandemic and the current situation in Ukraine – the related economic downturn and the difficult situation on the energy market will have a negative impact on the implementation of plans contained in strategy papers.

Strategy for responsible development

The 2017 Strategy for Responsible Development (SRD), which is a medium-term national development strategy, is formally the basic strategy paper based on which the development policy should be conducted. The strategy itself is based on the Responsible Development Plan, which is both a reflection paper and a strategic plan. The main goal of the strategy was to create conditions for the growth of Poland's income with a simultaneous increase in social, economic, environmental and territorial cohesion. The specific objectives relate to sustainable economic growth, development that is both sensitive and territorially balanced, and the effectiveness of the functioning of the state. Formulating the goals in such a way shows how broad the plan of the SRD is. Due to its general nature, it refers directly to agriculture and rural areas in a very limited way, presenting a vision of functioning rather than specific tools along with an appropriately selected financial framework.

The provisions of the strategy create a pact for rural areas, the aim of which is to de-marginalise rural areas along with an increase in the quality of public services and a growth in social capital. The SRD lists eight basic areas of intervention that relate to both agriculture and rural areas:

- development of local markets, including agri-food ones (e.g. local processing, direct sales),
- entrepreneurship and professional mobility in rural areas using the potentials of local and subregional economies,
- increase in employment – transport accessibility of rural areas, flexible working hours employment, remote work,
- viable, multifunctional family farms,
- use of renewable energy sources,
- programmes to revitalise small towns by strengthening their economic, social and cultural functions,

- a sustainable agricultural production sector ensuring food security,
- inclusion of family farms in the profitable production process of food of the highest quality, in particular, based on the traditional methods of production and GMO-free products[5].

The specific actions described in the strategy, which translate into achieving its goals, are not combined with the necessary tools. The key activity, also described in the sectoral strategy of agriculture, is smart specialisation at both the national and regional levels; these objectives align with the Europe 2020 strategy and formally function only on two levels. However, as Wiatrak [2021] writes, smart specialisations should also be taken into account when creating development plans at the local level. Smart specialisations at the national and provincial levels are supervised by the Ministry of Development.

It is also worth noting the significant role of local communities, whose task is to lead the development of the CLLD model[6]. According to the responsible development strategy, local development should be based on Local Action Groups (LAGs) and local community initiatives supported by appropriate national and EU instruments.

In the SRD, there is no presentation of specific tools to support planned activities, as well as a more precise financial framework. The planned investment expenses used to finance strategic projects are also an important issue – they assume, among other things, private investments in the amount of over PLN 300 billion by enterprises, as well as over PLN 200 billion from national development funds (which means additional debt). Comparing these figures with the data from before 2017 on business investments, these plans seemed very optimistic from the very beginning.

A separate issue is the selection of strategy monitoring indicators, especially in areas related to developing rural areas and agriculture. Ignoring general economic indicators related to the increase in GDP, the decline in income stratification and the decline in the risk of poverty, the only indicator relating to agriculture concerns the percentage of farms with an area of less than 5 ha (the value is to drop from 51 to 40%).

Polish Order

From the beginning of 2022, the legislative solutions known as the "Polish Order" (PO) began to be implemented – as already mentioned, this is not a formalised development strategy; however, while observing the way it is constructed – the sectoral coverage and presented development priorities – it should be treated as a strategy. The goal of the Polish Order is to overcome the crisis caused by COVID-19 and to make an "epochal civilisation leap". Due to the less formal way of building the PO, the authors departed from creating the structure of goals to be achieved. In terms of agriculture and rural development, the PO is much more precise than the SRD and formulates specific actions and solutions aimed at the sustainable development of both these areas.

The key proposals presented under the PO relating to the operation of farms include:

- legislative solutions reducing bureaucracy related to running agricultural activities, agricultural retail trade and small processing. The Rural Code and the

[5] Based on the [Ministerstwo Rozwoju 2017].
[6] CLLD – community-led local development

Family Farms Act are to be part of these changes – their aim is to secure the functioning of family farms,

- creating marketplaces which allow farmers to sell their products directly to final customers,
- increasing the rates of subsidies for agricultural fuel by 10%,
- facilitating access to agricultural land owned by the Agricultural Property Stock of the State Treasury administered by the National Centre for Agricultural Support,
- introducing the lack of obligation for agricultural retirees to sell farms,
- reconstructing the pig population,
- increasing subsidies for farms below 50 ha.

The proposed changes are to be introduced successively in the coming years, and most of them cannot be assessed at present. Art. 23 of the Constitution of the Republic of Poland defines family farms as the basis of the state's agricultural system – the proposed laws are to increase the protection of family farms, including against liquidation because of bailiffs' executions or exploitation and usury [PiS 2021]. It is also proposed to establish an Agricultural Guarantee Fund, the task of which is to guarantee income; the potential relationship between the fund and the direct payments system and the preliminary financial data has not been presented. So far, the bills mentioned above have not been drafted and, considering the current situation, they should be treated as non-priority acts.

The plan to create a network of farmers' marketplaces has been presented in several different variants – in each municipality or in each city. Local governments will be responsible for their organisation and running, and the markets themselves should be available to farmers free of charge. Their idea is to shorten the supply chain, increase the role of agricultural retail trade and increase farmers' income by excluding intermediaries.

Changes related to retirement and disposal of the farm may have a negative impact on the plans described in the Strategy for Sustainable Development of Rural Areas, Agriculture and Fisheries (SZRWRiR) regarding the increase in the average area of a farm and may cause an increase in agricultural land not used for agricultural production. The provision concerning additional payments for farms below 50 ha is also unclear. In the currently functioning system, there is an additional (redistributive) payment paid to owners of farms from 3 to 30 ha. It is not known whether the new payment would replace the additional payment or it would be a new supporting mechanism; there is also a lack of information on funding sources.

The proposal to increase the herd of pigs is also puzzling. Between 2010 and 2020, the herd decreased by almost 30% [GUS 2021], which was caused by both the ASF epidemic and the change in eating habits in Poland. The attempt to reconstruct the pig population does not seem to be justified in terms of market needs, even when considering export opportunities.

The development of rural areas in the PO focuses on three leading tasks. The first of these tasks is to support local government units in financing investments. The newly established Polish Order Government Fund will – through non-returnable co-financing from the Strategic Investments Programme – cover up to 95% of the value of supported

local government investments. Road investments and municipal management investments will be preferred. The fund is to be managed by BGK and financed through issuing bonds.

The second key priority is to increase the energy efficiency of both residential and public buildings in rural areas. For years thermo-modernisation of public buildings has been one of the main orientations of property expenditure, especially among rural and urban-rural municipalities. These actions seem to be extremely important now, with significant increases in electricity and heating costs.

The third priority task is additional support for former state-owned municipalities. The amount of the granted support does not correspond to the income situation of the municipality. According to published data [Redakcja Serwisu Samorządowego PAP 2022], the greatest support was granted to municipalities with relatively high incomes per capita. The total funds transferred to the former state-owned municipalities in 2022 amounted to PLN 586 million.

Strategy for Sustainable Development of Rural Areas, Agriculture and Fisheries

The Strategy for Sustainable Development of Rural Areas, Agriculture and Fisheries 2030 (SZRWRiR), adopted on October 15, 2019, is one of the eight sectoral strategies that complement and extend the national medium-term development strategy. It replaced the strategy of the same name, which was in force in 2012-2020. The main goal of the strategy is "the economic development of the countryside that will enable a sustainable increase in income of its inhabitants while minimising the economic, social and territorial stratification and improving the condition of the natural environment" [M.P. 2019 poz. 1150]. Such a broad formulation of the main goal, which refers both to agriculture itself and to rural areas, territorial cohesion, quality of public services in the countryside and environmental protection clearly shows the inseparability of agriculture and rural areas. However, while the main goal accurately reflects the strategy's goal, the main performance indicators do not. The strategy assumes a decrease in the income stratification of rural and urban residents, a double reduction in the number of people living below the relative poverty threshold in rural areas and an increase in the share of processed products in the export of agri-food industry products. These indicators only partially relate to the main objective and do not address rural development, but only show how the countryside comes closer to the city level.

The strategy also presents, in a very condensed and general way, a vision of the Polish countryside in 2050. The village is to be a place of "work, residence, rest and agricultural and non-agricultural business activity". Detailed objectives of SZRWRiIR are related to the second specific objective of the SRD, which speaks of socially sensitive and territorially balanced development – such a link between specific objectives is part of the sustainable territorial development plans.

The first specific objective concerns increasing the profitability of agricultural and fishery production and lists five directions of intervention:

- new models for the organisation of production and markets, short market chains and fair competition,
- food quality and safety,

- development of innovation, digitisation and industry 4.0. in the agri-food sector and its modernisation,
- risk management in the agri-food sector,
- expansion and development of sales markets for products and raw materials of the agri-food sector, including the bioeconomy[7].

As seen above, most of the interventions concern the food market, the implementation of new methods in agriculture and the quality of the food produced. You can see here the lack of a link between the strategic priorities with the already functioning programmes, including the RDP.

The second specific objective relates to the improvement of the quality of life, infrastructure and the condition of the environment. It includes interventions in the areas of:

- development of linear technical infrastructure,
- the availability of high-quality public services,
- development of social infrastructure and revitalisation of villages and small towns,
- sustainable management and protection of environmental resources,
- adaptation to climate change and counteracting it.

Actions to achieve this goal focus on improving infrastructure in rural areas (and consequently also developing public services) and environmental protection. These activities will require high investment expenditures, including – in appropriate proportions – infrastructure actions and environmental protection. The experience gathered during the last 15 years of project implementation (mainly with the use of EU funds) shows an undisputed advantage of projects in the field of social infrastructure and the so-called revitalisation of environment protection projects.

The third specific objective is the development of entrepreneurship, non-agricultural jobs and an active society. It covers five areas:

- response to demographic changes and their consequences,
- development of entrepreneurship and new jobs,
- increase in the skills and competencies of rural residents,
- building and developing the ability to cooperate in the social and territorial dimensions,
- development of the economy and social solidarity in rural areas.

The areas under the third specific objective seem to be absolutely crucial for the success of the whole strategy. The creation of non-farm employment, which results in stopping the depopulation of non-agglomeration rural areas and increasing the skills and competencies of their inhabitants, is the only way to achieve the remaining goals. Both agriculture and improving the quality of life in rural areas, i.e. the first two specific objectives, can be achieved only after reaching the third objective. It is also the most difficult goal to achieve, which requires substantial investments. Actions proposed under the third specific objective are mainly related to training which increases qualifications and skills as well as professional activation in non-agricultural professions. It also seems

[7] For the definition of the bioeconomy, cf., e.g. [Pink and Wojnarowska 2020]

necessary to create mechanisms that would increase entrepreneurship in rural areas. According to a survey conducted in 2016 [Mickiewicz 2016], this is mainly a task for both central administration and local government units.

The prepared financial framework of the strategy is completely outdated today, and it is known that it will not allow the planned activities to be carried out; it is not known whether the scope of implemented actions will be limited or whether there are plans to increase funds for the implementation of prepared tasks. It is also necessary to pay attention to the way actions are formulated. The structure of the strategy has a main goal, then specific goals, then intervention directions and finally, action. Each intervention direction is described with specific actions (from several to several dozen). Unfortunately, the way they are formulated is too general and does not refer to the entity responsible for its implementation.

The strategy monitoring indicators need to be also addressed. The implementation of SZRWRiR is monitored using 36 indicators [Strategie krajowe…]. These 36 indicators are responsible for monitoring 274 actions under the three specific objectives and a further 69 general actions. We consider the number of monitoring indicators and their selection to be inappropriate, and they prevent a reliable assessment of the implementation status of the strategy.

EU funds financing the undertakings of the Common Agricultural Policy

The Partnership Agreement (PA) and the Common Agricultural Policy Strategic Plan (CAPSP) are not national development strategies within the meaning of the Act on the principles governing the conduct of development policy; however, they are undoubtedly strategy papers for Poland and – what is much more important – strategy papers with not only precisely defined goals and indicators of their implementation, but also with a significant financial framework to achieve these goals.

We are at the turn of two consecutive, significantly different, long-term budgets of the European Union. The financial perspective for 2014-2020 with the two-year extension due to COVID-19 ends, and the perspective for 2023-2027 begins. The most important change is the separation of the Partnership Agreement covering the structural funds and the Common Agricultural Policy Strategic Plan. RDP priorities are also changing, as they are the rules for granting direct subsidies.

- In accordance with the CAPSP approved by the European Commission on August 31, 2022, from the beginning of 2023, the system of direct payments will be amended by:
- introducing the concept of an *active farmer* – having the status of an active farmer will be a necessary condition for receiving income support both under pillar I and payments under the Rural Development Program (RDP), e.g. payments for areas with natural or other specific restrictions (LFA),
- approximating rates of direct payments with their average level in EU countries,
- excluding basic payments from the reduction mechanism,
- granting payments to young farmers only with appropriate professional training or skills,
- differentiating payments regionally based on cattle production and their relation with the size of an average farm in a given region.

An important factor is the restriction of access to payment just for economically active farmers, which will allow for an increase in payment rates. The strategic plan assumes that an active farmer will be recognised as a person who indicates agricultural activity as their leading business activity in the Central Register and Information on Economic Activity (CEIDG), submits relevant documents from the National Court Register, proves that at least 1/3 of the farm's income comes from agriculture or that the amount of direct payments is at least 5% of the total income from non-agricultural activities. The obligation for young farmers to demonstrate appropriate qualifications will be fulfilled by having role-specific education (basic trade, secondary trade, secondary or basic vocational education) or a confirmed 3-year experience in agriculture. The transfer of almost 30% of RDP funds to pillar I[8], which is now necessary due to the potential necessity to lower the payment rates, will be maintained. In total, in the years 2023-2027, the CAP financial plan anticipates expenditure on direct payments in the amount of EUR 17.3 billion, including transfers from the EAFRD. Moreover, the Ministry of Agriculture and Rural Development announced the launch of the Transitional National Aid programme with a budget of approx. EUR 450 million. The introduced changes should be assessed positively – it is particularly important to connect payments with the status of an active farmer.

The allocation for the Rural Development Program, after the transfer of some funds to pillar I, amounts to EUR 4.7 billion, and an additional EUR 3.2 billion from the state budget will be used to co-finance projects. The 2023-2027 programme consists of 46 actions covering agriculture, rural development, support for local communities, environment protection and forest programmes. As you can see in the table below, over 70% of the initial allocation[9] was set aside for agricultural programmes. These actions include additional payments, support for organic farming, investments in farms, advisory services and the creation of producer groups. Rural development means primarily investment in infrastructure in rural areas and support for local action groups/LEADER. Expenditures on environmental protection and counteracting climate change are mainly aimed at biodiversity protection and investments contributing to the environment and climate protection.

Table 2. Funding allocation for the 2014-2022 Rural Development Programme

Programmes	Total Public Expenditure	EU contribution	National contribution	
	EUR million			%
TOTAL	**7,579.7**	**4,512.6**	**3,067.2**	**100.00**
Agriculture	5,409.8	3,135.3	2,274.5	74.16
Additional payments	1,527.7	1,000.1	527.5	17.20
Support for agriculture	2,977.2	1,637.4	1,339.7	43.68
Organic farming	904.9	497.7	407.2	13.28
Development of rural areas and local communities	1,217.3	669.5	547.8	17.86
Environment and climate protection	886.2	654.5	231.6	7.55
Forest programmes	66.5	53.2	13.3	0.43

Source: own study based on the Strategic Plan for the CAP.

[8] In the years 2023-2026. There will be no funds transfer in 2027.

[9] Despite signing and approving the Common Agricultural Policy Strategic Plan, allocations of funds for EAFRD actions are described as insufficient.

The amounts in the above table do not total to the full amount of the allocated funds due to additional commitments in other areas, technical assistance expenditure, sectoral programmes and the still preliminary nature of the division between priorities.

Despite the fact that programming the development with European funds is not a real development strategy, the most precise preparation of objectives and directions of intervention, along with a precise financial framework, is clearly visible here. Most importantly, the above amount is guaranteed and practically does not depend on the size of private investments.

National Recovery and Resilience Plan

The National Recovery and Resilience Plan (NRP) is related to the EU Instrument for Recovery and Resilience[10]. The condition for receiving funds from this instrument is preparation and consent from the European Commission for the National Recovery Plan. The Polish NRP was approved in June 2022 by the European Commission and the EU Council. However, the operation of the NRP and the transfer of funds to Poland is currently suspended due to the ongoing conflict between the Polish government and the European Commission, and the prospects for changing this situation are unclear.

The NRP for Poland consists of a non-reimbursable subsidy component (PLN 107 billion) and a loan component (PLN 52 billion). As agreed with the European Commission, almost 2/3 of the funds will be allocated to counteracting climate change and digital transformation. The remaining priorities concern strengthening the resilience and competitiveness of the economy, increasing the efficiency and accessibility of the health care system, and clean transport. None of the priorities are directly and exclusively related to support for agriculture or rural areas; however, in each of the components, actions are to be taken to support territorial cohesion. From the perspective of rural areas, the method of dividing funds to increase the efficiency of health care seems to be particularly important, as the level of medical services in rural areas is distinctly different from their level in cities.

National Strategy for Regional Development

The National Strategy for Regional Development [M.P. 2019 poz. 1060] (NSRD), adopted on September 17, 2019, is a national sector strategy responsible for sustainable territorial development at the regional and sub-regional levels. The most important assumptions of the NSRD are as follows:

- the main direction of intervention will be medium-sized cities losing their socio--economic functions, and the support is to be focused on less developed areas, in particular in Silesia and Eastern Poland,
- the role of provincial governments is to manage regional development; local governments should be more actively involved in creating development policies,
- contracts concluded between the government and provincial governments are to cover not only tasks financed under regional operational programmes, but also sector contracts,

[10] Recovery and Resilience Facility

- financing of regional development with national funds is to increase.

The content of the SRD indicates the assumption that regional development should be based on supra-local programming and is not directly related to agriculture or rural areas. The SRD assumes investments in medium-sized cities (district and larger cities, which are not cities with district status) – they are to become centres of local communities.

As we can see in the table above, both the selection of the indicators and their target values may give rise to discussion. There are no indicators relating to agricultural production both in terms of efficiency and quality. The only income indicator relates to comparing economic activity with agricultural activity. Rural development indicators focus on infrastructure and concern social capital at a minimum degree. Some indicators have already been achieved; in other cases, it can be seen that the planned values were selected too optimistically.

Adequacy and coherence of national strategy indicators for agriculture and rural development

A key element of each strategy is to prepare an appropriate method of monitoring the progress in implementing planned actions. The selected indicators should correspond to both the goals and the tools to achieve them, and monitoring the effectiveness of actions understood as achieving the planned goals while incurring the planned expenses. This gives the opportunity to react to possible irregularities in implementing the strategy and adjust it to the current conditions.

Most of the indicators presented above do not raise any major doubts, although some surprising facts should be pointed out, such as:

- setting the target ratio (for 2030) for the average annual net disposable income per person in a rural household to the urban one at a level lower than already achieved in 2020;
- recognising the number of non-governmental organisations per 10,000 residents in the NSRD for an adequate indicator of the social capital development,
- assuming that by 2030 the area of ecological land should practically remain at the current, very low level of approx. 0.5% of the area of agricultural land,
- adopting completely unrealistic assumptions about the growth of GDP per capita in relation to GDP per capita in the entire European Union.

Omission of indicators that would accurately describe – even indirectly – the progress in solving key problems not only of rural areas and agriculture, but of the entire society seems to be worth noting. Such problems include stopping the degradation of the environment and adapting agricultural production methods to the requirements of the principles of sustainable growth, improving the quality of life in the countryside, objectively confirmed by hindering the outflow of inhabitants from agricultural areas, and finally – a significant improvement in the efficiency of rural farms and efficient re-training of a significant part of the owners of the smallest farms, along with providing them with employment outside agriculture.

Table 3. Selected indicators monitoring national strategies for rural areas and agriculture

Strategy/indicator	Unit of measurement	Implementation			Plan
		2010	2015	2020	2030
SZRWRiR					
Agricultural area maintained in good agricultural condition	million ha	14.5	14.4	14.8	14.0
At-risk-of-relative poverty rate in rural areas	%	25.4	24.0	19.9	12.0
Farms with 1-5 ha agricultural area in the total number of farms	%	52.0	50.0	50.0	40.0
Percentage of households within the reach of Internet access with a speed of at least 30 Mb/s (EAC)	%		60.7	76.2	100.0
Percentage of the rural population using the water supply system	%	75.1	84.6	85.6	95.0
Total ecological lands	thousands ha	51.0	51.8	55.2	60.0
Number of the national economy entities in the REGON register per 1,000 inhabitants in rural areas		66.0	74	88.3	82.0
Percentage of people aged 25-64 participating in education or training – according to LFS	%	5.2	3.5	3.7	9.0
Average area of agricultural land in a farm	ha	9.8	10.3	11.1	17.0
Average monthly income per capita from a private farm in agriculture in relation to income per capita from self-employment	%	46.1	36.8	36.5	68.0
SRD					
GDP per capita according to PPP (EU28 = 100)	%	62	68	72[1)]	95
Gini coefficient – an indicator of income distribution	%	31.1	30.6	27.2	27.0
The ratio of the average annual net disposable income per person in a rural household to an urban one	%	66.5	69.5	78.3	75.0
Households having Internet access with speed ≥100 Mb/s	%		5.5	28.3[2)]	100.0
NSRD					
Share of investment expenditure in municipal budget expenditure			17.0	14.1	[3)]
Share of investment expenditures in the expenditures of budgets of municipalities at risk of permanent marginalisation	%		15.0	15.5	>15.5
The number of foundations, associations and social organisations entered into the REGON register per 10,000 residents			31	35	>35

[1)] The value from 2019; [2)] The value of the indicator assumed in the SRD in 2020 – 50%; [3)]The target value for 2030 is based on" growth trend continuation"

Source: [System Monitorowania Rozwoju...].

In addition, some contradictions can be identified in the indicators described above. The indicators relating to the surface structure of farms can be given as examples. In the SRD, the only indicator relating to agriculture is the percentage of farms with an area of less than 5 ha, which should decrease from 51 to 40% by 2030. However, this indicator is inconsistent with the indicator concerning the average agricultural area of a farm. In order to achieve the values of the indicators adopted there (an increase from 10.3 ha in 2015 to 17 ha in 2030), the percentage of small farms – assuming that the total area of agricultural holdings is maintained at the level of 14-15 million hectares – should fall to approx. 30%.

It should also be noted that the above-described changes related to retirement and disposal of a farm may have a negative impact on the plans for the growth of the average area of a farm described in SZRWRiR and may cause an increase in agricultural land not used for agricultural production.

Support for agriculture and rural areas – practice and its effects

When we analyse the data in Table 1 from the perspective of using public aid for agriculture and rural areas, it turns out that almost 2/3 of all funds allocated to these purposes were used for income instruments, i.e. to such forms of support that obviously improve the income situation of farmers, but which have little impact on the course of real processes in agriculture and which significantly reduce the financial envelope for financing the development of the still very poor social and technical infrastructure of rural areas. Moreover, the possibility of obtaining significant income for agricultural households from public funds – only on account of owning agricultural land and paying small social insurance contributions for farmers – may be a factor hindering the reconstruction of the agrarian structure and changes in the mode of agricultural production[11].

Table 4. Public expenditures on agriculture and rural development in 2010-2021 according to the directions of their use

Specification	2010	2013	2018	2019	2020	2021
	in total = 100					
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0
Income instruments	63.0	58.3	64.7	67.0	61.4	63.4
Direct payments	28.0	26.9	29.5	29.7	27.3	28.7
Subsidies for farmers' social insurance	34.9	31.3	35.3	37.3	34.0	34.7
Other forms of support for rural areas and agriculture	32.8	37.0	29.9	27.5	33.5	30.8
Administrative services for agriculture	4.2	4.8	5.4	5.5	5.2	5.8

[a] No expenses financed with subsidies from the public budget.

Source: own calculations based on the data of the Ministry of Finance from the budget reports of local government Rb-28, Rb-27s and Rb-28-s [Sprawozdania budżetowe...].

We consider the structure of public expenditure presented above to be extremely unfavourable for achieving strategic goals for rural areas and agriculture.

As it results from the analysis of indicators of the development of agriculture and rural areas in strategies and other documents defining the medium and long-term policy of the state, the assessment of whether the adopted assumptions have been achieved or it is probable that they will be achieved by 2030 will not give a clear picture of the effectiveness of the use of public funds for the development of rural areas and agriculture. The assessment based on basic data illustrating the situation in the area of interest to us seems more reasonable.

[11] A spectacular example is the case of an individual farmer widely described in the media, for whom farming on 15 hectares, which is only a secondary source of his income, brought an income of about PLN 5,000 in one year and PLN 25,000 subsidies from public funds.

Agricultural production

The data from Statistics Poland show that the added value measured in constant prices in section B[12] of the Polish Classification of Activities was lower in the entire period of 2013--2021 than in 2010. Even if we take into account the gradual increase in value added in the last two years and the area of farms, which has been decreasing for many years, it will be necessary to state that the public funds involved in supporting agriculture did not bring the effect in the form of higher agricultural efficiency.

Attention should also be paid to the clear variation of the dynamics of value added in section B of the Polish Classification of Activities, measured in constant and current prices. While the index in constant prices shows a negative deviation from the trends of changes in value added in other segments of the economy, it turns out that the value added in section B grew significantly faster than in the non-agricultural part of the economy. If we also add to this the high rate of increase in value added in trade, it becomes clear that the doubling of the added value in agriculture, just within 11 years, is entirely the result of price changes. It is also visible that this increase was the highest in 2021, when the value added in agriculture in current prices increased – in relation to the value added in 2020 – by 22%. An interesting issue – but beyond the scope of this article – is the analysis of the causes of such high growth and the distribution of its effects among individual links in the supply chain – from farmers to final consumers.

Table 5. Value added in the national economy and selected sections

Specification	**2010**	**2013**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
	2010 = 100, constant prices							
TOTAL	**100.0**	**107.5**	**119.4**	**125.0**	**131.6**	**137.7**	**134.7**	**142.2**
including:								
agriculture, forestry, hunting and fishing	100.0	97.6	91.3	92.1	83.7	83.0	94.5	96.3
industry	100.0	111.3	126.6	129.5	136.5	140.6	136.0	155.3
construction	100.0	103.3	110.9	118.1	132.0	131.6	121.3	122.9
trade, motor vehicles repair	100.0	99.8	109.4	115.6	121.6	127.3	122.7	130.1
	2010 = 100, current prices							
TOTAL	**100.0**	**114.7**	**129.3**	**137.3**	**145.9**	**158.4**	**161.9**	**179.1**
including:	100.0	123.1	114.4	138.3	120.0	128.5	140.8	148.5
agriculture, forestry, hunting and fishing	100.0	115.8	140.0	142.0	149.2	158.3	161.8	197.4
industry	100.0	100.6	107.9	115.2	132.7	140.1	136.8	141.8
construction	100.0	113.5	117.8	125.5	134.2	144.2	144.9	160.7
trade, motor vehicles repair	100.0	116.7	133.6	143.9	153.6	170.2	175.5	186.3
other services	100.0	114.7	129.3	137.3	145.9	158.4	161.9	179.1

Source: [Rachunki narodowe....].

[12] This section includes agriculture, forestry, hunting and fishing, while agriculture has a dominant position in the entire section and determines trends in changes such as global production or value added.

The number of farms is systematically decreasing, which results – with the almost constant area of agricultural land – in a slight increase in the average area of agricultural land per farm. However, this growth is slow and still, almost 1/3 of all farms practically do not reveal any production for the market.

Table 6. Farms in Poland in 2010-2020

Specification	2010	2013	2016	2017	2018	2019	2020
	thousand						
Farms	1,509.1	1,429.0	1.410,7	1,405.7	1,428.8	1,409.4	1,317.5
	ha						
Average area of a farm	11.11	11.17	11.19	11.42	11.52	11.60	12.47
including: agricultural area	10.27	10.40	10.31	10.40	10.27	10.42	11.14
forests	0.75	0.70	0.63	0.66	0.66	0.57	0.73

Source: own study based on data from [GUS 2022].

Population

Since 2013, the population of Poland has been systematically decreasing, and the total decrease in the number of inhabitants amounts to over 371,000 people. The aggregate data show that the population decline affected both cities (here, the population decline was the largest) and rural municipalities; only the population of urban-rural municipalities increased, with the transformation of many rural into urban-rural municipalities playing the main role here, as well as the relocation of city dwellers to suburban areas.

Table 7. Changes in the population of Poland in 2013-2021

Specification	**2013**	**2015**	**2017**	**2019**	**2021**
	Population change in relation to 2012				
TOTAL	**-31,393**	**-79,213**	**-100,231**	**-147,313**	**-371,565**
Cities	**-55,504**	**-150,458**	**-243,235**	**-303,856**	**-496,057**
in agglomerations	-34,860	-67,200	-98,884	-119,869	-230,002
outside agglomerations	-20,644	-83,258	-144,351	-183,987	-266,055
Urban-rural municipalities	**-2,879**	**59,507**	**136,337**	**224,690**	**193,161**
in agglomerations	11,937	31,617	93,476	118,035	139,550
outside agglomerations	-14,816	27,890	42,861	106,655	53,611
Rural municipalities	**26,990**	**11,738**	**6,667**	**-68,147**	**-68,669**
in agglomerations	30,147	65,985	98,469	139,391	201,101
outside agglomerations	-3,157	-54,247	-91,802	-207,538	-269,770
In total	**-31,393**	**-79,213**	**-100,231**	**-147,313**	**-371,565**
in agglomerations	7,224	30,402	93,061	137,557	110,649
outside agglomerations	-38,617	-109,615	-193,292	-284,870	-482,214

Source: own calculations based on the [Bank Danych Lokalnych].

The data showing the distribution of changes in the number of inhabitants in zones around cities with district rights (conventionally termed agglomerations here) and outside these zones is of particular interest. This data presents that the main direction of internal migrations is not the movement from cities to the countryside, but from areas away from larger cities to the outskirts of these cities. A large outflow of people from rural municipalities located outside agglomerations should be treated as a signal that in these municipalities, the living conditions are still not satisfactory.

Finance of local government units

Living conditions in rural areas largely depend on the ability of local government units to properly finance the performance of current tasks providing residents with access to public services and the ability to finance the necessary infrastructure investments.

The data presented below show that the financial situation of rural and urban--rural municipalities is still not good, and the own incomes of these municipalities significantly differ from the incomes obtained by urban municipalities. When analysing the income gap visible from the data in the table, it should be remembered that the ability to finance public tasks is also influenced by other factors, such as the higher cost of performing certain public tasks (including primarily educational tasks), as well as shortages in the equipment of a basic technical and social infrastructure, which often require very large expenditures. This increases the actual income gap, which is only partially reduced by the compensation income system, the effectiveness of which we evaluate negatively because:

- the compensation income system does not take into account the differentiation of the costs of performing various tasks, but only the level of tax revenues,
- due to the fact that the basic part of the general subsidy for municipalities is the so-called educational subsidy, the amount for compensation income is definitely too low in relation to the actual needs.

Table 8. Own revenue of municipalities per capita in 2009-2021

Specification	2009	2012	2015	2018	2019	2020	2021
	municipalities in total = 100						
TOTAL	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Cities with district rights	**159.0**	**154.9**	**154.2**	**152.5**	**148.0**	**140.7**	**145.8**
Cities	**90.8**	**88.7**	**86.6**	**89.8**	**89.7**	**89.2**	**89.3**
Urban-rural municipalities	**72.4**	**75.3**	**74.6**	**75.3**	**77.4**	**80.2**	**78.8**
in agglomerations	99.7	96.3	95.0	96.6	100.0	101.9	100.9
outside agglomerations	67.7	71.6	70.9	71.3	73.1	76.0	74.5
Rural municipalities	**57.7**	**63.2**	**65.4**	**65.4**	**69.0**	**75.3**	**70.9**
in agglomerations	86.3	86.3	87.9	89.8	93.7	96.7	95.9
outside agglomerations	50.2	56.7	58.9	58.1	61.5	68.7	63.1

Source: own calculations based on reports on the implementation of the state budget and the budgets of local government units.

Similarly to the analysis of changes in the number of inhabitants, fundamental differences between municipalities in the vicinity of larger cities and outside this zone draw our attention. It is clearly visible that the border between, conventionally speaking, the “poor” and “rich” municipalities runs not along the city-village line, but between the "agglomeration" municipalities and the rest of the country. Unfortunately, it is not reflected neither in the formal regulations concerning local government finances, nor in the division of public funds between municipalities.

The differentiation in the situation of “agglomeration” municipalities and other municipalities is also visible in the data illustrating capital expenditure per capita in various groups of municipalities. A significant weakness of the local government finance system, as well as the procedures for managing public funds, is the fact that the municipalities with the greatest investment needs have the lowest funds for their implementation.

Table 9. Capital expenditure of municipalities per capita in 2009-2021

Specification	**2009**	**2012**	**2015**	**2018**	**2019**	**2020**	**2021**
	PLN						
Total	**762,5**	**697,1**	**712,2**	**1.066,0**	**1.010,8**	**951,1**	**1.019,4**
Cities with district rights	1.018,1	1.007,0	1.020,4	1.168,5	1.264,0	1.212,3	1.255,2
Cities	626,7	491,5	477,8	911,1	810,9	763,9	797,2
Urban-rural municipalities	618,2	542,8	542,4	970,5	836,8	783,3	885,4
in agglomerations	800,7	648,3	732,8	1.130,6	1.038,0	997,7	1.085,2
outside agglomerations	586,7	524,2	508,1	940,1	798,7	742,3	846,8
Rural municipalities	653,6	581,3	622,2	1.110,2	970,9	890,1	978,7
in agglomerations	808,5	656,9	770,2	1.332,1	1.209,3	1.067,4	1.084,3
outside agglomerations	612,5	560,4	579,6	1.044,3	899,1	835,8	945,9

Source: own calculations based on reports on the implementation of the state budget and the budgets of local government units

The need to improve the financial potential is also evidenced by the following data showing the results of eighth-grade exams from 2019 and 2022. And here, there is a clear difference between cities (especially larger ones) and rural municipalities. These municipalities receive, admittedly, slightly more funds from the so-called educational subsidy; however, the preferences for rural municipalities are definitely too small for not very affluent municipalities to finance schools at a level that ensures a level of education comparable to that in cities.

Table 10. Results in the eighth-grade examinations for Polish in 2019 and 2022

Type of municipality Number of inhabitants	**2019**			**2022**		
	number of students	average result		number of students	average result	
		[%]	Poland = 100		[%]	Poland = 100
Total	**361,185**	**63.2**	**100.0**	**478,110**	**59.7**	**100.0**
Village	134,648	62.0	98.1	179,341	58.0	97.1
City up to 20,000.	59,864	60.0	94.9	83,306	57.0	95.5
City from 20,000 to 100,000	70,581	63.0	99.7	97,174	60.0	100.5
City over 100,000.	96,092	67.0	106.0	118,289	64.0	107.2

Source: [CKE 2019, 2022].

It can be added that the gap between the results of exams in rural and urban schools is widening in the case of the results of maths and English exams.

Summary

The conducted analysis of the system of public support for agriculture and rural development leads to three main conclusions:

- a significant part of public funds that Poland spends for the above-mentioned goals does not bring the assumed effects – neither in the form of effective (and thus leading to higher efficiency while maintaining the principles of sustainable development) support for agriculture, nor in the form of improving living conditions in agricultural areas,
- one of the main reasons for the current situation is the lack of coordination of activities to modernise agriculture, improve the agrarian structure, improve living conditions in rural areas and protect the environment,
- formally binding the system of national development management has ceased to play the role of an actual "road map" for the government's actions and allocation of public funds – not only for purposes related to rural areas and agriculture.

The data presented above clearly indicate that the current structure of public support for agriculture and rural areas does not ensure their effective use aimed at solving the most crucial problems. Therefore, it seems necessary to significantly change the support objectives for the mentioned area so that public funds will be actually used for the adaptation of rural development and agriculture to the current challenges, related not only to current problems, but also, and above all, to the need to actively approach issues such as environment protection, stopping the climate catastrophe, fighting threats to the health condition of Polish people, and finally – equalising development opportunities and ensuring good living conditions for the inhabitants of all municipalities and regions.

Taking into account the amount of financial support offered by the Common Agricultural Policy (CAP) programmes, one should expect an increased link between national strategies and the EU strategies already implemented. Possible state interventionism in the food market is also striking – interventions shall concern supply chains, market competition and the development of sales markets.

We consider the structure of public expenditure presented above to be extremely unfavourable for the achievement of strategic goals for rural areas and agriculture. Income instruments are characterised by low selectivity, which means that a significant part of funds is given to such farms, which neither do not show any commercial production, nor is their production for the market very modest. This clearly limits the social and economic effects of using public funds, limiting the possibilities of carrying out actions preparing agriculture and rural areas for the necessary changes. The effect of these changes will be the need to create jobs in the countryside for people leaving agriculture and improve the efficiency of agricultural production, neutralising the effects of growing pro-ecological requirements – and these directions of public support should be given a clear priority.

For the assessment of the structure of expenditure shaped in this way, it is important that while programming the use of funds from the EU budget, the broadly understood development expenditures were deliberately limited, and the maximum amount, in the light of EU regulations, was allocated to income instruments and payments with a very wide range of recipients. This is proved in particular by the following facts:

- the possibility of shifting 30% of amounts from rural development financing to general-purpose payments was fully used,
- the possibility of limiting the subjective scope of direct payments was not used, as allowed by the Common Agricultural Policy, which means that a significant part of the subsidies goes – as we have already indicated – to farmers for whom the entitlement to subsidies results solely from the fact of having agricultural land in a registered farm,
- very mild conditions for obtaining the so-called payments for greening were introduced without proper monitoring of compliance with these conditions.

All of this has resulted in a significant reduction in both expenditures on supporting efficient, modern farms and on developing rural areas, which, despite many years of efforts, still have significant deficiencies in the infrastructure necessary to ensure good living conditions and to support agriculture. Without further elaborating on this topic, we would like to draw attention to the fact that a significant part of expenditure on rural development, including in particular expenditure on the activities referred to as revitalisation of villages in rural areas, was used for projects irrelevant from the perspective of real rural problems [NIK 2021]. The procedures for qualifying projects for co-financing from the EU funds were also used many times to spread the epidemic of "concreting" in Poland.

The current territorial scope of the RDP also raises questions. For most of the RDP infrastructure actions, eligible expenditure is the expenditure relating to entirely rural municipalities, rural areas in urban-rural municipalities and cities with less than 5,000 inhabitants, including urban municipalities with such a population. In our opinion, in order to increase the efficiency of RDP expenditures, it would be advisable, on the one hand, to exclude rural municipalities with high incomes from the possibility of obtaining RDP funds, especially such municipalities located on the outskirts of large cities, on the other hand – to increase the population limit in cities that are the seats of urban-rural municipalities which may receive funds from the RDP.

What is striking is the negligible amount of expenditure (but also relatively little interest in this form of assistance) on training and advisory actions. It is also worth noting that it completely omitted two important actions of this type, namely:

- training courses preparing to work outside agriculture,
- consumer and health education, which, in our opinion, is one of the most important factors determining the success of actions aimed at improving the quality of produced food and adapting the structure of agricultural production to "healthier" patterns of food consumption,

while in the latter issue, educational activities also require new legal solutions promoting healthy food.

The weaknesses mentioned above in the implementation of support for agriculture and rural areas, first of all, require in-depth consideration of the directions and forms of this support, including reconsidering the principles of direct payments [European Commission 2020]. It also seems necessary to strengthen the day-to-day control of both the procedures for granting public funds and their effective use.

A significant and growing part of expenditures on support for agriculture is allocated to the expenditures of institutions providing administrative services for agriculture and rural areas. It is justified, especially after the last reform of the agricultural administration, to postulate a thorough review of the competencies of individual institutions and the expenses incurred for their maintenance.

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Strategia wsparcia rozwoju obszarów wiejskich i rolnictwa – założenia i praktyka

STRESZCZENIE
Celem artykułu jest konfrontacja ustaleń dotyczących rozwoju rolnictwa i obszarów wiejskich zawartych w oficjalnych, rządowych dokumentach strategicznych, w tym – wskaźników realizacji celów strategii, z danymi obrazującymi faktyczną politykę państwa w tej sferze oraz efekty tej polityki. Dokonano analizy treści kluczowych dokumentów strategicznych, zanalizowano również odpowiednie dane GUS i Ministerstwa Finansów. W wyniku tej analizy stwierdzono, że: (1) z mierników realizacji celów wsparcia rolnictwa i obszarów wiejskich przyjętych w badanych strategiach nie można odczytać spójnej koncepcji polityki wobec wsi i rolnictwa; (2) wskazać można przykłady niezgodności ustaleń zawartych w różnych strategiach; (3)wsparcie publiczne skierowane zostało przede wszystkim na poprawę sytuacji dochodowej rolników, ze szkodą dla realizacji takich celów jak poprawa struktury agrarnej i wydajności gospodarstw rolnych, poprawa warunków życia na wsi oraz bardziej skuteczna ochrona środowiska.

Słowa kluczowe: polityki publiczne, wsparcie rolnictwa, polityki rozwoju, fundusze unijne, rozwój regionalny, finanse samorządowe

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COMMUNICATION OF THE CENTRAL BANK AS A DETERMINANT OF THE CREDIBILITY AND EFFECTIVENESS OF THE MONETARY POLICY ON THE EXAMPLE OF THE EUROPEAN CENTRAL BANK

ABSTRACT
The aim of the undertaken research is an attempt to explain, on theoretical and empirical grounds, the interdependence between central bank communication, its transparency credibility and, consequently, the effectiveness of monetary policy pursued by central banks. The study used research methods based on the literature analysis on the subject in the field of banking and finance, as well as statistical and econometric methods (Granger causality analysis and the generalised linear model – GLM). Literature studies are aimed at answering the question of what is the relationship between the transparency, credibility of the central bank and the effectiveness of monetary policy in theoretical terms. However, the empirical research studies aim to confirm the hypothesis (H_0) or reject the hypothesis (H_1) about the causal relationships between the variables mentioned. Empirical analyses were conducted on the example of the European Central Bank, which, from the point of view of its monetary policy, is characterised by relatively high efficiency, relatively effectively stabilising inflation in the monetary union. All statistics used in the study were taken from databases of the International Monetary Fund (IMF World Economic Outlook), the European Union statistical office (Eurostat) and the Organisation for Economic Cooperation and Development (OECD) (OECD Data). The analysis covers the period from 2010 to 2022 based on monthly data. The results of the research confirmed the existence of the null hypothesis (i.e., the significant impact of communication, transparency and credibility of the European Central Bank on the effectiveness of monetary policy in the Euro area). The results of the conducted research may be a starting point for further, more in-depth research on the relationship between communication, transparency, credibility and effectiveness of central banks in countries with different levels of economic development.

Key words: communication, transparency, credibility, European Central Bank, monetary policy
JEL codes: E50, E51, E59, D83

Introduction

Not so long ago, central bankers believed that decisions made as part of the pursued monetary policy should surprise the markets to achieve maximum impact on the real economy. Over the past two decades, there has been a radical change in this regard. Namely, central banks are trying to increase and more transparency in their monetary policy, particularly regarding goals, strategies and the basis of decisions taken. This change is closely related to the growing independence of the central bank in functional,

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financial, personnel and institutional terms, which requires a counterbalance in the form of increased transparency and accountability of the central bank. Also, the achieved economic benefits are considered to be another key reason for greater transparency of activities on the part of the central bank [Dincer et al. 2022].

As Freedman and Laxton [2009] claim, it is widely believed in the central bank environment that providing more information about the monetary policy conducted by the central bank may increase its effectiveness. This view is based on theory and empirical research highlighting the importance of monetary policy expectations as a key element in determining interest rates and other asset prices. Overall, the transparency of the central bank's activities and adequate communication with the central bank's environment contribute to a decrease in volatility in financial markets, increase the predictability of upcoming interest rate decisions and help achieve monetary policy goals. In order to convey the mood of the central bank to the society and markets properly, and – thus – to improve the effectiveness of the pursued monetary policy, the central bank is required to be more transparent in its activities and to actively and well-planned communication with the environment. Accordingly, there is now a lot of attention to the way central banks present their key messages. Central banks are expected to communicate more and more actively with the market, which will ultimately contribute to increasing the effectiveness of the pursued monetary policy [Issing 2005].

Communication and credibility strategy of the European Central Bank

The public can better comprehend ECB monetary policy thanks to transparency. The policy is more credible and successful when the public's views are better understood. The ECB must be transparent in how it interprets its mission and plans to carry out its policy goals. By clearly stating its mission and procedures, the ECB improves its credibility. Inflation expectations are firmly anchored when the ECB is viewed as being able and ready to carry out its political mandate. Regular updates on the central bank's evaluation of the state of the economy are especially helpful. Additionally, it is advantageous for central banks to be forthright and honest about what monetary policy can and, more significantly, cannot accomplish. Decision-makers are forced to practice self-discipline through a fervent commitment to transparency. It makes sure that their policy judgments and justifications remain constant over time. Decision-making bodies are more motivated to carry out their duties to the best of their ability when public scrutiny of monetary policy activities is made easier [Lustenberger and Rossi 2020].

The European Central Bank regularly assesses the state of the economy and releases its findings in public. This aids markets in comprehending the mechanism by which monetary policy responds to societal changes and potential economic shocks. In the medium term, it improves the market predictability of central bank movements. Market expectations can be created more effectively and precisely in this way. The ECB has created its own structure for communicating with the environment, similar to many other central banks of industrialised economies [Wyplosz 2022].

The European Central Bank (ECB) first revealed its monetary policy plan in October 1998, defining price stability quantitatively and defining a two-pillar medium--term analytical framework with economic and monetary analysis to evaluate price stability concerns. This established a strong foundation for trustworthiness and reaffirmed its dedication to openness and transparency. In particular, the ECB has given the public

a foundation for effectively influencing expectations and lowering the sensitivity of inflation expectations to short-term shocks by developing and publicising a quantitative definition of price stability (below, but close to, 2%). The choice was successful. According to the Consensus Economics Forecast, for instance, long-term inflation estimates for the Euro area have remained in the 1.7-2% range since the introduction of the Euro in 1999.

During the same period, financial market expectations of inflation were more volatile. Although these expectations occasionally showed only slight deviations from the accepted definition of price stability, as in the recent spike in food and energy prices, we were able to quickly regain control of these expectations thanks to the ECB's openness and steadfast dedication to the achievement of its main objective. Further evidence that inflation expectations are securely anchored at levels consistent with the current definition of price stability comes from recent empirical findings suggesting long-term inflation expectations in the Euro area are essentially resistant to changes in actual inflation performance. This is a significant accomplishment, especially in light of the several recent negative supply shocks affecting the Euro region. In addition, the quantitative definition provides a precise benchmark against which to measure the inflation experienced by all market participants.

A genuine understanding of the strategy is a necessary, though insufficient, condition for the public to form appropriate expectations about the future course of monetary policy. This is true despite the extraordinary role the ECB's strategic framework plays in communication policy. In a world of uncertainty with scant information on the health and prospects of the economy, differences in interpretation and appraisal of the state of the economy and accompanying policy actions may result in discrepancies between the private sector and central bank forecasts at any moment. As a result, the ECB goes to great lengths to explain the economic justification for monetary policy choices by offering thorough analyses of the current state of the economy and the financial system as well as the Governing Council's assessment of medium- to long-term threats to price stability.

Finding the ideal balance between the necessity of giving the guidance of the market, remaining adaptable to constantly revaluate the appropriateness of the monetary policy stance in light of changing circumstances, and never making an upfront commitment to the medium-term sequence of future interest rates is difficult in this type of communication. An essential instrument, in this regard, is the opening statement made during the news conference held each month after the first Governing Council meeting. It conveys the Governing Council's collective opinion of the monetary policy stance, is structured in accordance with the established strategy and provides a detailed explanation of the monetary policy decisions made. Thus, the information provided in this manner is actually comparable to that released by other central banks [Moschella and Romelli 2022].

The ECB's communication strategy has two major benefits, though. First, a bigger audience is reached with better timeliness and greater flexibility than disclosing collegial protocols. The press conference, in particular, not only offers in-depth details on the monetary policy considerations made far earlier than the final procedure. Specifically, a press conference is held 45 minutes after the decision on the main interest rates is announced, giving the public a chance to read about the many topics in an open and unfiltered manner. The purpose of the news conference amply demonstrates the necessity and demand for an honest and transparent dialogue between decision-makers and public

representatives. In order to highlight the collegial nature of the ECB's decision-making process and the unique institutional circumstances in which the ECB functions as a supranational institution, the Governing Council decided not to publish the voting minutes. The Governing Council members' votes, particularly those of the governors of national central banks, run the risk of being interpreted from a national viewpoint, regardless of their true justifications, if the information on individual voting behaviour is made public. The validity of the choices made could be jeopardised. Based on its immediate influence on financial markets, the ECB news conference can be evaluated as a key source of information about monetary policy. Since the ECB does not publish its decisions and justifications at the same time as other central banks do, there is a small lag between the announcement of the decision and the justification made at the press conference. This presents an especially interesting opportunity to highlight different signals of communication with the central bank. Therefore, news about the future direction of short-term interest rates must be the only factor driving changes in forwarding rates during the press conference; news about the release of decisions must not be included. According to a recent ECB poll, market activity on the days of Governing Council meetings has gradually decreased over time.

Similarly, a related study discovered that ECB press conferences typically had a bigger impact on asset prices than ECB decision releases. The signal-to-effects ratio of the press conference is high, as evidenced by the fact that the impact on interest rates is inversely proportional to the impact on asset price volatility. This outcome does not at all come as a surprise. A question-and-answer session actually gives journalists a chance to ask clarifying questions and process the information presented. The public can verify through speeches given by the monetary authorities that the committee that determines monetary policy is a true collegial body and not a body and that its members have a feeling of shared accountability for the decisions made. The goal of the "one-voice" rule, which the Governing Council members adhere to while speaking in public, is to make sure that the opinions voiced on an individual basis consistently represent those of the Council as a whole. According to the empirical literature, this approach is an example of communal responsibility because of its improved message clarity and successful reduction of possible media noise in communication. The growth and expansion of the Euro area by new members will undoubtedly strengthen the significance of this policy. Accordingly, the ECB study demonstrates that a higher level of dispersion among the monetary policy committee members decreases the ability of financial markets to predict future monetary policy actions and raises uncertainty.

The Central Bank Communication Index (CBCI), which examines the content of opening remarks made at press conferences held by the European Central Bank, is one way to rate the effectiveness of a central bank's communication with the outside world (as of 2006). Using linguistic analysis, this indicator shows the empirical findings of the ECB's inclination to make opening statements, distinguishes between content related to monetary policy decisions, including standard and non-standard monetary policy instruments, content related to monetary policy decisions and information on future decisions. Content related to the Euro area's economic outlook includes information on production, price changes, and monetary aggregates [Picault and Renault 2017].

As a result, the CBCI index really consists of two sub-indices: the economic outlook index and the monetary policy index. Three components comprise the monetary

policy index, which evaluates the preliminary monetary policy announcement from the ECB. They tend to adopt a hawkish, neutral, or dovish tone (e.g., we decided to increase the key ECB interest rates), respectively (e.g., the Governing Council decided to lower the key ECB interest rates by another 75 basis points). If the statement's monetary policy index is 1, then all of its monetary policy sentences are dovish. On the other hand, the economic outlook index provides three components that evaluate the information in the ECB's preliminary economic outlook statement. They show a propensity to be either optimistic (for example, the domestic demand in the Euro area is anticipated to sustain its relatively high momentum), neutral (for example, the Governing Council continues to assess the threats to these outlooks as roughly balanced) or negative (intensification and deepening of the turmoil in the financial markets is likely to weaken global and Euro area demand). An economic outlook index of 1 indicates that all of the statement's predictions for the Euro area's economy are optimistic [Picault and Renault 2017].

Monetary policy index – light grey. Economic perspective index – dark grey.

Figure 1. CBCI communication indicator for the European Central Bank in the period 2008-2022

Source: [Picault and Renault 2017].

In line with the data presented in the figure above, it can be seen that the monetary policy and economic outlook indices in the Euro area frequently changed in the analysed period, which was a consequence of changes in economic activity and inflation in the Euro area. What's more, the analysed indicators were highly correlated with each other, proving that the nature of the ECB's monetary policy was very consistent with the outlook for economic development in the Euro area.

While analysing the inflation rate in the period 2010-2020, it can be noticed that in the period 2010-2021, the Euro area recorded a stable level of prices (i.e., inflation oscillating around the inflation target set by the ECB at a level close to 2%). It was only in 2022 that a sharp increase in inflation was recorded, amounting to almost 9%, mainly due to the global energy crisis caused by Russia's attack on Ukraine.

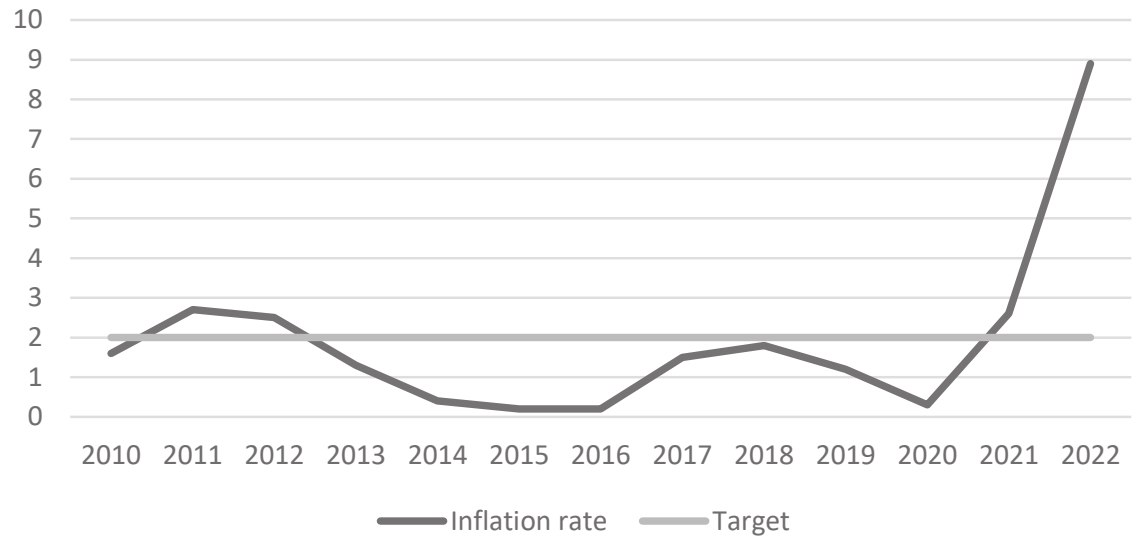

Figure 2. Inflation rate in the Euro area in (EA 17) in the period 2010-2022
Source: own study based on [IMF 2022].

So, too, in this instance, a significant negative correlation can be seen between changes in the central bank's communication index and in inflation in the Euro area. This means the ECB properly communicates with the environment by transmitting appropriate signals to the market regarding its intentions regarding the pursued monetary policy.

Transparency, credibility and effectiveness of the monetary policy of the ECB

According to the methodology outlined by Dincer et al. [2022], the central bank transparency index is the total of evaluations associated with 15 criteria that fall into the following categories (min = 0, max = 15). The bigger the indicator's value, the more transparent the central bank is (following 4 cateories):

- Political openness is referred to as political transparency. This involves a formal declaration of goals, detailed institutional structures, prioritising of the major goal or goals and quantifying the second goal or goals.
- Economic transparency deals with economic evidence used in monetary policy. It covers economic statistics, the economic model a central bank uses to prepare predictions or measure the influence of its choices and internal predictions (model--based or judgmental) on which the central bank counts.
- Procedural transparency deals with the method of making decisions by the central bank and concerns the method of making decisions by the central bank in the context of the monetary policy used.
- Operational transparency deals with the implementation of central bank activities. It includes a discussion of control faults in implementing operational objectives and macroeconomic disturbances affecting the transmission of monetary policy impulses to the real economy [Dincer et al. 2022].

The European Central Bank's transparency score exhibited an upward trend over the period examined, indicating that the Euro area central bank recognised real benefits from an improved market and ECB communication regarding the pursued monetary policy.

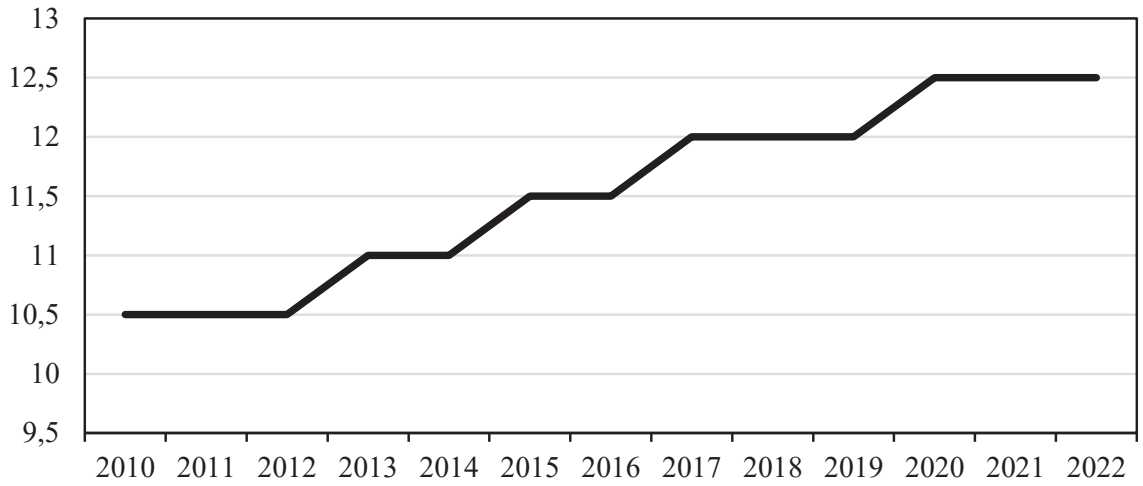

Figure 3. Transparency index of the European Central Bank in the period 2010-2022
Source: own study based on IMF data (2022).

However, a technique to quantity the central bank's credibility is to look at how closely inflation expectations link to the actual inflation rate in the country [Demertzis et al. 2012]. The closer to these two variables, the more credible the central bank is in terms of its monetary policy. Credibility is, thus, estimated as the square of the difference between the predicted inflation and observed inflation. The higher the index value, the lower the central bank's credibility.

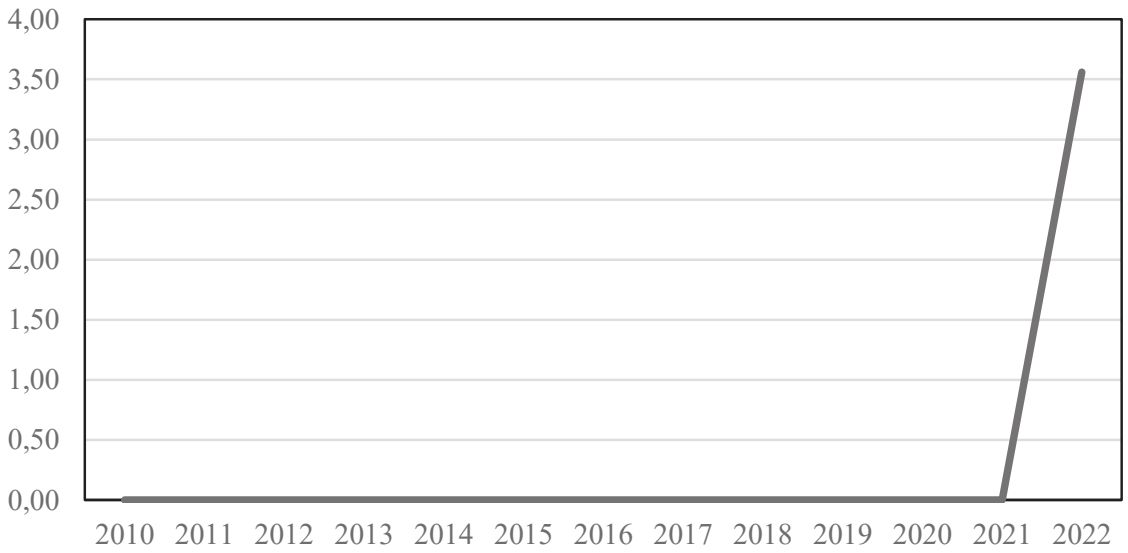

Figure 4. ECB credibility indicators in the period 2010-2022
Source: own study.

The credibility of the European Central Bank in the period 2010-2022 was relatively high and stable; however, this credibility significantly worsened in 2022 due to the rising inflation in the Euro area, significantly different from the forecast by the ECB. On the other hand, the efficiency of monetary policy is associated with the scope of implementation of the inflation objective set by the central bank. It is calculated as the square of the difference between the observed inflation and the set inflation target. The higher the value of the index, the lower the effectiveness of the central bank's monetary policy.

In the period 2010-2021, the ECB's monetary policy efficiency index was relatively low and stable over time, which confirmed the high effectiveness of monetary policy in the Euro area. But the effectiveness of the monetary policy in the Euro area has recently deteriorated since 2022, which resulted from a sharp acceleration of inflation in this economy. Of course, this inflation was largely caused by external factors (including a sharp increase in energy commodity prices as a result of Russia's invasion of Ukraine), over which the ECB had no significant influence; nevertheless, the effectiveness of monetary policy was significantly limited.

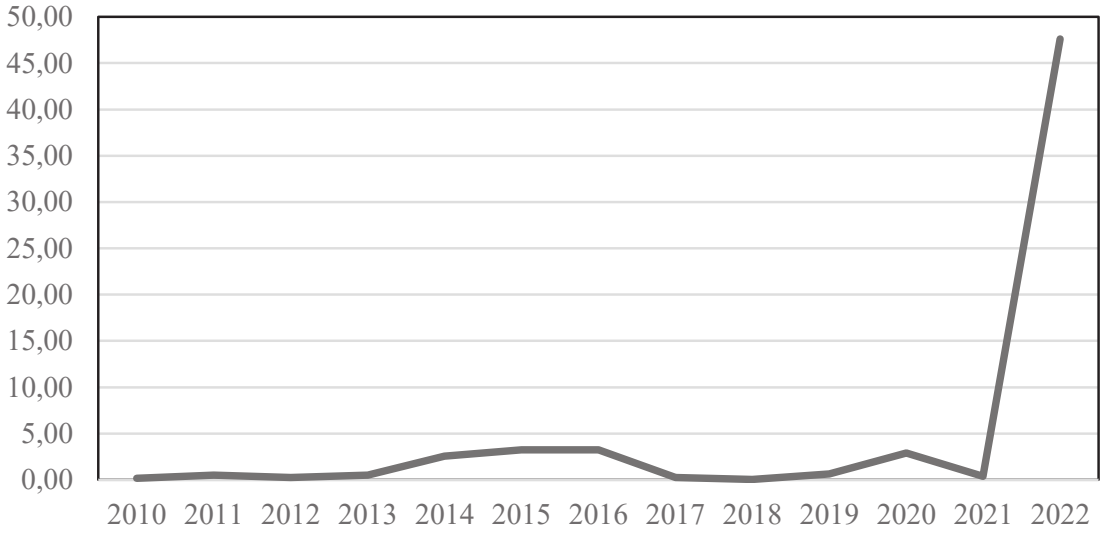

Figure 5. ECB monetary policy performance indicators in the period 2020-2020
Source: own study based on IMF (2022).

In turn, in the case of the Euro area, a very high linear relationship between the credibility and efficiency of the European Central Bank and a significant but lower correlation between transparency and efficiency of the central bank were revealed.

Table 1. Coefficients of correlation between the transparency, credibility and effectiveness of the monetary policy of the central bank in the EU-5 and the Euro area

Specification	CI / EI	TI / EI
Correlation coef. EA-17	0.995	0.386

Source: own study based on IMF (2022).

Nevertheless, it is wrong to draw causal conclusions based on simple correlation analysis because correlation only informs about the stochastic connection of a particular set of variables in a specific research case.

Results of econometric analysis

The goal of the undertaken original model research was an attempt at practical verification of the relationships between the transparent communication policy of the central bank, its credibility and the effectiveness of the monetary policy pursued by the central bank in the context of meeting the inflation target, present in the theoretical analyses. Two aspects of the study's methodology are covered below in more depth. Both qualitative and quantitative analyses are included in the study. First, econometric and statistical tools are applied. To analyse the cause-and-effect link between the openness and credibility of central banks and the efficacy of monetary policies, the statistical approaches employed in the analysis include comparative analysis and financial modelling. The research includes qualitative as well as quantitative analysis. First of all, statistical and econometric methods are used. The statistical methods used in the analysis cover a comparative analysis and financial modelling to examine the cause-and-effect relationship between the transparency and credibility of central banks and the effectiveness of monetary policies following the expression below. All statistics used in the study were taken from databases of the International Monetary Fund (IMF World Economic Outlook), the European Union statistical office (Eurostat) and the Organisation for Economic Cooperation and Development (OECD) (OECD Data). The analysis covers the period from 2010 to 2022 based on monthly data.

$$EI_{EA_{17}} = a + \beta \times CI_{EA_{17}} + \gamma \times TI_{EA_{17}} + \varepsilon,$$

where:
$EI_{EA_{17}}$ – monetary policy efficiency index of European Central Bank,
$CI_{EA_{17}}$ – the European Central Bank credibility index,
$TI_{EA_{17}}$ – the European Central Bank Transparency Index,
a – intercept of the equation,
β, γ – sensitivity coefficients,
ε – random component.

Initially, Graner's causality analysis was used to determine whether the explanatory variables were significant causes of the explanatory variable of the model. The main assumption of Granger causality analysis is the existence of a cause-and-effect chain, according to which if the effect occurs in period t, the cause occurs in period t. Variable x is the Granger cause of variable y if the current value of y can be predicted with greater accuracy by using past values of x rather than without them, with the information remaining unchanged [Maddala 2008].

Based on the obtained results, it can be concluded that there was a significant connection between the transparency and efficiency of the central bank and between the credibility and efficiency of the central bank in the Euro area in the period 2010-2022 was confirmed. The results of the relevant tests are shown in the Table 2.

Table 2. Results of Granger causality tests

Null Hypothesis:	*F*-Statistic	Prob.
EI_EA_17 does not Granger Cause CI_EA_17	0.17068	0.8470
CI_EA_17 does not Granger Cause EI_EA_17	1.01132	0.4183
EI_EA_17 does not Granger Cause TI_EA_17	0.80436	0.4904
TI_EA_17 does not Granger Cause EI_EA_17	1.02820	0.4131

Lags: 2

Source: own study.

Next, the connections between the aforementioned variables was analysed by estimating the structural parameters of the model using the generalised linear model (GLM), which is a flexible generalisation of ordinary linear regression. GLM generalises linear regression by allowing the linear model to be associated with the response variable using a link function and allowing the magnitude of the variance of each measurement to be a function of its predicted value. Generalised linear models were formulated by John Nelder and Robert Wedderburn as a way to standardise various other statistical models, including linear regression, logistic regression and Poisson regression. The results are presented in the Table 3.

Table 3. Estimation results of equation (1) for the Euro area

Dependent Variable: EI_EA_17				
Variable	Coefficient	Std. Error	z-Statistic	Prob.
CI_EA_17	1.020769	0.095177	10.72493	0.0000
TI_EA_17	0.018165	0.027031	0.672022	0.5016
Mean dependent var	4,786154	*SD* dependent var		12.92926
Sum squared resid	19.20341	Log-likelihood		-21.06795
Akaike info criterion	3,548916	Schwarz criterion		3,635831
Hannan-Quinn criteria.	3.531051	Deviance		19.20341
Deviance statistic	1.745765	Pearson SSR		19.20341
Pearson statistic	1.745765	Dispersion		1.745765

Source: own study.

The results of estimating equation showed that in the Euro area, there was a significant cause-and-effect relationship between the credibility of the ECB and the effectiveness of the monetary policy of the central bank. In this case, the sensitivity coefficient was 1.02, which meant that in the case of the Euro area, the sensitivity of the central bank's efficiency to changes in the credibility of the central bank was relatively high. On the other hand, the research results did not confirm the existence of a significant relationship between the transparency of the central bank and the effectiveness of the monetary policy pursued. This situation may result from the fact that the ECB is characterised by relatively high credibility among its participants and, therefore, a high degree of predictability – which means that the ECB's transparency is not a necessary condition for conducting a sufficiently effective monetary policy. Moreover, according to the results of empirical research, the ECB's transparency significantly determines the credibility of the ECB and, thus, indirectly influences the effectiveness of monetary policy led in the Euro area.

Conclusions

The central bank's actions ought to be foreseeable under a transparent monetary policy. The capacity of market participants to predict impending changes in monetary policy can be viewed as predictability. This implies that monetary policy choices should have a low level of surprise on the days the monetary policy committee meets. It is anticipated that when markets can accurately forecast central bank operations, market participants will make more logical and efficient judgments [Poole 2001]. According to theoretical literature and actual data, transparency is crucial to a central bank's credibility. Transparency is a multifaceted phenomenon that includes both the proper interpretation of the information provided by the public and the issuance by the central bank of sufficient information in terms of quantity and quality. In this regard, transparency ought to improve the ability of the private sector to anticipate changes in monetary policy [Blinder 2018].

Therefore, theoretical and empirical analyses confirm that in countries with a relatively high degree of the central bank's communication with the market, there is relatively high effectiveness of monetary policy led by the central bank thanks to the bank's transparency and credibility.

The findings of the study could serve as a springboard for a more in-depth investigation into how central banks in nations with various degrees of economic development interact in terms of communication, legitimacy and efficiency. This issue appears to be particularly significant during the current market volatility associated with an increase in global inflation brought on by supply-and-demand shocks.

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Komunikacja banku centralnego jako determinanta wiarygodności i skuteczności polityki pieniężnej na przykładzie europejskiego banku centralnego

STRESZCZENIE
Celem podjętych badań jest próba wyjaśnienia na gruntach teoretycznym i empirycznym współzależności między komunikacją banku centralnego, jej przejrzystością i wiarygodnością, a w konsekwencji skutecznością polityki pieniężnej prowadzonej przez banki centralne. W badaniach wykorzystano metody badawcze oparte na analizie literatury przedmiotu z zakresu bankowości i finansów oraz metody statystyczne i ekonometryczne (analiza przyczynowości Grangera oraz uogólniony model liniowy – GLM). Studia literaturowe mają na celu odpowiedź na pytanie, jaki jest związek między przejrzystością, wiarygodnością banku centralnego a efektywnością polityki pieniężnej w ujęciu teoretycznym. Z kolei przeprowadzone autorskie badania empiryczne mają na celu potwierdzenie hipotezy (H_0) lub odrzucenie hipotezy (H_1) o związkach przyczynowych między wymienionymi zmiennymi. Analizy empiryczne przeprowadzono na przykładzie Europejskiego Banku Centralnego, który z punktu widzenia prowadzonej polityki pieniężnej charakteryzuje się relatywnie wysoką efektywnością, relatywnie skutecznie stabilizując inflację w unii walutowej. Wszystkie statystyki wykorzystane w badaniu zostały zaczerpnięte z baz danych Międzynarodowego Funduszu Walutowego (IMF World Economic Outlook), urzędu statystycznego Unii Europejskiej (Eurostat) oraz Organizacji Współpracy Gospodarczej i Rozwoju (OECD) (OECD Data). Analiza obejmuje okres od 2010 do 2022 roku na podstawie danych miesięcznych. Wyniki przeprowadzonych badań potwierdziły występowanie hipotezy zerowej, czyli istotnego wpływu komunikacji, przejrzystości oraz wiarygodności Europejskiego Banku Centralnego na efektywność polityki pieniężnej w strefie euro. Wyniki przeprowadzonych badań mogą stanowić punkt wyjścia do dalszych, bardziej pogłębionych badań dotyczących relacji między komunikacją, transparentnością, wiarygodnością i skutecznością banków centralnych w krajach o różnym poziomie rozwoju gospodarczego.

Słowa kluczowe: komunikacja, przejrzystość, wiarygodność, Europejski Bank Centralny, polityka pieniężna

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BEHAVIOURAL SEASONAL ANOMALIES ON THE STOCK EXCHANGE – VERIFICATION OF THE JANUARY EFFECT ON THE WSE IN WARSAW

ABSTRACT
Practice and empirical observations prove that achieving above-average returns on the stock market is possible. It is possible to achieve both higher and lower returns than those resulting from the fundamental value of the companies being valued. This condition is affected by anomalies that make the market ineffective. Numerous studies in behavioural finance show that the causes of market inefficiency are to be found in the incomplete rationality of investors. Numerous deviations of investor behaviour from the *homo economicus* model result from their cognitive and motivational limitations. Sometimes the mistakes of an individual investor are systematic – such systematic and massive errors take the form of heuristics that can influence the magnitude of market anomalies, including the occurrence of calendar effects. One of the best-known calendar anomalies is the January Effect. The January Effect is characterised by an increase in stock prices in January, and the occurrence of the January Effect is expressed by the fact that the returns in January are the highest of the entire year. The research conducted on the Warsaw Stock Exchange confirmed the presence of the January Effect in small- and medium-sized companies. During the research, the presence of other calendar effects (related to the months of June and October) was also diagnosed.

Key words: behavioural finance, seasonal anomalies, calendar anomalies, January Effect
JEL codes: E7, G14, G41

Introduction

A rational, thinking and independent being makes many choices and decisions in their life. The personal character of humankind's existence most accurately explains this "human fact". Man is not only an independent being in the sense of his existence, but also in terms of the actions he undertakes. This independence leads man to know the reality that surrounds him and make free decisions that result from this knowledge [Andrzejuk 2007, p. 13].

Since the day-to-day functioning of humans at virtually every level of life involves the broad financial sphere, most decisions are financial in nature, resulting – in part – from the process of the financialisation of economies [Franc-Dąbrowska 2018, pp. 701-718, Franc-Dąbrowska 2019, pp. 1-19]. All choices and decisions a person makes should be the best possible, satisfactory and as rational as possible for them [Pawlonka and Pietrzak 2020, pp. 7-9]. However, people cannot always predict the consequences of their decisions wholly and accurately. Financial decisions also involve

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risks that are not always predictable [Sartre 1956, p. 167]. This risk is inextricably linked with financial management and all investment activities [Kuziak 2011, pp. 9-22]. Given this, the question arises: what influences investors' decisions to buy or sell stocks? The simplest way to analyse their actions suggests that their decisions aim to maximise profits and minimise losses and risks. However, their preferences are not necessarily so easy to identify.

Emotions can interfere with a rational approach to investing – for example, different market participants may perceive the same fundamental information differently under the influence of stress, fear or joy. Under the influence of emotions, investors may display an excessive propensity or aversion to risk. Many models developed in the twentieth century wrongly assume that the average market participant acts rationally and has all the information he can fully and unrestrictedly process.

The influence of behavioural factors can have different effects on companies' stock prices – starting from slight changes caused by certain inclinations to enormous rises caused by euphoria or enormous falls caused by fear. A notable example of this is the fear related to the COVID-19 pandemic, which was observed on the global (including Polish) stock market in March 2020.

The market is efficient if its participants behave rationally and prices always fully reflect the available information [Żelazowska 2019, p. 3]. In such a market, it is impossible to achieve above-average returns. However, practice shows that, in reality, it is possible to achieve higher returns than can be deduced from fundamental analysis. The reasons for this include anomalies in the stock markets. Anomalies are relationships between returns that cannot be explained by the CAPM model [Fama, and French 1996, p. 55-84]. They result from certain irrational behaviours of investors who are guided by their emotions when investing and increase objections to the market efficiency hypothesis.

Seasonal anomalies refer to the trend of systematic returns of financial assets at certain times of the day, week, month or even year [Lobão 2019, p. 241-265]. One of the best-known seasonal anomalies is the January Effect, also known as the month-of-the-year effect. The January Effect is characterised by an increase in stock prices in January. The occurrence of the January effect is manifested by the fact that returns in January are the highest recorded in the entire year. The best-known study of the January Effect was conducted by Rozeff and Kinney in 1976. They showed higher returns in January compared to other months on the New York Stock Exchange [1976, p. 379-402]. Thus, they confirmed the theory of S. Wachtel from 1942, which had already pointed out that there are regularly higher returns in certain months [1942, p. 184-193].

As Szyszka notes [2009, p. 166-170], after the publication of the study by Rozeff and Kinney, many other authors began to investigate the January Effect – (including Branch [1977, p. 198-207], Dyl [1977, p. 165-175], Dimson (1988), Lakonishok, Smidt [1988, p. 403-425], Haugen and Lakonishok [1987] – obtaining confirmation of the existence of the January Effect.

The January Effect occurs for a variety of reasons. The most popular theory is that this effect is due to a stock sale at the end of the year for tax reasons. Investors sell shares in companies that have generated a negative return during the year to reduce the tax base. Due to December stock sales, many companies remain undervalued at the beginning of the year, leading investors to buy their stock in early January. The most popular tax theory, which attempts to rationalise the occurrence of the January Effect, does

not quite correspond to reality because in countries such as Australia or England, where the end of the tax year does not coincide with the end of the calendar year, the January Effect can also be observed. In these countries, there are even two months with higher average returns. One is January, and the other is the first month of the tax year – April [Hillier and Marshall 2002, p. 73-84]. For Australia – July [Brown et al. 1983, p. 33-88]. In Japan, there is no capital gains tax but yet January is the month with the highest returns [Kiyoshi 1985, p. 223-245]. The reason for the January Effect in these countries could be the mutual interaction of world markets.

The study by Reinganum [1983, p. 89-104] is important in understanding the above anomaly since he has shown that the January Effect mainly occurs in small- and medium-sized companies. This shows that investors are reluctant to sell large stocks and well-known companies because they believe that well-known companies without important fundamental information are a safe investment. In this case, investors fall into the trap of the accessibility heuristic or, more precisely, are affected by the phenomenon of the pure exposure effect. It manifests itself in the fact that people prefer what they know to what they know less.

The above assumptions, arising from empirical observations, only together account for the January Effect. None of them explains this anomaly one hundred per cent. Since the January Effect is so well-described in academic literature, one might think that investors could easily profit from it. This reasoning led to an anomaly known as the Santa Rally or simply the December Effect. It is based on a rise in stock prices in the last days of December, mainly between Christmas and New Year's Day [Stanek 2020]. Investors anticipating the occurrence of the January Effect want to buy shares of undervalued companies earlier. This is a logical and easy way to achieve above-average returns, but it has two consequences. First, buying stock in December means that the investor increases, not decreases, the tax base, which ultimately contributes to a decline in profits. Secondly, if the investor finds a company that other stockbrokers want to earn from and buys its shares in advance at the end of December, it will turn out that the company is not undervalued at all, meaning that the investor does not earn anything from it at all and only loses by increasing the tax base.

Research methodology

The study's main objective was to verify the presence or absence of the January Effect in the conditions of the Polish stock market for medium-sized companies. As part of the comparison, an analogous study was carried out for large companies, although earlier studies indicated that the January Effect mainly applies to medium and small enterprises [Reinganum 1983, p. 89-104].

To check the presence of the January Effect on the Polish stock market, two stock indices were used, namely WIG20 and mWIG40. The WIG20 index includes the 20 largest companies listed on the Polish capital market. The mWIG40 index includes 40 other companies, so-called "medium-sized" companies, which are not included in the WIG20 index.

The study covers 2000-2019, excluding 2008 and 2009, using stock market index returns in each month over 18 years. Then, the cumulative returns for each month and the

average annual returns for a given month during the study period were calculated. To achieve the main objective, two research hypotheses were formulated:

- H_1 – The January Effect occurs within the WIG 20 index.
- H_2 – The January Effect occurs within the mWIG40 index.

To confirm the presence of the January Effect in each of the two stock indices analysed, the first month of each year had to meet all of the following conditions:

- W_1 – January must have the highest cumulative return and the highest average return in each of the years studied;
- W_2 – January must have the highest number of highest returns among the months studied in all the years studied;
- W_3 – January must have the highest number of positive returns among the months studied in all of the years studied.

The study presents the results from 2008-2009, although they were not taken into account at the stage of testing the research hypotheses and formulating the final conclusions. The fact that the years 2008-2009 were excluded from the study period is due to the financial crisis and the crash on the American stock market in 2007-2009. On the Polish capital market, this crash left its mark one year after its beginning (i.e., in 2008). For similar reasons, 2020 and 2021 were also excluded from the study. During this period, an increase in the importance of the fear factor and the impact of dynamically changing macro-environmental conditions on the valuations of listed companies was observed.

Inside the tables, the designation was consistently used:

- the tables in grey cells show the months in which positive rates of return were recorded;
- white cells show negative rates of return;
- amounts of negative rates of return in italics;
- in each of the periods, the highest return in a given year is shown in bold and underlined;
- the dashed line marks the years 2008 and 2009, which were excluded from the study sample.

The designation used applies to Tables 1-4.

Results and discussion

The conducted study showed that the probability of reaching the positive side of the return in January 2000-2007 and 2010-2019 was above 50% for all analysed indices. In the case of the WIG20 index, the probability of achieving a positive return was the lowest (55.6%), and in the case of the mWIG40 index, the probability was the highest (72.2%). However, the result of the research does not allow us to conclude that regardless of the stock market index, the probability of achieving a positive return is highest in January because, in the case of the WIG20 and mWIG40 indices, the probability of achieving a positive return is the same or higher in October, as shown in Figure 1.

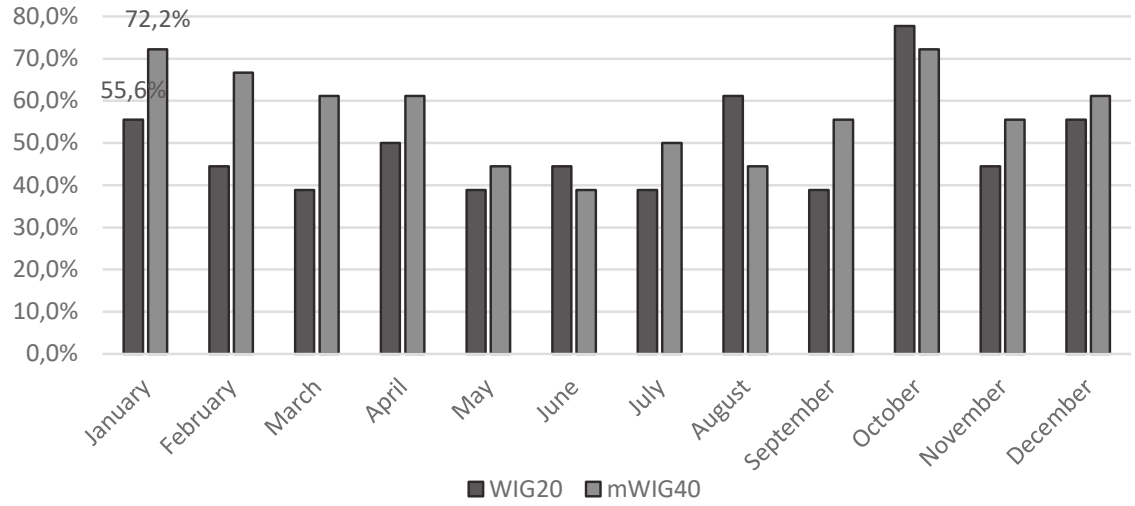

Figure 1. The probability of achieving a positive return in each month in 2000-2007 and 2010-2019 (%)

Source: own study.

Verification of the January Effect within the WIG20 index

The monthly rates of return amounts in the years 2000-2009 and 2010-2019 as part of the WIG20 index are presented in Table 1 and Table 2.

Table 1. Monthly rates of return on the WIG20 index in 2000-2009 [%]

Month	Years									
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
January	3.09	*-1.26*	**18.72**	*-5.15*	0.94	*-4.03*	4.08	4.04	*-13.71*	*-15.05*
February	**20.33**	*-15.90*	*-4.19*	*-3.41*	4.62	**9.20**	0.48	*-8.66*	*-3.85*	*-10.45*
March	*-4.84*	*-4.26*	*-3.67*	0.26	*-1.16*	*-4.33*	*-0.39*	**9.54**	3.25	9.54
April	*-7.56*	6.00	0.13	1.76	*-0.25*	*-6.52*	9.66	3.59	*-3.51*	**18.03**
May	0.33	2.07	4.89	5.99	*-4.35*	2.99	*-11.74*	1.04	*-2.48*	*-3.85*
June	*-4.54*	*-13.04*	*-12.69*	5.34	2.64	8.05	1.82	0.57	*-10.41*	*-2.84*
July	*-4.05*	*-6.44*	*-12.23*	12.97	*-2.45*	*-2.45*	**10.21**	*-0.40*	**7.58**	13.51
August	0.46	*-3.45*	3.42	**18.45**	3.07	2.18	*-5.28*	*-1.89*	*-4.40*	2.51
September	*-13.50*	*-10.99*	*-6.59*	*-13.72*	4.41	8.51	*-1.75*	0.56	*-7.74*	*-0.33*
October	*-7.76*	**21.48**	13.49	6.88	0.66	*-8.80*	5.98	6.04	*-24.36*	0.84
November	*-1.53*	2.31	2.41	*-8.82*	*-0.40*	4.54	4.04	*-7.00*	*-4.20*	3.92
December	11.68	*-3.01*	*-6.40*	4.60	**5.36**	4.53	1.64	*-1.71*	4.89	0.43

Source: own study based on: [Notowania GPW…].

Table 2. Monthly rates of return on the WIG20 index over the period 2010-2019 (%)

Month	Years									
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
January	*-2.53*	*-2.78*	6.29	*-5.08*	*-3.08*	1.37	*-1.34*	5.12	3.68	3.41
February	*-4.15*	*-0.37*	*-1.97*	*-1.89*	**6.29**	1.59	2.62	5.39	*-6.70*	*-2.56*
March	**9.03**	4.63	*-1.48*	*-3.38*	3.04	1.60	**9.46**	-3.46	*-5.34*	*-0.90*
April	*-0.20*	1.25	*-2.62*	*-2.38*	*-0.96*	**5.10**	*-3.88*	**7.07**	2.35	*-0.28*
May	*-0.77*	*-0.55*	*-5.82*	**7.79**	*-0.10*	*-3.38*	*-4.82*	*-4.64*	*-5.88*	*-3.44*
June	-5.00	*-3.43*	**9.84**	*-8.10*	*-1.29*	*-4.89*	*-0.50*	0.95	*-2.50*	**4.02**
July	8.99	*-3.09*	*-3.07*	3.99	*-3.49*	*-2.86*	0.87	2.17	**8.63**	*-2.25*
August	*-4.38*	*-9.30*	3.18	1.41	3.21	*-2.98*	1.78	5.44	0.97	*-4.71*
September	6.59	*-9.36*	4.70	*-0.14*	2.34	*-2.33*	*-2.96*	*-2.93*	*-3.00*	1.34
October	1.53	**10.48**	*-3.43*	4.80	0.04	0.49	5.17	2.24	*-5.79*	1.93
November	*-2.52*	*-2.87*	3.22	1.43	*-1.85*	*-7.29*	1.85	*-3.71*	4.25	*-4.64*
December	2.88	*-5.32*	5.75	*-5.31*	*-4.19*	*-3.37*	9.19	2.98	*-2.26*	1.31

Source: own study based on: [Notowania GPW…].

A review of the data presented in Tables 1 and 2 shows that of the 18 observations, positive returns occurred ten times in January. Positive returns were recorded much more frequently in October (14 times). Only in four of the 18 years studied were there negative returns for the WIG20 index in October. In more than ten years, August and December were also characterised by positive returns. The remaining months, with the exception of April (nine positive and nine negative years), had more years in which they had a negative return for the index.

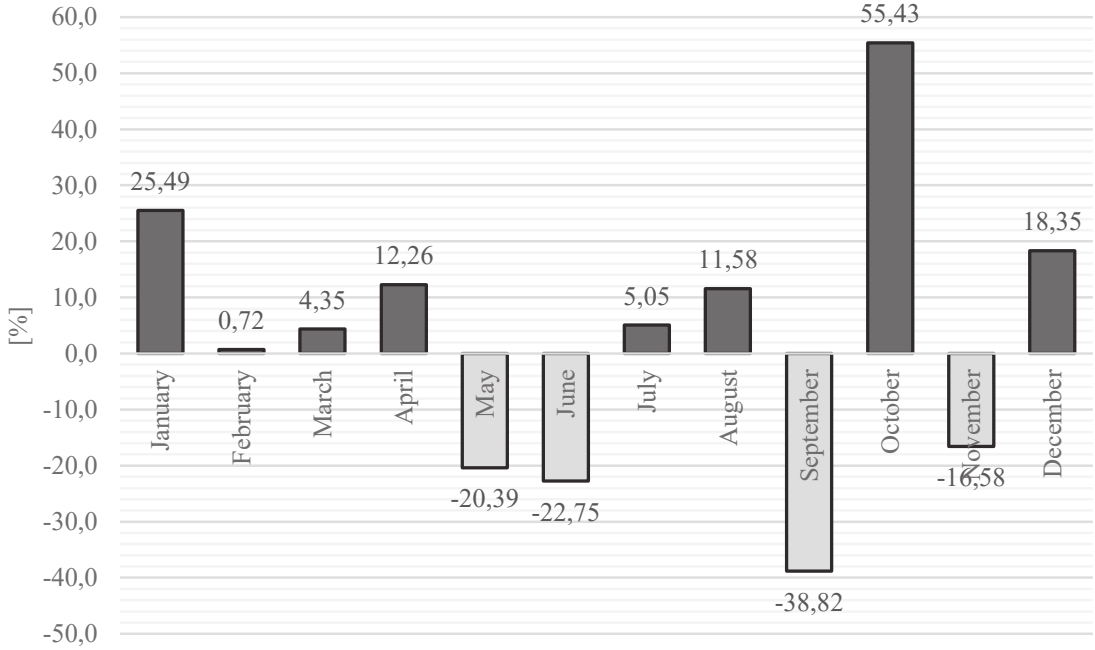

Figure 2. Cumulative rate of return on the WIG20 index from 2000-2007 and 2010-2019 [%]
Source: own study.

However, neither January nor October was characterised by the greatest number of highest returns in each year. The highest returns (i.e., three times) were in February (2000, 2005, 2014) and in March (2007, 2010, 2016). On the other hand, months such as September and November never achieved the highest return in the 18 years analysed.

Thus, the month of January did not fulfil the first two conditions already mentioned in connection with the January Effect. It did not stand out for having the highest number of years with positive rates of return, and it achieved the highest return in the WIG20 index only in one year (2002) – which means that it is also not the leading one in this respect either.

Figure 2 shows the cumulative rate of return for individual months in 2000-2007 and 2010-2019, showing what return could have been achieved if contracts for the index had been entered into at the beginning of the month and then sold at the end of the month each year (in the years of the study).

Figure 3 shows the average annual rate of return in each month within the WIG20 index, based on the average for 2000-2007 and 2010-2019.

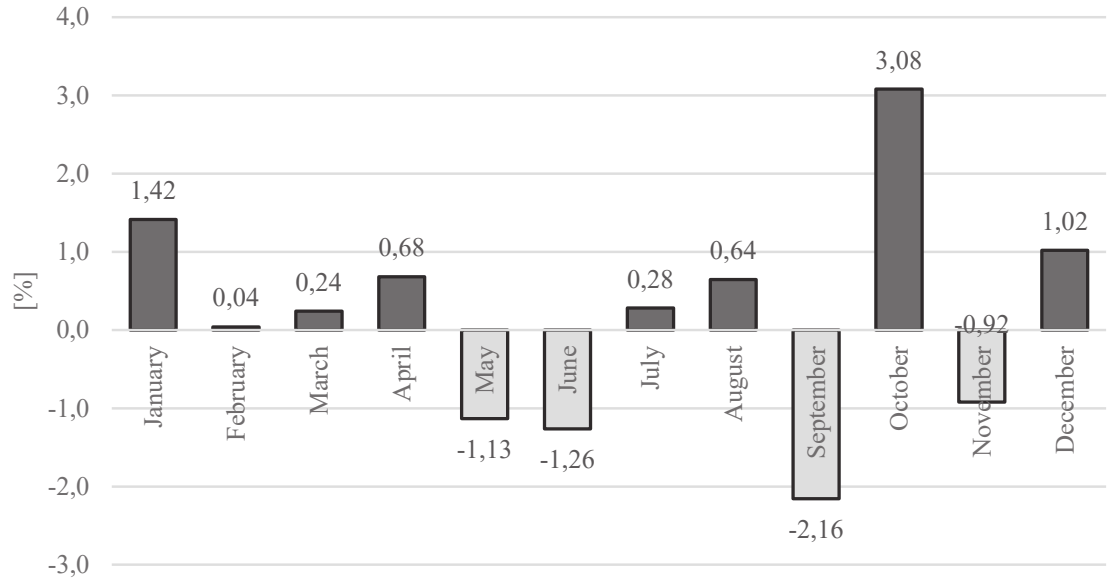

Figure 3. Average rate of return on the WIG20 index in 2000-2007 and 2010-2019 [%]
Source: own study.

Analysis of the data presented in Figures 2 and 3 shows that the highest cumulative returns and average returns on the WIG20 index in 2000-2007 and 2010-2019 could be achieved in October. The cumulative rate of return that could be achieved in October was more than double the January value, which is the second highest. On the other hand, the average return of the WIG20 index during the survey period was more than three per cent in October. The reasons for the dominance of October in terms of return may be that it is the first month of the last quarter and, therefore, it could be a period when investors make the last portfolio changes before the end of the year but then hold the shares until the end. This is because they are hoping for an even higher profit in a situation where the share prices of companies are rising or bet until the last minute on a reversal of the falling price in terms of the sunk cost effect and, therefore, do not change the contents of the portfolio.

In the case of January, despite the observed high cumulative and average returns (the second highest cumulative return, ten years of positive returns on the WIG20 index, average return at the level of 1.42%), the result of the study in the context of the verification of the January Effect does not allow its confirmation.

According to the conditions that enable the verification of the January Effect (and, in particular, the W_1 condition), cumulative and average January returns should be the highest throughout the year. Moreover, during the study period, the highest return in a given year was observed only once in January, which also does not constitute a basis for confirming the January Effect (according to the W_2 condition). The investigation conducted for WIG20 to verify the January Effect showed that this effect did not occur because not all three conditions (W_1, W_2, W_3) were met. Consequently, the H_1 hypothesis that there is a January Effect in the WIG20 index cannot be confirmed. However, in the case of the WIG20 index, the occurrence of the calendar effect can be detected, with the "exceptional" month being October rather than January. In the case of October, all three required conditions would be met. However, analysis of the "October Effect" in the case of the WIG20 index would require an in-depth investigation and extended conclusions on the possible causes of the observed phenomenon.

Verification of the January Effect within the mWIG40 index

The monthly returns of the mWIG40 index in 2000-2009 and 2010-2019 are shown in Tables 3 and 4. At first glance, the data presented in the tables show significantly more months with positive returns for the mWIG40 index than for the WIG20 index. While positive returns occurred in 106 of 216 possible months (49.07%) for the WIG20 index, there were positive returns in 123 of 216 possible months (56.94%) for the mWIG40 index. A larger number of months with positive returns may mean that investors consider mid-sized companies more profitable than large ones and invest in them more frequently. Medium-sized companies are characterised by slightly higher fluctuations in returns. It should be noted that these are not significant differences as the mWIG40 is the backbone of the WIG20; but they are worth noting.

In the case of the mWIG40 index, there have been as many as nine months of positive returns in ten or more years. The highest number of positive returns was recorded in January and October (13 out of 18). The only months with more negative than positive returns were May, June and July. On the other hand, January proved to be unrivalled when it comes to recording the highest returns for the year among all months in the study period. January recorded the highest returns for the index in five of the 18 years. This means that two of the three criteria have already been met in the case of the January Effect on the mWIG40 index. It is interesting to note the high number of years in which October returned positive returns. In the case of the WIG20, it was 14 years and, in the case of the mWIG40, 13 years. Moreover, the two highest annual returns were achieved in October – in 2001 and 2011.

In Figures 4 and 5, as in the case of the previous index, the cumulative rate of return for individual months was presented, as well as the average rate of return on the mWIG40 index.

Table 3. Rates of return on the mWIG40 index in 2000-2009 [%]

Month	Years									
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
January	1.46	2.15	**7.30**	*-4.77*	**10.90**	*-1.23*	**20.26**	13.13	*-17.32*	*-11.77*
February	*-8.30*	*-7.66*	*-2.46*	*-1.69*	8.46	2.25	1.34	*-1.82*	*-3.75*	*-7.79*
March	**8.70**	1.34	*-3.07*	*-0.22*	7.46	*-1.36*	4.03	**13.78**	**4.07**	10.88
April	*-4.65*	5.03	*-0.05*	3.22	6.42	*-4.87*	3.69	6.59	*-4.91*	**22.40**
May	*-2.01*	0.86	4.68	4.73	*-4.35*	*1.78*	*-10.38*	11.16	*-3.72*	1.46
June	*-0.41*	*-4.36*	*-8.08*	1.38	*-2.33*	5.53	0.03	0.42	*-14.66*	*-0.72*
July	*-0.91*	*-5.74*	*-8.43*	12.08	*-0.05*	2.30	11.70	*-9.86*	*-3.23*	14.98
August	*-2.62*	0.40	1.33	**17.78**	2.72	2.28	*-0.62*	*-3.17*	*-3.95*	12.47
September	*-9.09*	0.17	*-4.32*	*-9.59*	1.97	2.18	9.58	*-5.15*	*-6.77*	0.35
October	*-2.50*	**7.97**	5.41	6.66	*-3.67*	3.26	10.30	3.22	*-28.78*	*-0.57*
November	1.24	2.49	3.63	*-5.15*	*-1.85*	3.32	8.60	*-10.95*	*-4.78*	2.49
December	4.61	4.32	0.07	4.08	1.65	**7.40**	*-4.92*	*-1.84*	*-1.35*	2.17

Source: own study based on: [Notowania GPW…].

Table 4. Rates of return on the mWIG40 index in 2010-2019 [%]

Month	Years									
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
January	*-2.70*	0.18	**7.48**	1.27	*-0.09*	1.38	*-3.96*	**10.55**	3.11	3.28
February	0.27	0.05	4.09	0.19	5.20	3.56	2.35	4.00	*-5.24*	1.27
March	**7.34**	1.74	1.68	*-0.06*	2.77	1.26	5.13	*-3.50*	*-2.96*	*-0.70*
April	1.65	0.60	*-4.15*	*-3.51*	*-2.09*	**3.75**	1.00	2.65	0.26	*-1.09*
May	*-1.55*	0.13	*-7.38*	**10.58**	1.23	*-0.90*	*-3.69*	*-2.21*	*-2.41*	*-3.55*
June	*-3.15*	*-3.27*	4.36	*-0.68*	*-1.12*	*-4.93*	*-0.32*	1.29	*-6.40*	**3.52**
July	5.70	*-4.02*	*-3.04*	4.07	*-3.43*	3.63	5.78	0.71	**3.37**	*-3.62*
August	*-0.68*	*-11.06*	*-0.16*	4.80	2.33	*-3.45*	**9.32**	*-0.48*	*-2.79*	*-3.65*
September	5.73	*-8.16*	5.26	4.69	**5.57**	*-0.98*	3.40	1.61	*-0.52*	*-2.14*
October	3.86	**7.88**	1.48	5.21	*-1.01*	2.54	1.99	*-1.99*	*-8.33*	0.74
November	*-2.79*	*-4.58*	4.43	*-0.15*	0.33	*-1.49*	2.59	*-2.27*	1.94	0.53
December	2.96	*-0.44*	2.09	*-4.28*	*-1.86*	*-1.79*	2.38	2.61	*-3.02*	2.87

Source: own study based on: [Notowania GPW…].

The cumulative return of the mWIG40 index in January was almost 70%. This is almost 30 p.p. higher than the second-largest cumulative return in March and October 3. The average return in January was higher than that of the WIG20 index in October (3.08%).

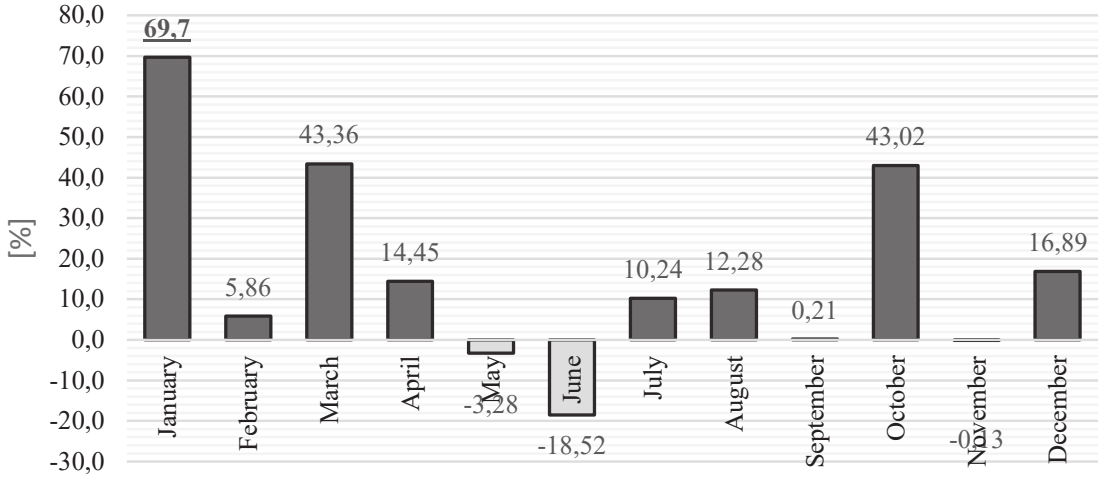

Figure 4. Cumulative rate of return on the mWIG40 index for 2000-2007 and 2010-2019 [%]
Source: own study.

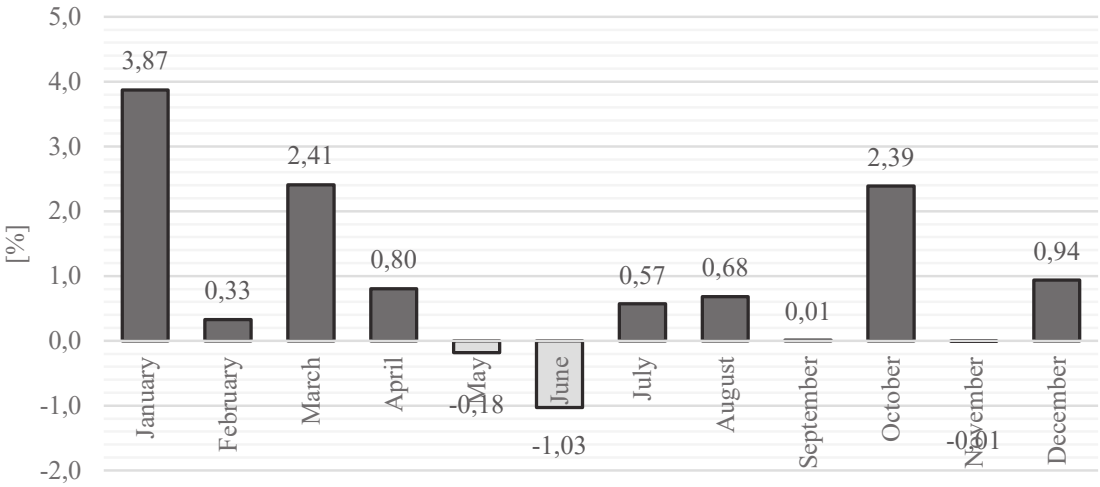

Figure 5. Average rate of return on the mWIG40 index in 2000-2007 and 2010-2019 [%]
Source: own study.

In accordance with the conditions that allow the verification of the January Effect (Condition W_1), the cumulative and average January rates of return in the case of the mWIG40 index were the highest among the other months of the analysed study period. Moreover, in January, the highest return in a given year was observed five times during the study period, which can also confirm the existence of the January Effect (Condition W_2). January also recorded the highest number of positive returns among all months of the analysed study period (Condition W_3). The study conducted for mWIG40 to verify the January Effect indicates the occurrence of this effect, which results from the fact that all three conditions are met (W_1, W_2, W_3). Consequently, hypothesis H_2, according to which there is a January Effect in the mWIG40 index, was confirmed.

Conclusions

The study's main objective was to verify the presence or absence of the January Effect in the conditions of the Polish stock market for medium-sized companies. As part of the comparison, an analogous study was carried out for large companies, although earlier studies indicated that the January Effect mainly applies to medium and small enterprises. The study covers 2000-2019, excluding 2008 and 2009, using stock market index returns in each month over 18 years. Then, the cumulative returns for each month and the average annual returns for a given month during the study period were calculated.

The results of the survey show that the January Effect is observed on the Warsaw Stock Exchange, although it only applies to medium-sized companies. Only they show the highest return in January. This means that the conducted study confirms the correctness of hypothesis H_2. However, hypothesis H_1 was not confirmed, indicating no argument for a January Effect for large companies (WIG20 index). This result of the study is in line with the observations of Reinganum [1983, p. 89-104], who, in 1983, showed that the January Effect mainly affects smaller companies. The reason for this is the reluctance of investors to divest themselves of the shares of the largest companies at the end of the year as these form the core of the portfolio – even if these companies were loss-making. This is due to the belief that companies listed in the main index are generally not at risk of collapse and, even if they are making losses now, the trend will reverse in the future. On the other hand, if investors have shares of smaller companies in their portfolios and they are loss-making or not as profitable as expected, they will sell their shares at the end of the year. As a result, the stocks of some medium and smaller companies may be undervalued at the beginning of the year, leading investors to add stocks of promising medium and small companies to their investment portfolio at the beginning of the year – resulting in high returns in January in the mWIG40.

The study also showed that there are other calendar effects in the case of the Warsaw Stock Exchange. For all the indices analysed, it was found that May and June are characterised by the lowest returns, negative in each case. From the perspective of the existing research on the so-called "summer rally", the result on the Warsaw Stock Exchange is surprising. In accordance with the observations on the effects of the summer rally, the market has the highest returns at the beginning of the summer (especially in June). Research conducted on the Warsaw Stock Exchange has shown that negative returns are recorded, on average, in June – regardless of the index. It should also be mentioned that the analysed returns in June were the lowest among all other months (except for September for the WIG20 index, which was even worse).

On the other hand, in addition to January, October is also attractive in terms of investment as it generates an average positive return for all two indexes analysed (the maximum return for the WIG20 index). Interestingly, such a result (of the study) does not coincide with the results of studies on the so-called "Mark Twain effect". This effect assumes that October is the worst month for stock market traders in terms of achieved returns. It could also be that the consequence of high returns in October is negative returns in November, which also occur regardless of the index.

The application conclusion resulting from the research is that calendar effects, departing from the paradigm of rationality in the sense of the *homo economicus* model, indicate a lack of full rationality among investors during investment decisions. This means

that there are heuristics resulting from cognitive and motivational tendencies, which disturb the rationality of investors and total market efficiency.

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Behawioralne anomalie sezonowe na giełdzie – weryfikacja kalendarzowego efektu stycznia na GPW w Warszawie

STRESZCZENIE
Praktyka i empiryczne obserwacje dowodzą, że na rynku giełdowym istniej możliwość osiągnięcia ponadprzeciętnych stóp zwrotu. Możliwe jest osiąganie zarówno wyższych, jak i niższych stóp zwrotu niż wynika to z wartości fundamentalnej wycenianych spółek. Wpływ na taki stan rzeczy mają anomalie, które sprawiają, że w rzeczywistości rynek nie jest efektywny. Liczne badania w nurcie finansów behawioralnych dowodzą, że przyczyn nieefektywności rynku doszukiwać się można w niepełnej racjonalności inwestorów. Liczne odstępstwa zachowań inwestorów od modelu homo oeconomicus wynikają z ich ograniczeń o charakterze poznawczym i motywacyjnym. Niekiedy, popełniane przez pojedynczego inwestora błędy mają charakter systematyczny. Takie systemowo i masowo popełniane błędy przyjmują formę heurystyk mogących wpływać na nasilenie anomalii rynkowych, w tym na pojawienie się efektów kalendarzowych. Jedną z najbardziej znanych anomalii kalendarzowych jest efekt stycznia. Efekt stycznia charakteryzuje się wzrostem cen akcji w styczniu. Występowanie efektu stycznia objawia się tym, że styczniowe stopy zwrotu są najwyższymi stopami zwrotu odnotowywanymi w całym roku. Zrealizowane na GPW w Warszawie badanie pozwoliło na potwierdzenie występowania efektu stycznia w przypadku spółek małych i średnich. W trakcie badań zdiagnozowano również występowanie innych efektów kalendarzowych (związanych z miesiącem czerwcem i październikiem).

Słowa kluczowe: finanse behawioralne, anomalie sezonowe, anomalie kalendarzowe, efekt stycznia

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THE PRINCIPLE OF THE ADVANTAGE OF SUBSTANCE OVER FORM IN THE TRANSACTION OF SUBMITTING A TRADEMARK

ABSTRACT

The article assesses the transaction of contributing a trademark created during business activity to a newly established company in the context of the principle of the advantage of substance over form and applicable tax law provisions. In order to build the value and structure of their assets in the balance sheet and act against the principle of substance over form, enterprises separate and contribute economic resources that do not meet the definition of assets to newly established companies. Literature studies and analysis of legal acts were used to achieve the assumed goal, and a study of a selected real case of a transaction of separating one's own trademark and its contribution to a daughter company in order to improve the property and financial situation was carried out. The analysis of the case study indicates actions against the principle of the advantage of content over form and, thus, the principle of a faithful image. In order to improve the property and financial situation, the company's management board activated a trademark created during its operations by separating it and contributing it to a daughter company and thus falsified the picture of the property and financial situation of the enterprise presented in the reports, exposing their addressees to the consequences of incorrect decisions.

Key words: the principle of superiority of substance over legal form, comparability study
JEL code: G32

Introduction

The principle that creates many problems, both in theory and in the practice of accounting, is the principle of the superiority of content over form. According to this principle, the accounting of events, including economic operations, should be adequate to their economic content and impact on the financial position of the enterprise and not only on their legal form. This principle is particularly important in a situation where enterprises, for the construction of value and the structure of their assets in the balance sheet, acting contrary to this principle, allocate and contribute economic resources that do not meet the conditions of the definition of assets to newly created companies. In order to improve the property and financial situation of the company, a simple action (in terms of form) is to separate and contribute a trademark of the company created during its business activity by separating it and contributing it to a subsidiary and thus falsifying the financial reports.

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The resulting picture of the company's property and financial situation presented in the reports exposes the addressees to the consequences of erroneous decisions.

The article was created as a result of a literature search and, above all, the interpretation of the National Tax Chamber and cases that the author examined as part of the proceedings of a court expert. The theoretical part included a critical and descriptive analysis of the literature and applicable legal provisions. The empirical research concerned a critical analysis of a selected trademark disclosure transaction. The research sample was limited to an entity that is undergoing court proceedings, as a result of which a bankruptcy petition was filed, and the disclosed trademark was a way to avoid bankruptcy. Specifically, improving liquidity ratios and covering liabilities with assets.

Trademark definition

According to the definition of "a trademark" contained in Article 120(1) of the Industrial Property Law Act of 30 June 2000 [Dz.U. 2013 r. nr 1410 ze zm., Dz.U. 2001 nr 49 poz. 508, article 120 sec. 1], in the version in force in 2014, a trademark may be any sign that can be represented geographically, if such a sign is suitable for distinguishing the goods of one enterprise from those of another enterprise. Paragraph 2 of that article provides that a trademark within the meaning of paragraph 1 may be, in particular, a word, a drawing, an ornament, a colour composition, a spatial form – including the form of goods or packaging, or a melody or other audible signal.

Registration of a trademark enables legal protection, which means the owner obtains legal protection for goods and services signed with this mark. It has the character of a monopoly, so its right is an exclusive right and belongs only to its owner. Pursuant to Article 153 of the aforementioned Act, by obtaining the right of protection, the right to the exclusive use of the trademark in a commercial or professional manner is acquired throughout the territory of the Republic of Poland (RP). The nature of trademarks means that the right of protection concerning them is the fastest and most effective tool for defending an economic operator using such a trademark on the market of goods and/or services in the case of its rights to such signs [Co zyskujesz…].

Building a strong brand is a long-term process of active brand development, the aim of which is to interest more and more people in the brand. Creating a strong company brand, i.e. treatments in the field of creating advertising, as well as marketing the company, are distinguished by innovation and implementation of standards. The brand is also called the trademark and flagship of a given company. The more recognisable the product is on the market and the better the visual identification of the brand, the company's competitive advantage increases, which in turn ensures that the company's profits also grow. The development of the company is not possible without a long-term brand-creation process. Companies that want to ensure stable profits and loyal consumers are interested in building strong brands.

A brand is, but is not limited to, a name or graphic symbol (trademark) placed on products or points of sale in order to protect against imitation, counterfeiting, impersonation, or attribution of authorship. In a market economy, a brand has a price, and a "good brand" is the foundation of business success. A brand consists not only of a name or logo, but also of communicative, behavioural and visual elements which define an enterprise or product.

Well-known brands are an important element of every company's assets. A brand is not a fleeting marketing fad; it is a set of material and intangible features centred around a symbol, generating value and enabling influence on the recipient. As the experience of recent years shows, a strong brand is the most valuable capital that a company can accumulate.

The terms brand and trademark, although they are not identical, are often used interchangeably. As mentioned, a trademark is subject to registration, so it is the part of the brand that enjoys legal protection.

Trademarks, commonly referred to as "commercial mark", "brand mark", "company name", "logo" or "brand" are important assets of the company, thanks to which it is possible to achieve economic benefits. Among the areas that can determine the brand's strength to reflect its economic potential, we can indicate, among others: market position, customer loyalty, audience reach, adaptation and setting trends, positioning and dissemination of the brand, legal protection and industry perspectives.

A brand that consists of a name alone has no raison d'être. First, one needs to choose a brand name, and then one needs to create its identity by encapsulating its name with different meanings and promises. When choosing a brand name, the position designated for the product according to its value must be considered. A brand is strong when its name is associated with positive qualities, benefits, company values, personality and users. The task of the brand builder is to create a brand identity based on these dimensions.

A well-known brand on the market is the owner's greatest treasure; it is often worth more than all the owner's wealth. A recognisable brand causes greater interest among buyers and thus ensures growing profits. A brand has its own value, which can be expressed in money; the value of a brand is evidenced primarily by its reputation, i.e. social acceptance, popularity, consumer loyalty, i.e. whether a given brand is able to acquire and maintain a group of consumers. From a financial point of view, the value of a brand is the specific amount for which that brand can be sold.

Based on a trademark that is part of the company's brand, the entrepreneur's reputation is built. It can be assumed that it is the trademark that constitutes the most valuable asset of the company. The most expensive trademarks in the world are often valued at billions of dollars, which is why they can be called reputable marks. The owner of a reputable mark has a considerable market and procedural advantage. However, they should remember that reputation is not given once and for all and requires monitoring of the activities of competitors and decisive protective measures. A trademark is not only a designation of a good, service or enterprise, but also an important element of a company's marketing strategy seeking to promote its key products [Januszczyk 2017].

Rules for inclusion in the accounting books

According to applicable law, the acquired brand or the trademark identified with it may constitute an element of goodwill, which can then be disclosed among the assets in the acquiring company's balance sheet. Therefore, if it is possible to separate it, then it can be presented in the position of intangible assets as a trademark.

Pursuant to Article 3(1)(14) of the Accounting Act [Dz.U. 1994 nr 121 poz. 591], intangible assets are property rights acquired by an entity, classified as fixed assets,

suitable for economic use, with an expected economic useful life of more than one year, intended for the entity's needs. In particular, these are:

- author's economic rights, related rights, licenses, concessions,
- rights to inventions, patents, trademarks, utility models and ornamental models,
- know-how.

Intangible assets also include acquired goodwill and costs of completed development works.

Intangible assets generally include acquired intangible assets (the exception is the costs of completed development works). The acquisition of ownership of an asset may take place by way of purchase, exchange, in-kind contribution, donation, or inheritance on the basis of another agreement obliging to transfer the ownership of the item marked as an identity. Self-generated rights are not intangible assets. Thus, if the trademark was not acquired by the entity, but produced in-house, it cannot be counted as an intangible asset. However, if the entity has incurred costs for the production of the trademark (e.g. fees collected by the Polish Patent Office or other costs directly and indirectly related to the establishment of the protection right to the mark), they should be recorded as costs of a given period. Depending on the adopted layout of cost accounts, posting can be carried out in various ways. However, the classic notation looks like this:

- the WN side of the relevant team IV account, e.g. "External services",
- the MA side of the settlement account or "Cashier" or "Bank Account".

In a situation where the trademark right acquired by the entity meets the conditions set out in the Accounting Act for intangible assets, it is entered into the accounting books, entering:

- Wn account 02 "Intangible assets",
- Ma account of 30 "Settlement of purchase" or 24 "Other settlements".

All rights included in the accounting books – including the right to a trademark – classified as intangible assets, are subject to depreciation or redemption write-offs based on Article 33 of the Accounting Act (in conjunction with Article 32(1)-(4) and (6) of that Act). These write-offs are therefore made by systematic, planned distribution of the initial value over a fixed depreciation period (Wn account 40-0, Ma account 07-2).

Intangible assets – including acquired trademark rights – are valued at least at the balance sheet date at the purchase price, less depreciation or write-offs, as well as impairment losses [Dz.U. 1994 nr 121 poz. 591, art. 28, sec. 1, p. 1]. During the inventory, by means of verification of intangible assets, the real value of these components is examined, i.e. it checks whether there has been a permanent impairment of their value. It consists of the fact that there is a high probability that these values will not bring the expected economic benefits in the future. If such impairment has occurred, an impairment loss should be made for the remaining operating expenses.

In the balance sheet, intangible assets should be presented in their net value. Depending on the balance sheet formula an entity uses, the amount of intangible assets is presented on the assets side under:

- A.I "Intangible assets" – with a further division into costs of completed development works, goodwill, other intangible assets, advances on intangible assets – when the entity prepares financial statements in accordance with Annex 1 of the Accounting Act,
- "Non-current assets" – when preparing the report in accordance with Annex 4,
- A.I "Intangible assets" – when the report is prepared in accordance with Annex 5.

It follows from the above that an own brand developed during its operations cannot be included in the company's balance sheet assets. On the other hand, in the valuation of the enterprise and the measurement of the increase in value for the owner, the brand identified with the trademark is an operating asset, the value of which will significantly affect the value of the enterprise and, ultimately, the assessment of the company's situation.

Brand recognition as an asset may be based on the fulfilment of certain criteria that are intended to prevent manipulation of reporting volumes, as well as to limit the freedom of managers and accountants in this regard. Therefore, the developed brands of enterprises are very often an underestimated resource of the enterprise and not disclosed at all in the financial report. In practical terms, it happens that the management boards of companies take action to show the brand in the balance sheet. In order to promote the logo and brand on the market, a separate entity is created, selling only the products of the entity that created it, and after achieving the intended goal, it is purchased by the founder's company [Grzybek 2015, za: Szczepankiewicz 20212]. In addition, the business practice found another way to disclose the brand through the shares of a subsidiary to which the company's mark valued at market value was contributed as an in-kind contribution.

The principle of the predominance of content over form

Balance sheet law is a set of legal norms regulating the basic principles of accounting by enterprises. The most important act in this respect in Poland is the Accounting Act of 29 September 1994, in force since 1 January 1995, whose provisions are modelled on the European Union Directives and International Accounting Standards (IFRS). Along with the progressive globalisation of the economy, and thus the need for changes in accounting, the Polish balance sheet law underwent modifications aimed at approximating national regulations to international solutions, which was reflected in subsequent amendments to the Accounting Act.

The above Act does not regulate in detail all accounting issues. By allowing alternative solutions to the same problem and thus leaving economic units a certain freedom in shaping the image of the enterprise, it gives the opportunity to conduct accounting policy. With the adoption of the Accounting Act, there were opportunities to influence the presented results in accordance with the adopted policy of the enterprise. As a result of the amendment to the balance sheet law, the scope of this freedom has been further expanded, which many entities use to create their own desired image.

The Accounting Act, amended on 1 January 2002, raised the profile of the accounting policy and defined this policy for the first time. It defines in Article 3(1)(11) [Dz.U. 1994 nr 121 poz. 591] the principles (accounting policy) as selected and applied

by the entity, appropriate solutions for its activities permitted by the provisions of the Act and ensuring the required quality of financial statements.

The principle that creates many problems, both in theory and in the practice of accounting, is the principle of the superiority of content over form. According to this principle, the accounting of events, including economic operations, should be adequate to their economic content and impact on the financial position of the enterprise, and not only to their legal form. The statutory permission to apply this principle in practice depends on many factors, including the level of economic and legal culture of the society of a given country, as well as the role and importance of auditing financial statements. The application of this principle in accounting practice may give rise to the risk of its use to comply with applicable law. Assuming that such a risk does not exist or is small, the application of the principle of the superiority of content over form contributes greatly to making the financial statements of an enterprise a true and fair view of its assets, financial position and profit or loss. Strict adherence to the rules – usually delayed in relation to economic development – of the law, often distorts this picture.

The aforementioned amendment to the Accounting Act Introduced the principle of the predominance of economic content over legal form. According to this principle, events, including business operations, are recognised in the accounting books and reported in the financial statements in accordance with their economic content, which is reflected in Article 4(2) of the Accounting Act [Tuszyński 2001]. As Jankowska rightly observes, "In the event of a discrepancy between the economic substance of transactions and economic events (primarily their economic effects) and their legal form, balance sheet law determines the superiority of the economic content" [Jankowska 2005, p. 137-150].

The direct inclusion in the Accounting Act of the principle of the superiority of content over form is proof of the legislator's recognition of a phenomenon commonly occurring in practice, when the legal form of a transaction deviates from its economic realities. A practical example would be a contract to sell securities with the obligation to repurchase the same securities on predetermined terms. From a legal point of view, the sale and purchase of securities are separate sale and purchase transactions, while from an economic point of view, the transaction is a loan.

Apart from the very definition of a principle in the Accounting Act, it is difficult to look for other regulations defining the application of the principle in records, valuation and presentation. The lack of its application results in incorrect recognition of economic transactions, a false picture of the property and financial situation in the financial statements and incorrect inference of the addressees of the financial statements appears.

The subject of the study

In the examined case, the General Meeting of Shareholders of MR Sp. z o.o. owned by R S.A., which adopted a resolution to increase the core capital from PLN 50,00.00 to PLN 248,000,000.00 by making a contribution in kind in the form of an organised part of the enterprise of R S.A., consisting of a set of tangible and intangible assets constituting the Marketing Branch of R S.A. including: all rights and obligations arising from transferred contracts, movable property, intangible assets, financial resources, and employees. At the same time, on 07.11.2011, R S.A. concluded a license agreement with MR Sp. z o.o. for the use of Trademarks in its business activity for profit-making

purposes. As a result of the concluded agreement, the Licensor grants the Licensee a non-exclusive license to use the copyrights of all trademarks. From the license agreement for the use of Trademarks in the conducted business activity for profit--making purposes of 07.11.2011 R S.A. and MR Sp. z o.o. it follows that:

1. The license fee payable to the licensor for the granting of a license to use the Trademarks shall be determined on the basis of the revenues generated by the Licensee using the Trademarks.
2. The revenue generated by the licensee using the Trademarks is the net revenues from the sale of products, goods and materials recognised in the Licensee's income statement, less the revenues from sales to the partner network (press) and other recipients (FMCG) recognised in the Profit and Loss Account of the Licensee, and the revenue from the rental of real estate.
3. The license fee due to the Licensor shall be determined as the product of the revenues generated by the Licensee using the Trademarks determined in accordance with paragraph 3 above in a given settlement period and the rate of 1%.

Despite granting a non-exclusive trademark license, MR Sp. z o.o. could not freely dispose of them and license them to other entities, while the Licensee, i.e. R S.A. could do so. The right of MR Sp. z o.o. to the trademark was also limited by the provision of § 6 point 3 of the above-mentioned License Agreement of 07.11.2011, according to which MR Sp. z o.o. as the Licensor was obliged not to engage in any behaviour that could result in the expiration of the protection right for any of the Trademarks.

The case documentation shows that the valuation of the organised part of the enterprise consisting of a set of tangible and intangible assets constituting the Marketing Branch of R S.A. (the organised part of the enterprise, hereinafter referred to as ZCP), including the trademark R S.A. The estimated fair market value of ZCP, in the absence of profitability and limited liquidity of R S.A. and the restructuring process starting, was set as of 31 March 2011 in the range of: from PLN 239.0 million to PLN 259.0 million. On the other hand, the estimated fair market value of Trademark R (including accompanying marks) as of 31 March 2011 ranged from PLN 209.0 million to PLN 239.0 million (Table 1).

Table 1. The fair value of the shares over the book value of the net assets transferred recognised in financial income

Description	Amount [PLN thousand]
The fair value of the shares subscribed in R Marketing	248 000
Net assets in book values transferred	905
Intangible Assets	566
Fixed assets	10
Receivables	4
Cash	346
Liabilities	-21
The fair value of the shares over the book value of the net assets transferred recognised in financial income	**247 095**

Source: own study.

As a consequence, the trademark created during its activity and transferred to the assets of the daughter company was included in the assets of R S.A. as shares from related entities.

The economic benefit of contributing an organised part of R S.A. to MR Sp. z o.o., as shown in Table 2, was to increase the value of R S.A.'s assets by creating long-term financial investments, which improved financial ratios and assessment of the condition of R S.A., while remaining neutral for the assessment of the financial situation of the capital group. The second positive category built on the basis of the in-kind contribution and its valuation were financial revenues disclosed in the amount of PLN 247 million and ultimately a positive financial result of 2011, which allowed the Management Board to plan the payment of dividends to Shareholders.

Table 2. R S.A. Income Statement for the years 2009-2012 [thousand PLN]

Sing.	Content	2009	2010	2011	2012
		[thousand PLN]	[thousand PLN]	[thousand PLN]	[thousand PLN]
A.	**Net revenues from sales and equals. with them, including**	**3 969 119**	**3 603 894**	**3 481 992**	**2 212 634**
	– from affiliated undertakings				
I.	Net revenue from the sale of products	101 866	104 541	92 655	59 145
II.	Net revenues from the sale of goods and materials	3 867 253	3 499 353	3 389 337	2 153 489
B.	**Costs of products, goods and materials sold, including:**	**3 421 938**	**3 105 809**	**2 999 607**	**1 835 132**
	– related parties				
I.	Costs of production of sold products	42 319	41 683	29 961	9 522
II.	Value of goods and materials sold	3 379 619	3 064 126	2 969 646	1 825 610
C.	**Profit (loss) on gross sales (A-B)**	**547 181**	**498 085**	**482 385**	**377 502**
D.	**Selling costs**	**472 562**	**411 281**	**437 999**	**412 647**
E.	**General management expenses**	**131 728**	**127 209**	**144 588**	**104 033**
F.	**Profit (loss) on sales (C-D-E)**	**-57 109**	**-40 405**	**-100 202**	**-139 178**
G.	**Other operating income**	**41 856**	**51 009**	**224 602**	**106 071**
H.	**Other operating expenses**	**64 222**	**104 411**	**105 742**	**104 753**
I.	**Operating profit (loss) (F+G-H)**	**-79 475**	**-93 807**	**18 658**	**-137 860**
J.	**Financial income**	**7 788**	**3 422**	**254 735**	**16 353**
K.	**Financial costs**	**2 446**	**1 001**	**4 409**	**15 721**
L.	**Profit (loss) on business activities (I+J-K)**	**-74 133**	**-91 386**	**268 984**	**-137 228**
M.	**Result of extraordinary events (M.I. - M.II.)**	**0**	**0**	**0**	**0**
N.	**Gross profit (loss) (L+/-M)**	**-74 133**	**-91 386**	**268 984**	**-137 228**
O.	**Income tax**	**-905**	**-9 727**	**-53 249**	**-19 152**
P.	**Other mandatory profit reductions (loss increases)**	**0**	**0**	**0**	**0**
Q.	**Net profit (loss) (N-O-P)**	**-73 228**	**-81 659**	**215 735**	**-156 380**

Source: own study.

The basis for estimating the fair market value of ZCP was financial forecasts presented by the Management Board of R S.A. covering the years 2011-2016. Based on the same financial forecasts regarding the operating revenues of R S.A., a calculation of free cash flows generated by Znak Towarowy R S.A. and, consequently, ZCP was prepared. Thus, the financial position disclosed in the forecasts for R S.A. was the basis for future cash flows (forecasts) for ZCP, and its value was determined using the discounted cash flow method. Subsequently, ZCP measures operating profit (EBIT), adjusted for the following elements: reductions in income tax and capital expenditures, increases due to depreciation and changes in the required level of working capital. The cash flow for ZCP calculated in this way was discounted with a weighted average cost of capital (WACC) of 14.2%.

It follows that the assumptions for the future results (flows) of R S.A., the historical expenses of the Marketing Department, the ZCP Budget for 2011, and the P&L of ZCP were the basis for estimating free flows for ZCP; therefore, the assumptions of these forecasts were analysed. The forecasts for R S.A. and ZCP presented in the Valuation Report were compared in Table 3.

Table 3. Comparison of forecasts for R S.A. and ZCP in 2011-2016

Assumptions [amounts in PLN thousand]	**9th 2011**	**2012**	**2013**	**2014**	**2015**	**2016**
Net revenues of R S.A. from the sale of products, goods and materials	3 255 000	4 869 000	5 540 000	6 141 000	6 634 000	7 259 000
change in revenue	*Bd*	*18,80%*	*13,80%*	*10,80%*	*8,00%*	*9,40%*
Increase in revenues from sales of ZCP	17 629	26 234	30 741	34 200	38 536	44 513
change in revenue		*48,81%*	*17,20%*	*11,30%*	*12,70%*	*12,60%*
Revenue from trademark licenses R	16 033	23 970	28 327	31 516	35 661	41 460
Percentage of 1% on revenues of R S.A. (Expert's calculations)	32 550	48 690	55 400	61 410	66 340	72 590

Source: own study.

The ZCP revenue forecasts do not include any revenues other than those achieved in transactions with R S.A. Table 3 shows that the forecasted revenues of ZCP do not change adequately to changes in the forecasted revenues of R S.A.

The total revenues of 2012 of R S.A. between 2011 and 2012 increased by 18.8%, and for ZCP, by as much as 48.81%. At the same time, it should be noted that the historical data contained in the financial statements of R S.A. indicate a 10% decrease in revenues between 2009 and 2010 and 6% between the average quarter for 2010 and the first quarter of 2011. Despite such historical data, valuations assumed revenue increases for subsequent years.

In this respect, a research problem arises: In the scope of the recording and presentation of shares in RM sp. z o.o. to which the trademark created during the R S.A. brand's activity was applied, has the principle of the predominance of content over form been preserved? How to verify the rules of content advantage over forms that have been or are not preserved?

A test of the advantage of content over form

The person examining or reading the financial statements should be able to verify whether a particularly significant item has been recognised and presented in the financial statements in accordance with its economic content and not its legal form. The notes on the financial statements could include a test of the content of new operations that are relevant to the entity's property and financial position. In this respect, it is necessary to use already known and practised methods of estimating transfer pricing and informing about their application.

The provisions of § 19, sections 1 and 2 of the Regulation of the Minister of Finance of 10 September 2009 [Dz.U. 2009 nr 160 poz. 1268] helped understand the essence of the principle of the predominance of content over form in the context of transactions between related parties within the scope of the examined case. The method and procedure for determining the income of legal persons by means of estimation and the method and procedure for eliminating double taxation of legal persons in the case of adjustment of profits of related entities' tax authorities are required to examine whether reasonable independent entities would enter into such a transaction on terms agreed by related parties. In cases where the reasonably expected benefits of the entity concluding such a transaction are clearly less than the expenses incurred in connection with this transaction and the entity does not indicate reasonable reasons justifying their incurrence in a certain amount, the tax authority examines the correctness of the expenses incurred, while the examination also takes into account other costs conditioning the use of a given good or service. The tax authority is, therefore, competent to examine whether the existing links have not influenced the determination of such terms of transactions that independent entities would never have concluded, and, consequently, the entity does not show income that would reasonably be expected if those links did not exist. Thus, the formal possession of an intangible asset for transfer pricing purposes does not in itself constitute a right to remuneration, which an independent owner would have. In the case of related parties, priority for determining the right to remuneration for the management of trademark protection rights will be given to the functions performed, the assets involved and the risks incurred. Only the entity that plays key roles in creating/maintaining the value of an asset in the form of an intangible asset is entitled both to obtain a super-current profit, but at the same time, is also exposed to achieving losses.

Currently, a similar approach results from the Regulation of the Minister of Finance of 21 December 2018 on transfer pricing in the field of corporate income tax [Dz.U. 2018 poz. 2491], which obliges to assess the compliance of the conditions set by related entities with the conditions that would be set between unrelated entities, hereinafter referred to as the "comparability test", including the comparability criteria of these conditions.

The conduct of the comparability analysis shall consist in particular of the following steps:

- the determination of the period to be covered by the investigation;
- analysis of information on the related entity and its economic environment;
- analysis of all the circumstances of the audited controlled transaction that may have a material impact on the level of transfer pricing, taking into account the functions performed, assets involved and risks incurred, and, where required by the most appropriate method, the selection of the audited entity;

- verification that there are internal comparative data that can be used for the comparability test;
- identification of available external sources of comparative data;
- the choice of the most appropriate method and financial ratio, where the analysis of the financial ratio is necessary for the correct application of the most appropriate method;
- analysis of available comparative data, in particular in terms of their comparability with the transaction under examination;
- making comparability adjustments if they are necessary to obtain a higher degree of comparability of comparative data to the audited controlled transaction;
- calculation of the results of the comparability test and their interpretation.

Identification of the circumstances of the transaction under examination is important for its correct recognition in the accounting books and in the statements, including its valuation.

The comparability test shall take into account, in particular, the following comparability criteria:

- characteristics of goods, services or other benefits,
- the course of the transaction, including the functions performed by the entities in the compared transactions, the assets they engage and the risks incurred, taking into account the ability of the parties to the transaction to perform a given function and bear a given risk,
- the terms of the transaction specified in the contract, agreement or other evidence documenting these conditions,
- the economic conditions occurring at the time and place in which the transaction was carried out,
- economic strategy;
- to the extent that those criteria have or may have a material effect on the conditions established or imposed between affiliated parties.

For controlled transactions involving intangible assets, the comparability test shall also include an assessment of the ability of the parties to the transaction to perform the function and to bear the risk in relation to:

- having legal title to intangible assets, its protection and maintenance;
- the creation of intangible assets, including their development;
- development of intangible assets, including their improvement;
- use of intangible assets.

In this respect, the risk assessment is particularly important from the point of view of the impact on the profit potential, and the allocation of risk assumed between the parties to the transaction affects the profits or losses resulting from the transaction, which should be allocated in accordance with the market principles of transaction valuation.

Therefore, the analysis of transactions concluded between related parties, i.e. R S.A. and RM Sp. z o.o. was carried out taking into account the type of risks, functions performed related to specific risks and the method of allocating individual risks. From

the point of view of transfer pricing, the following types of risks can be distinguished in particular:

- strategic or market risk,
- operational risk,
- financial risk,
- transaction risk,
- force majeure (this risk can often be mitigated by entering into insurance, but sometimes the insurance may not cover all potential losses, especially in the context of the impact on the operations carried out or the reputation of the entity).

The following issues have been taken into account in the process of analysing the risks incurred by the parties to the transaction in accordance with the OECD Guidelines:

- the nature and source of the risk,
- the materiality of risks in the context of the transaction,
- contractual arrangements relating to risk sharing, taking into account the actual allocation of risk,
- operational activities to which specific risks are assigned,
- risk management process,
- the impact of individual risks on the executed transaction,
- assessment of risk sharing in functional analysis.

Also, the assessment of the level of capital employed should not be the sole factor influencing the conclusions of the analysis carried out.

The mere commitment of capital does not automatically result in the right to allocate above-average profits where the involvement of capital is not closely linked to the realisation of risks and functions relevant to the transaction.

Functions performed by the parties to the transaction

Entities participating in the transaction perform specific functions, which consist in taking actions and carrying out activities. These features typically translate into revenue and profits made by the parties to the transaction. Functions may be performed directly by entities involved in the execution of transactions or indirectly by commissioning them to other entities.

For controlled transactions involving intangible assets that are difficult to measure, the comparability test shall also take into account the assessment of:

- whether unrelated parties in comparable circumstances:
  - recalculate the amount of the price originally fixed on the basis of a contractual clause for price change,
  - renegotiate the originally agreed terms, including the price of the subject of the transaction,
  - accept contingent payments for the settlement of a comparable transaction;
- whether the transfer pricing forecast as of the date of the transaction took into account all circumstances foreseeable by the related party, affecting the amount of the transfer price.

Intangible assets that are difficult to measure are understood as intangible assets, as well as rights to those values for which, at the time of their transfer between related parties, there were no reliable comparative data and forecasts regarding future cash flows or expected revenues from these values or assumptions used in the valuation of these values were burdened with a high degree of uncertainty, which causes that the final economic result from the transfer of these values was difficult to determine.

The analysis of the transaction shows that for the correct identification of the content of the event, it would be reasonable to include similar data and information in the additional information as in the transfer pricing documentation. It would be especially necessary to place:

- a description of the object of the contribution,
- a description of the purpose of the transaction,
- a description of the valuation method,
- a description of the valuation assumptions, with an indication of historical and forecast data of the assumed values,
- the terms of the transaction specified in the contract, agreement or other evidence documenting those terms, including:
    - indication of whether the transferred right will be used on the basis of lending, rental or licensing agreements by the applicant,
    - indication of whether there are restrictions on the disposal of rights by the company holding the contribution,
    - indication of the type of risks, functions performed related to specific risks and the method of allocation of individual risks.

Conclusions

The principle of the predominance of content over form is a fundamental principle that determines the faithful reproduction of reality in financial statements. It is particularly important in terms of the recognition of resources generated in-house and redistributed within related entities. The freedom of creation resulting from the balance sheet policy, combined with data from the organisation, may result in the presentation of transactions in order to influence the addressee of the reports, but contrary to its economic content.

The examined case of transferring a self-generated trademark to a daughter company with a simultaneous increase in equity resulted in an individual increase in the value of long-term investments and financial results in the report. As a result, financial indicators and the assessment of the property and financial situation have improved. In this respect, the transaction was identified as contrary to the principle of the advantage of content over form. The obligation to disclose data in the additional information similar to those in the field of transfer pricing policy would allow for realistic identification of the transaction and its significance for the property and financial situation. Supplementing the information with a description of the subject of the transaction, its purpose, valuation method and valuation assumptions, with an indication of historical and prognostic data of assumed amounts and terms of transactions specified in the contract, agreement or other documentary evidence, gives reporting stakeholders the basis for a correct assessment of the economic content of the transaction and the correct inference about the property and financial situation.

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Zasada przewagi treści nad formą w transakcji zgłoszenia znaku towarowego

STRESZCZENIE

W artykule dokonano oceny transakcji wniesienia wytworzonego w toku prowadzenia działalności gospodarczej znaku towarowego do nowoutworzonej spółki, w kontekście zasady przewagi treści nad formą i obowiązujących w zakresie przepisów prawa podatkowego. Przedsiębiorstwa dla budowy wartości i struktury swojego majątku w bilansie, działając wbrew zasadzie przewagi treści nad formą, wydzielają i wnoszą zasoby gospodarcze nie spełniające warunków definicji aktywów do nowoutworzonych spółek. Do realizacji założonego celu zastosowano studia literaturowe, analizę aktów prawnych oraz przeprowadzono badanie wybranego rzeczywistego przypadku transakcji wydzielenia własnego znaku towarowego i jego wniesienia do spółki córki celem poprawy sytuacji majątkowo-finansowej. Analiza badanego przypadku wskazuje na działania wbrew zasadzie przewagi treści nad formą i tym samy zasadzie wiernego obrazu. Zarząd spółki dla poprawy sytuacji majątkowo-finansowej znak wytworzony w toku prowadzonej działalności aktywował poprzez wydzielenie i wniesienie do spółki córki i tym samym zafałszował obraz sytuacji majątkowo-finansowej przedsiębiorstwa przedstawiony w sprawozdaniach, co naraziło ich adresatów na konsekwencje błędnych decyzji.

Słowa kluczowe: zasada przewagi treści nad formą, badanie porównywalności

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CONSEQUENCES OF THE COVID-19 PANDEMIC IN THE EUROPEAN UNION FROM THE PERSPECTIVE OF GENERAL GOVERNMENT FINANCES – AN ANALYSIS BASED ON THE SOCIAL ACCOUNTING MATRIX

ABSTRACT
The aim of the paper is to assess the effects of the COVID-19 pandemic from the perspective of income circulation processes in the economies of the European Union. The empirical study is based on statistical data compiled according to ESA2010 standards, published by the European Commission in the Eurostat database. The fundamental quantitative relationships between entities grouped into institutional sectors have been synthetically presented in the form of a social accounting matrix (SAM). The analyses of simple macroeconomic indicators show the growing importance of the government sector due to the pandemic. This is evidenced by the growing involvement of this sector in consumption, accumulation and income redistribution between institutional sectors. Simulation analyses based on the SAM model determine to what extent the contribution of the government sector to GDP results directly through feedback loops from final demand and to what extent from current and capital transfers.

Key words: system of national accounts, social accounting matrix, input-output model, general government
JEL codes: E16, C67, H2, H4

Introduction

The analysis presented in this paper aims to indicate the changes that have occurred in the economies of the European Union due to the COVID-19 pandemic. Particular emphasis is placed on the role of the general government sector's expenditures and revenues in income circulation between institutional sectors. The results of the simulations, carried out by using the hypothetical extraction method, are applied in order to assess the impact of government expenses on GDP in 2019, 2020 and 2021. It has been hypothesised that governments' importance increased during the pandemic.

Since 2020, much research has been published to analyse the impact of the COVID-19 pandemic on different areas of interest: social issues, poverty, consumption, unemployment, inflation, international trade and others. Some focus on the short-term direct effects of the lockdown [OECD 2020], while others analyse the problem in the from a broader long-term perspective. The authors of modelling the analysis of the impact on household consumption and poverty concluded that in the absence of social protection,

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the impact of the pandemic "led to a massive economic shock to the system" [Martin et al. 2020, p. 453-479] and a particularly high risk of poverty (during the pandemic) particularly concerns people with low education levels and low income who are "significantly insulated by government transfer payments" [Arndt et al. 2021, Pereirinha et al. 2021, 569-594]. Another study [McKibbin et al. 2020, p. 45-52] modelled the evolution of the COVID-19 pandemic in 2020 and its impact in the economy of G20 economies. Authors of this study, as well as – for example – Picek [2020, p. 325-331], also emphasise the critical role of governments because the COVID-19 pandemic should be seen as "a multi-faceted crisis that will require monetary, fiscal and health policy responses".

The main role of the government at the beginning of 2020 was to reduce the spread of the COVID-19 virus and, at the same time, to minimise the instability of the European countries' economies caused by the lockdown [Zamfir et al. 2022, pp. 4519--4531]. The scope of the government's activities was, therefore, two-fold: firstly, the choice of a strategy for dealing with the pandemic and its implementation [König et al. 2021] (significant actions at the beginning of the pandemic); secondly, providing viable solutions for social and political stability [Instytut Finansów 2022]. The longer-term responses seem to be more important. According to data from the International Monetary Fund (IMF), funds allocated to fight the pandemic worldwide amounted to $10.793 billion (10.2% of global GDP) in fiscal assistance and $6.117 billion (6.2% of global GDP) in liquidity assistance [Fiscal Monitor… 2021].

The support mechanisms in response to the crisis caused by the Coronavirus pandemic focused primarily on securing households against loss of income (e.g., by strengthening partial unemployment programs or subsidies to employees' salaries). An example of such action is remuneration for full-time work in Germany, which was used in 2009 by over 1.5 million people, and similar programmes also widely used during the pandemic crisis in France or Spain (50% of employees used them). Further activities were aimed at enterprises that faced the threat of bankruptcy resulting from problems with liquidity and in obtaining external financing. In many countries such as Germany, France, Great Britain and Poland, aid was granted through subsidies to the employment of employees and direct granting of loans or guarantees to entrepreneurs by the state. A detailed list of assistance activities undertaken in selected EU countries can be found, for example, in the report of the Institute of Finance [Instytut Finansów 2022]. These expenditures of the government were incurred as part of the so-called "anti-crisis shield". It should be emphasised that the aim of the article is not to assess the effectiveness of the anti-crisis shield or the legitimacy of introducing its individual elements. The assessment of government activities is devoted to works, for example, by Bagozzi et al. [2022, p. 359--392] or Christensen and Lægreid [2020, p. 774-779], who investigate government actions during the COVID-19 crisis in Norway.

There are many statistics in various databases reporting changes resulting from the pandemic. The in-depth analysis contained in this paper focuses on the relationship between the government sector and other sectors operating in the economy. The differences in the structures of intersectoral flows in 2019, 2020 and 2021 were identified with the aid of statistical data reflecting the entire sequence of transactions included in the European System of Accounts [European Commission 2013]. This is an internationally compatible accounting framework broadly consistent with the System of National

Accounts [European Commission et al. 2009] (SNA) of the United Nations regarding definitions, accounting rules and classifications. However, the ESA considers the specificity of the functioning of EU members [European Commission 2013, p. 10]; it enables a systematic and detailed description of an economy, its components and its relations with other economies. In ESA, the national economy is described by the activities of institutional units which are grouped into institutional sectors [Miller et al. 2009, p. 499--542] according to their characteristic function in the production process, economic goal and type of activity. Five domestic institutional sectors are distinguished: the non--financial corporations, the financial corporations, the general government, the household sector and the non-profit institutions serving households. In addition, the rest of the world sector consists of non-resident units engaged in transactions with resident institutional units or have other economic links with residents.

Macroeconomic analysis based on ESA considers the actions of institutional sectors in terms of production, generation of income, allocation of primary income, secondary distribution of income and the use of income. All of them form a sequence of interrelated accounts. Each of them is recorded as a bilateral, balancing statement of revenues and expenses, and their sequence can be written in the form of the so-called "social accounting matrix" (SAM) [Miller et al. 2009, pp. 499-542]. Such a matrix synthetically presents the basic quantitative relationships (transactions) occurring in income circulation between institutional sectors. The methodological part of the paper is devoted to the principles of construction of such matrices and examples of their use also as a deterministic simulation model. The analysis of changes in the functioning of EU economies due to the pandemic was carried out based on a series of SAMs comprised of data officially published by the European Commission in the Eurostat database. The empirical analysis is divided into two parts. The first one concentrates on the changes in SAM structures visible in the macroeconomic indicators formulated for the purposes of the analysis. The second part contains a simulation analysis which estimates a hypothetical decline in GDP if the governments of EU countries had refrained from covering the expenses related to counteracting the effects of the pandemic. The last part summarises the statistical and simulation analysis.

Materials and methods

The statistical analysis is based on the full sequence of non-financial accounts included in the ESA, with the term "non-financial" specifying the scope of the flows included. These are transactions reflecting the activities of institutional sectors within the so-called "real economy"; there are no transactions related to the acquisition of financial assets or incurrence of liabilities. The non-financial account sequence ends with the balancing item – net lending/net borrowing, which is the difference between the sum of all revenues (primary incomes as well as current and capital transfers received) and the sum of all expenses (consumption and accumulation as well as current and capital transfers paid). At the same time, by definition, this item is equal to the difference between the net acquisition of financial assets and the net incurrence of liabilities. In this way, the sequence of non--financial accounts is linked to the financial account.

Table 1. SAM scheme

SAM					USES					
					I	II	III	IV	V	Total
Resources	current accounts	products account		I						
		primary income	D1 D2X3 B2A3 D4	II						
		institutional sectors	S11 S12 S13 S14_S15 S2	III						
	capital account	institutional sectors	S11 S12 S13 S14_S15 S2	IV						
		B9		V						
	total									

S11 – non-financial corporations, S12 – financial corporations, S13 – general government, S14 – households, S15 – non-profit institutions serving households (NPISH), S2 – rest of the world, D1 – compensations of employees, D2X3 – taxes on production and imports less subsidies, B2A3 – operating surplus and mixed income, D4 – property income, B9 – net lending/net borrowing.

Source: own elaboration.

This paper presents linkages between the accounts in ESA in the form of social accounting matrix (SAM). Its structure may vary depending on the purpose of the analysis conducted on its basis, the required degree of detail of the accounts and the availability of statistical data. The choice of SAM form may concern entities executing transactions (industries, institutional sectors) and their grouping on individual accounts, as well as the level of disaggregation of transactions within the selected account – for example, forms of current transfers [Boratyński 2005, p. 50-51]. Social accounting matrices are not published; hence their final form depends on the creativity of the person who undertakes their construction. In this paper, the matrix built for each EU country consists of 25 sub-matrices, of which only 12 contain elements other than 0 (marked in grey in Table 1).

Sub-matrix I,I is a scalar that reflects the amount of intermediate consumption. Sub-matrices I,III and I,IV (row vectors) contain elements of final demand, with the distinction of consumption of the general government, households and NPISH, and exports (sub-matrix I,III), as well as investments of domestic institutional sectors in sub-matrix I,IV. The value recorded in this sub-matrix for the rest of the world sector relates only to acquisitions less disposals of valuables. Sub-matrix II,I (column vector) contains the individual elements of value added and taxes on products less subsidies. The same economic categories are then presented in sub-matrix III,II as primary income of institutional sectors: compensation of employees as income of households and the rest of the world, taxes less subsidies as income of the general government and the rest of the world, operating surplus as income of all domestic institutional sectors and mixed income of households. In addition, sub-matrix III,II contains resources in the form of property income. In sub-matrix II,III, property income is recorded as the uses of institutional sectors. This sub-matrix also includes compensation of employees paid by the rest of the

world sector. In sub-matrix III,I, which is a column vector, there is only one transaction – imports of goods and services as the resource of the rest of the world.

Sub-matrix III,III shows the intersectoral flows of current transfers. It was constructed based on the resources and uses tables of the following transactions recorded in the secondary distribution of income account: current taxes on income, wealth, etc., net social contributions, social benefits other than social transfers in kind, other current transfers and, additionally, the adjustment for changes in pension entitlements. The flows in the columns represent the uses of the institutional sectors, which are simultaneously the resources of other sectors recorded in the rows (table in the form of from-whom-to-whom, also called payer-payee matrix). This sub-matrix is created by summing the flow tables for each transaction mentioned above. For transactions that are recorded on the resource/use side of only one sector, the payer-payee matrix can be written in an unequivocal manner. For example, in most EU countries, the adjustment for a change in pension entitlements is recorded as a use of financial corporations and household resources, so the table for this transaction consists of only one element – the flow between these two sectors. In case there are at least two sectors on the side of payers and beneficiaries, the elements of the flow table are estimated. This study adopted the idea of estimation procedure of intersectoral flows tables proposed by Tsujimura and Mizoshita [2004, p. 3-9]. The same method based on input-output methodology was applied, for example, by Li [2008, p. 215-239] for the construction of SAM supplemented with financial account transactions for China and Bustamante-Ayala et al. [2022, p. 5305-5319] for the Mexican economy. Burkowski and Kim [2018] used this method to investigate the financial system in the Brazilian economy, while Tomaszewicz and Trębska [2017, p. 7--26] used it to analyse the intersectoral flows of financial instruments in Poland. Okuma [2013, p. 387-404] applies input-output analysis to the inter-sector flow of funds accounts and simulates the ripple effects of financial shocks transmitted in sectoral interlinkages.

The same estimation method was applied for the calculation of the intersectoral flows of capital transfers, which are recorded in sub-matrix IV,IV. These are flows in the form of capital taxes, investment grants and other capital transfers.

In sub-matrix IV,III, there are savings in the domestic institutional sectors. As a balancing item for current accounts, they can take positive or negative values depending on whether the current revenue is higher or lower than the current expenditure. Savings constitute both the use of the current account and the resources of the capital account as one of the sources of financing the capital expenditure. For the rest of the world sector, the current account balance is recorded here, taking into account the balance of foreign trade (imports minus exports), primary incomes and current transfers. The balancing items for the entire sequence of non-financial accounts of individual institutional sectors are recorded in sub-matrices V,IV (net lending) and IV,V (net borrowing).

The SAM constructed according to the principles presented above guarantees equality of sums in rows and columns. The sum of all elements of sub-matrices I,I, II,I and III,I shows the total supply (intermediate consumption, value added, taxes on products and imports). The same value that is the sum of the elements written in sub-matrices I,I, I,III and I,IV represent the total demand (intermediate and final consumption, exports and accumulation). The sums by rows (institutional sectors) of the columns of sub-matrix III,II are primary incomes by production factors (compensations of employees, operating surplus and mixed income as well as property income). Sub-matrices I,III, II,III, III,III and

IV,III show the distribution, redistribution and use of current income, so their sums in columns are the current expenditure of individual, institutional sectors. The sums of sub-matrices I,V, IV,IV and V,IV reflect the total capital expenditure of individual sectors (accumulation, capital transfers paid and net lending). On the other hand, the sums in the rows of sub-matrices IV,III, IV,IV and IV,V represent the total capital resources of the institutional sectors: saving, capital transfers obtained and net borrowing. The totals in the accounts by institutional sector (i.e., the totals in columns/rows III and IV) are not directly reflected in the sequence of accounts.

SAM contains information on basic macroeconomic indicators used to assess the condition of the economy or the financial condition of individual, institutional sectors – in particular:

- gross domestic product (B1GQ[2]), which is the sum of final consumption (P3) of the general government (S13), households and non-profit institutions (S14_S15), accumulation (P5G) of all domestic institutional sectors and exports (P6) minus imports (P7); in SAM built according to the scheme presented in Table 1, the GDP is, therefore, the sum of the elements of sub-matrices I,III and I,IV reduced by the value of the only element written in sub-matrix III,I. GDP calculated according to the income approach is the sum of compensation of employees (D1), taxes on production and import less subsidies (D2X3) and the operating surplus and mixed income (B2A3); in SAM, it is the sum of the elements recorded in sub-matrix II,I:
  $$B1GQ = P3\_S13 + P3\_S14\_S15 + P5G + P6 - P7 = D1 + D2X3 + B2A3 \quad (1)$$
- disposable income of each domestic institutional sector is the sum of current resources minus the sum of current transfers paid; thus, for example, the disposable income of the first sector (S11) is equal to the sum of the elements recorded in the first row of sub-matrix III,II and III,III minus the sum of the elements recorded in the first column of sub-matrix III,III in SAM.

Based on the above two macroeconomic aggregates, several indicators can be determined, which are herein used in the empirical analysis to assess the economic effects of the pandemic in terms of the general government sector finances:

- share of the general government consumption and investments in GDP;
- share of its current resources (sum of elements of the third row of sub-matrix III,II and III,III) in GDP;
- the structure of its current resources, in particular the share of taxes on production and imports less subsidies;
- share of transfers received and paid by the general government in the total of intersectoral flows of current transfers;
- share of its capital expenditure (sum of elements of the third column of sub-matrices I,IV, and IV,IV) in GDP;
- share of transfers received and paid by the general government sector in the total of intersectoral flows of capital transfers;
- net borrowing (the third element of sub-matrix IV,V) in relation to GDP.

[2] ESA symbols are used.

A simple statistical analysis of the above indicators is supplemented with a simulation based on SAM, treated as a multi-equation, deterministic, static model of the economy. This is an extension of the input-output methodology for investigating the relationships between the production process and income circulation [Pyatt 2001, p. 139--163.]. Using SAM for simulation analyses requires distinguishing endogenous and exogenous accounts in SAM. The division of SAM into endogenous and exogenous accounts may differ depending on the purpose of the simulation analyses carried out on its basis. In this case, the simulation aims to determine the impact of various forms of government spending on GDP so that the exogenous accounts include the general government's current and capital expenditure (but only those that are distinguished in the SAM accounts by institutional sector) as well as current and capital expenditure of the rest of the world, which is by default treated as exogenous in simulation analyses based on SAM. The general principle of SAM division is presented in Table 2.

Table 2. Endogenous and exogenous accounts in SAM

		Uses		Total
		Endogenous accounts	Exogenous accounts	
Resources	Endogenous accounts	**Z**	**Y**	**x**
	Exogenous accounts	**R**	**W**	**r**
Total		$\mathbf{x}^T$	$\mathbf{r}^T$	

Source: [Tomaszewicz 2001, p. 12].

Matrix **Y** consists of four columns representing the current and capital expenditure of the general government and the rest of the world, which is the resource on every account except for the general government and the rest of the world. Matrix **W** includes current and capital transfers between the general government sector and the rest of the world (or between the units included in these two sectors). Matrix **R** consists of rows showing the revenues of the general government and the rest of the world, except for the transactions included in **W**. Matrix **Z** contains all other transactions recorded in SAM. All the uses recorded on endogenous accounts depend on exogenous variables.

The simulated GDP is calculated based on the appropriate elements of the $\mathbf{Z}'$ matrix, determined according to the following formula:

$$\mathbf{Z}' = \mathbf{A}_\mathbf{z}\widehat{\mathbf{x}'}, \tag{2}$$

where: $\mathbf{A}_\mathbf{z} = \mathbf{Z} \cdot \hat{\mathbf{x}}^{-1}$ is a matrix of shares of individual expenses in endogenous accounts in total expenses (calculated from the base SAM), $\mathbf{x}' = (\mathbf{I} - \mathbf{A}_\mathbf{z})^{-1}\mathbf{y}'$ is a simulated vector of total revenues on endogenous accounts, $\mathbf{y}' = \mathbf{Y}' \cdot \mathbf{i}$ is a column vector obtained by summing the rows of the $\mathbf{Y}'$ matrix, in which the chosen values of the columns representing government expenditure are equal to 0 with the simulation assumption that government expenditure (i.e., consumption or accumulation or transfers) would not be incurred and the expenditure of the rest of the world would not change.

GDP is calculated according to Formula 1, which requires determining the imports from the **R** part of SAM:

$$\mathbf{R}' = \mathbf{A_r}\widehat{\mathbf{x}'}, \tag{3}$$

where: $\mathbf{A_r} = \mathbf{R} \cdot \hat{\mathbf{x}}^{-1}$.

SAM multipliers calculated on the basis of matrix $(\mathbf{I} - \mathbf{A_z})^{-1}$ indicate the change in GDP caused by the increase in exogenous expenses by 1. Additionally, the results were presented in a way that allows determining to what extent the contribution of the government sector to the creation of GDP in 2019 and 2020 results from its final expenditure and to what extent from current and capital transfers.

The analysis of the simulation results based on the SAM model requires realising that it is a static model; therefore, it does not take into account the effects delayed in time. The simulation results depend on the adopted assumptions; in this case, it is imperative to assume that the coefficients of matrix **A** are constant – regardless of the government's behaviour. However, adjustments in the form of changes in the structure of revenues and expenditures of institutional sectors, treated as endogenous in the model, should be expected. Moreover, the simulation results depend on the selection of variables treated as exogenous in the model and the share of expenses recorded in these accounts in the total sum of transactions concluded in SAM.

Limiting the conclusions of the simulation analyses to compare the impact of different types of expenditure on GDP, as done in this study, does not seem to raise methodological reservations.

Results and discussion

The results presented in this section refer to the European Union countries, except for Bulgaria (due to a complete lack of data on national accounts in the Eurostat database for this country) and Malta (due to significant data gaps), preventing the construction of SAM according to the adopted scheme. Therefore, it was possible to construct SAM for 25 countries for 2019, 2020 and 2021. Despite the lack of data for Bulgaria and Malta, the Eurostat database contains aggregate data for 27 EU countries, so the outcomes were supplemented with averaged effects for the EU calculated based on aggregate data for 27 countries (EU27). The economic impact of the pandemic was identified by comparing data for 2020 with data for 2019. Additionally, some outcomes were also referred to in 2021. To increase the transparency of the figures, they were prepared for the ten largest EU countries (with the highest GDP).

In 2020, gross domestic product – in real terms – decreased in most European Union countries. The largest drops in gross domestic product in 2020 were recorded in Spain, Greece, Italy and Portugal – more than 8%; in these countries, even in 2021, the GDP volume did not return to the 2019 level [Eurostat 2022a].[3] These countries were most affected by the effects of the 2008 financial crisis and, therefore, reacted particularly strongly to the recent pandemic crisis [Ladi et al. 2020, p.1041-1056.]. At the same time, an increase in general government expenditure was observed. The share of general government consumption in GDP (see Figure 1) increased in 2020 in all EU countries (on average in the EU27 by 2 percentage points (p.p.) – from 20.7% in 2019 to 22.7% in 2020).

[3] https://ec.europa.eu/eurostat/databrowser/view/gov_10a_exp/default/table?lang=en (accessed: 22.09.2022)

The largest increase in this share – exceeding 3 p.p. – was recorded in Cyprus, Croatia and Spain, with the lowest in countries where it was already high in 2019 – Sweden and Denmark. In 2021, it was still higher than in 2019 in all countries; in the EU27, it was at 22.3%. The share of the general government accumulation in GDP also increased in all EU countries (except for Slovakia) in EU27 from 3.0% in 2019 to 3.4% in 2020 and 3.2% in 2021.

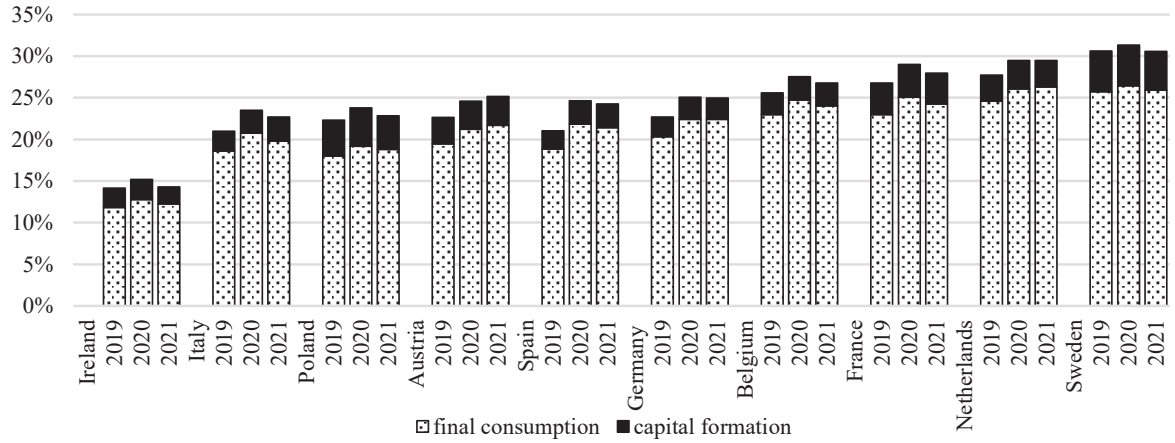

Figure 1. The share of consumption and investment expenditure of the general government in GDP
Source: own elaboration based on the Eurostat database (accessed: 3-11-2022).

The increase in the share of expenditure on consumption and investment purposes was accompanied by a decrease in the ratio between the sum of current revenues and GDP in most EU countries (in the EU27 from 43.4% in 2019 to 42.6% in 2020 – i.e., a decrease by 0.8 p.p. on average) except for Spain, France, Croatia, Latvia, Hungary, Romania and Slovakia. In particular, the share of taxes on production and imports (minus subsidies in GDP) decreased from 11.8% in 2019 to 10.4% in 2020 and 10.9% in 2021 in the EU27. In all countries, the share of this transaction in the current revenues of this sector also decreased. This is due to the increase in the amount of subsidies paid by the general government, which increased by over 200% in many countries (almost 60% in the EU27).

The decline in fiscal and other receipts, coupled with increased social benefits paid by the government, is also evident in the secondary distribution of income account – in the structure of SAM sub-matrix reflecting the intersectoral flows of current transfers. The share of this sector's resources in total transfers (see Figure 2) decreased in the EU27 by 2 p.p. in 2020 (from 47.4% to 45.4%), while the share of expenses (see Figure 3) increased by 2.4 p.p. (from 30.1% to 32.5%). Such a tendency was observed in all EU countries, but the share in revenues decreased the most in Belgium, the Czech Republic and Austria (by over 3 p.p.), while the share of expenses increased the most in Lithuania, Romania and Ireland (by over 4 p.p.).

Transactions between the general government (mainly the sub-sector of social security funds) and households dominate the structure of payer-payee matrix for current transfers. These are social contributions and social benefits. The government sector's links to other sectors are mainly related to existing taxes on income and other current transfers. Payments from all sectors to the general government, especially from households, have

decreased in most countries. This especially concerns payments from households as the pandemic resulted in a decline in the level of social contributions and taxes on income, which was related to a decline in labour revenues and operating surpluses and mixed incomes. The largest decrease in the share of household payments to the general government was recorded in Ireland, Italy, Slovakia, Belgium, France and Hungary – above 2 p.p. This share did not decrease or increase insignificantly in Luxembourg, Portugal, Sweden or Cyprus. In the cross-sectoral structure of general government revenues, only the share of intra-sector transfers increased, mainly related to flows between sub-sectors (i.e., central government and social security funds).

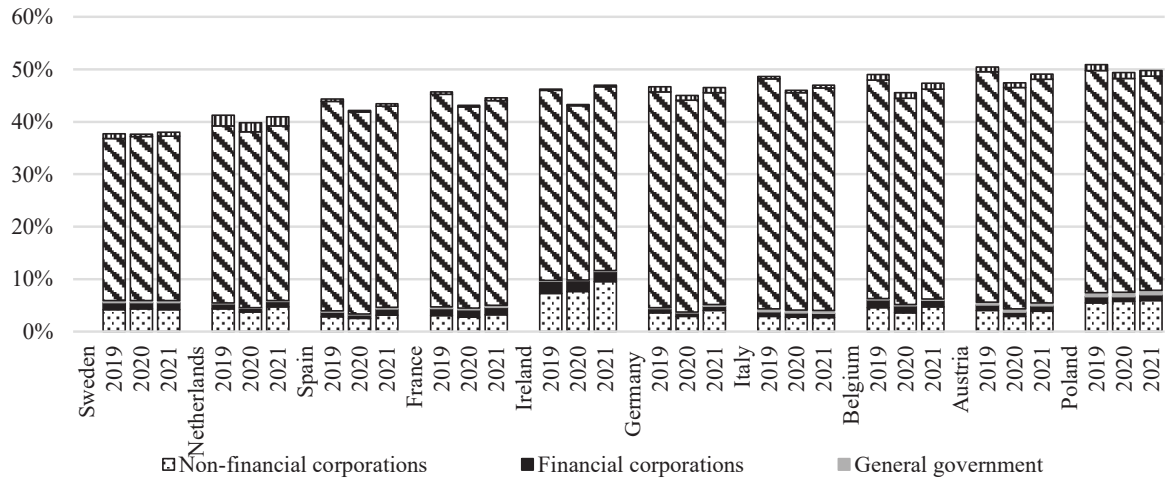

Figure 2. Intersectoral structure of general government resources in terms of current transfers
Source: own elaboration based on the Eurostat database (03.11.2022).

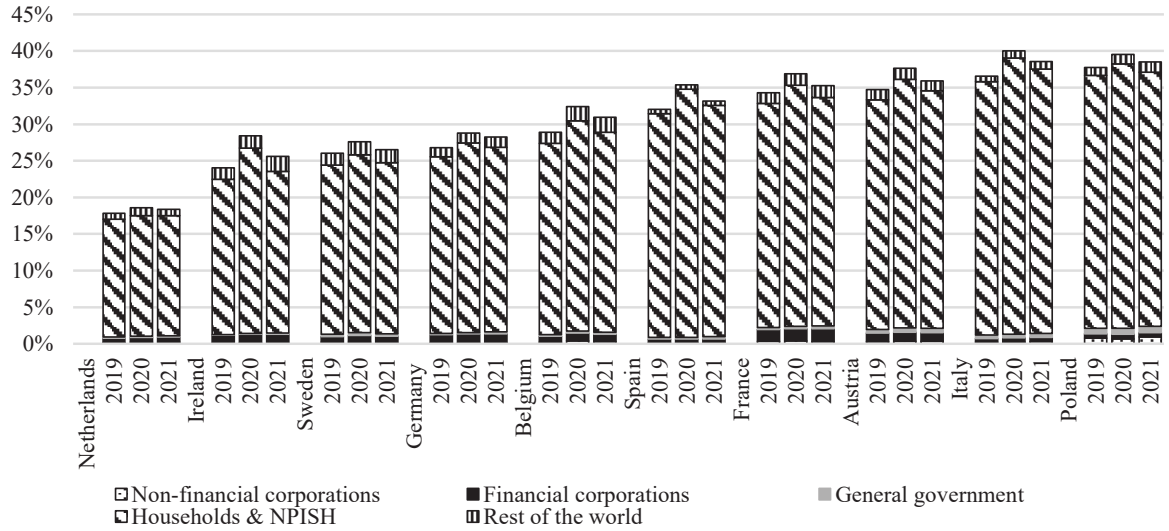

Figure 3. Intersectoral structure of general government uses in terms of current transfers
Source: own elaboration based on the Eurostat (03.11.2022).

In the case of the government sector's expenditure on current transfers, payments to households and the rest of the world increased in all EU countries and, in most countries, also to other sectors (see Figure 3). The largest increase in the share of current transfers to households was mainly due to the higher amount of transfers paid from other social insurance benefits (i.e., healthcare and unemployment benefits). In 2020, a particularly large increase in this share was recorded in Lithuania, Ireland, Spain and Italy (over 3 p.p.).

The intersectoral structure of capital transfers is more spatially varied (see Figure 4). The share of the government sector's revenues in total capital transfers ranged from 13-15% in 2019 in Austria, Luxembourg and Cyprus to over 60% in Latvia, Slovakia and Finland. In most EU countries, this share decreased in 2020 – in the EU27 from 33.0% in 2019 to 24.2%, the most in Latvia, Poland, Denmark, Lithuania, Spain, Greece and Hungary – by more than 15 percentage points. Increases were recorded only in Cyprus, Croatia, Romania, the Netherlands and Germany. In the latter two countries, this was due to an increase in capital taxes, which are taxes on gains on financial savings of households. Government revenues of this kind increased only in these two countries (Austria and Finland) and decreased in all the others. However, in most countries, investments grants received by the government increased in 2020; these are transfers largely paid by the rest of the world sector – especially in countries that joined the Union relatively recently. Therefore, the structure of government revenues from capital transfers is mainly due to the importance of the above-mentioned types of transfers. In some countries, payments from households clearly dominate – in Denmark, Belgium, France, Finland, Luxembourg, the Netherlands, Germany and Ireland (in countries with a high share of capital taxes in total capital transfers). In others, more than 50% of government revenues from capital transfers are payments from the rest of the world sector (in Poland, Latvia, Lithuania, Estonia, Czech Republic, Romania, Slovenia, Portugal, Slovakia, Hungary and Greece – in countries where most investment grants are paid by the rest of the world) or intra--government transfers (in Cyprus and Italy).

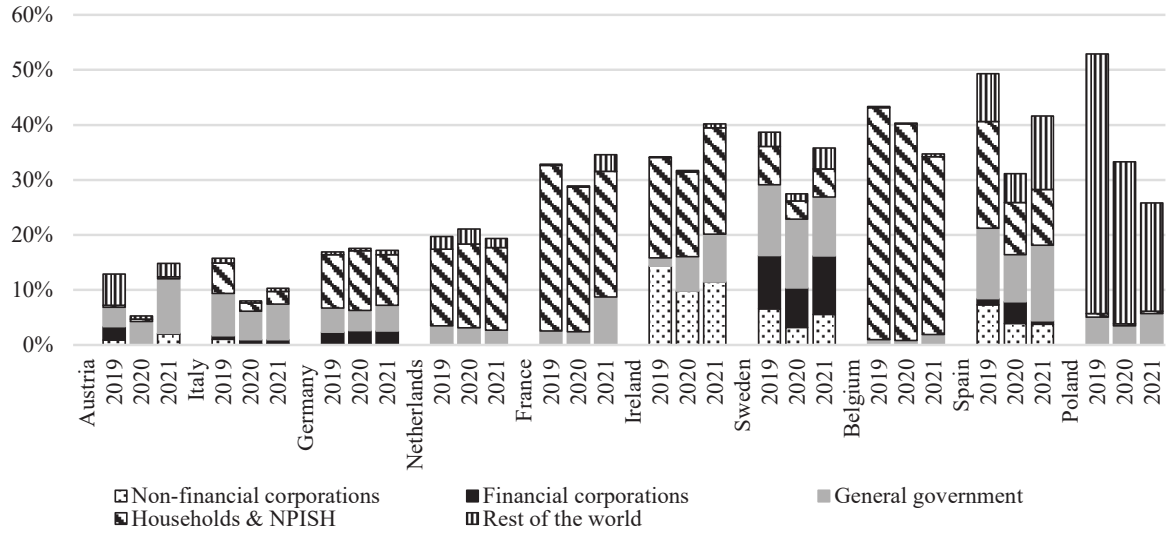

Figure 4. Intersectoral structure of general government resources in terms of capital transfers

Source: own elaboration based on the Eurostat database (03.11.2022).

The general government pays capital transfers in two forms – investment grants and other capital transfers. The last category is challenging to define unambiguously, but it was crucial during the pandemic because it encompasses, among other things, payments made by the general public or by the rest of the world to owners of property damaged or destroyed by war, other political events or natural disasters, transfers from the general public to businesses and microenterprises to cover losses accrued over several fiscal years or exceptional losses resulting from causes [European Commission 2013, p.121-122]. As expected, in most EU countries, the share of government expenditure in total capital transfers increased in 2020 (in the EU27 from 59.0% in 2019 to 66.3% in 2020 – i.e., an increase of 4.3 p.p. on average). The largest increases in this share were recorded in Austria, Latvia and Denmark (above 20 p.p.), with decreases only in Cyprus, Spain, Romania, Croatia and the Netherlands. The increases are mainly caused by transfers paid to non-financial corporations (in the EU27 by 6.5 p.p.) – see Figure 5.

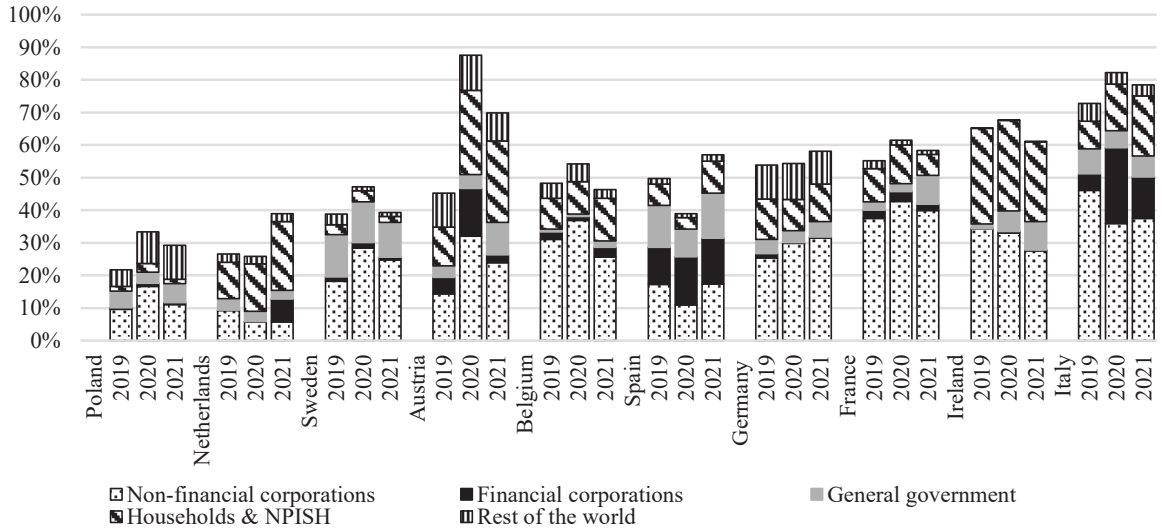

Figure 5. Intersectoral structure of general government uses in terms of capital transfers
Source: own elaboration based on the Eurostat database.

The scale of government economic support has been analysed in this article, with the distinction of individual forms of support (i.e., by type of expenditure). There are many analyses in which the government's involvement in the fight against the pandemic is assessed in an aggregated way as the sum of government expenses [Pereirinha et al. 2021, p. 569-594] or with the use of specific indexes [Hale et al. 2021, p. 529-538]. According to the data of the European Commission (also see the report prepared by the Institute of Finance [2022]), expenditures on combating the effects of the pandemic in 2020 amounted to 4.5% of GDP in Poland, 3.3% in Germany, 3.5% in France, 6.6% in Italy and 4.2% in Spain.

The results of the second part of empirical research in this paper - simulation experiments – show hypothetical declines in GDP caused by the government refraining from spending in the form of final consumption, accumulation or transfers. The SAM model reflects a system of feedback between production, distribution and use of disposable income. In other words, this is a circular flow of income – from production and products

to production factors, to income and expenditure of institutional sectors, and back to products [Laursen et al. 2004, p. 19]. The assumed decline in government expenditure for final consumption or accumulation affects domestic production and imports, compensation of employees (household income), operating surplus (producer income) and transfers related to the fiscal burden. Final expenditure of other institutional sectors is also changing, and these, in turn, affect production, etc. The cumulative effect measured as a decline in GDP (see Formula 1) may be greater or less than the change of consumption/accumulation of the general government depending on how sensitive imports are to changes in this sector's final expenditure. SAM multipliers (see Table 3), which measure, in this case, the change in GDP caused by the change in the general government final demand by 1, can be more than 1 when the change in other domestic sectors' final demand is greater than the change in imports or less than 1 in the opposite situation.

Table 3. Decomposition of GDP multipliers in SAMs models for 2019

Country	Indirect effects		Change in GDP (sum of direct and indirect effects)	Indirect effects		
	Final demand of other domestic sectors	Exports net		Compensation of employees	Taxes on production and imports less subsidies	Operating surplus and mixed income
Initial change in final demand of the general government = 1						
Germany	0.653	-0.480	1.173	0.626	0.115	0.432
France	0.692	-0.415	1.276	0.651	0.176	0.449
Italy	0.793	-0.395	1.398	0.561	0.177	0.659
Spain	0.835	-0.445	1.390	0.643	0.143	0.604
Netherlands	0.371	-0.577	0.794	0.380	0.088	0.327
Poland	0.635	-0.549	1.085	0.425	0.138	0.522
Sweden	0.531	-0.465	1.066	0.506	0.215	0.345
Belgium	0.426	-0.640	0.786	0.385	0.078	0.322
Ireland	0.313	-0.726	0.587	0.165	0.040	0.382
Austria	0.582	-0.541	1.040	0.505	0.128	0.408

GDP multipliers <1 are also observed in the Czech Republic, Denmark, Estonia, Cyprus, Lithuania, Luxembourg, Hungary, Slovenia and Slovakia

Source: own calculations.

Changes in GDP caused by a decline in the general government's final demand can be decomposed into direct effects (consumption and accumulation of the general government are GDP components, so their decline by 1 involves a decline in GDP by 1) and indirect effects concerning final demand of other domestic sectors and imports. For example, a decline in the final demand of the general government in Germany in 2019 by €1 million would cause a EUR 1.173 million decline in GDP, which is 1 (direct effect) plus 0.653 (change in final demand of other domestic sectors) minus 0.480 (change in imports). Opposite example is e.g. Ireland, where decline in final demand of general government in 2019 by 1 million euro would cause only 0.587 million euro decline in GDP, which is 1 (direct effect) plus 0.313 (change in final demand of other domestic sectors) minus 0.726 (change in imports). Another method of decomposing GDP allows for the indication of the effects of reducing government expenditure, distinguishing changes in compensation of employees (D1), operating surplus and mixed income

(B2A3), as well as taxes on production and imports less subsidies (D2X3). For example, the aforementioned hypothetical decrease in GDP by EUR 1.173 million in Germany, caused by a decrease in government spending by 1, consists of a decrease in D1 by 0.626, a decrease in B2A3 by 0.432 and a decrease in D2X3 by 0.115. In turn, for example, in Poland and Italy, due to a relatively large number of micro-enterprises, B2A3 is declining more strongly than D1.

The government's refusal to pay transfers has an impact by decreasing the current and capital revenues of other institutional sectors, as well as their ultimate expenditure, output, etc. Since some of the earnings do not have to be utilised to meet final demand (for example, for financial investments that are not included in GDP), the predicted impact of transfers is less significant than the impact of final demand. Therefore, SAM multipliers, which measure the change in GDP caused by the change in general government transfers, are usually less than 1. Moreover, an increase in the propensity to save by households and a decrease in demand for tangible investments during the pandemic caused a decrease in the value of these multipliers in 2020 compared to 2019 in most EU countries (see Table 4).

Table 4. GDP multipliers in SAMs models for 2019 and 2020 – changes in GDP caused by an increase in general government expenditure (final demand, current and capital transfers) by EUR 1 million

Country	Final demand		Current transfers		Capital transfers	
	2019	2020	2019	2020	2019	2020
Germany	1.173	1.184	0.725	0.696	0.965	0.868
France	1.276	1.284	0.824	0.785	1.191	1.144
Italy	1.398	1.360	0.957	0.858	1.184	0.681
Spain	1.390	1.369	0.964	0.876	0.787	0.596
Netherlands	0.794	0.820	0.473	0.462	0.579	0.461
Poland	1.085	1.053	0.795	0.741	0.918	0.560
Sweden	1.066	1.112	0.701	0.694	0.976	0.998
Belgium	0.786	0.784	0.499	0.456	0.709	0.631
Ireland	0.587	0.638	0.389	0.406	0.575	0.558
Austria	1.040	1.072	0.689	0.662	0.919	0.689

Source: own calculations.

In the literature, you can find other examples of applications of multiplier analyses based on SAM. For example, Betho et al. [2022, p. 823-860] used a SAM-based multiplier analysis to estimate the total impact of COVID-19 on the economy and distinguish between the contributions of foreign and domestic shocks to changes in production and employment across a range of economic sectors. Their estimates indicate that economic growth in 2020 was 3.6 percentage points lower because of COVID-19 than it would have been otherwise. However, the analysis of the impact of the pandemic on economic activity had a completely different goal and simulation assumptions. Its purpose was to calculate the combined effects of specific demand and supply shocks, assuming that the SAM structure with a built-in IO table in 2020 would be the same as in 2015. Other examples are the assessment of the first six months of the pandemic in Rwanda (simulation based on SAM for Rwandan economy in 2018) [Aragie et al. 2021], the application of a multiplier model based on the SAM structure for Myanmar's economy in 2019 [Diao et al. 2020] or the 2015 SAM for South Africa [Arndt et al. 2020]. In contrast,

the simulation analysis presented in this article estimates a hypothetical decline in GDP if the government had not incurred expenses related to counteracting the effects of the pandemic. They are based on the current 2020 and 2021 SAM structures.

Conclusions

The effects of the COVID-19 pandemic are visible in the entire sequence of interrelated elements of the income circulation process in the economy. A loss in income from such production components as labour and capital – a decrease in wages and operational surplus – was a result of production limits caused, among other things, by interruptions in the supply of raw materials, a decrease in consumption and investment demand. This caused a reduction of some redistributive transfers – mainly income taxes. At the same time, the value of transfers paid to corporations and households increased. All of this resulted in a significant deterioration of the situation of public finances.

The above observations are reflected in officially published statistical data. Analysing the European Commission data on the most important transactions allows for identifying the following changes observed in most EU countries due to the pandemic.

1. The share of general government consumption and accumulation in GDP increased with a simultaneous decline in the share of exports. Government expenditure increased on average by 9.2% in the EU in 2020 – in particular, related to general economic, commercial and labour affairs (by 97.2%), unemployment (by 65.3%) and broadly understood health (by 9.7%) [Eurostat 2022b].[4]
2. The ratio between the sum of current revenues of the general government and GDP decreased – especially the share of taxes on production and imports less subsidies in GDP due to the decrease in taxes and significant increase in subsidies paid by this sector.
3. The decrease in fiscal revenues, including income taxes and social contributions, was accompanied by an increase in social benefits paid by the general government. Thus, in the structure of the intersectoral flows table in terms of current transfers, the share of government expenditure increased while the share of its revenues decreased.
4. Due to the lockdown caused by the pandemic, the amounts of transfers from the general government to corporations and micro-enterprises to cover losses increased significantly. Thus, the share of government payments increased in the structure of intersectoral flows table in terms of capital transfers.
5. The increase in general government expenditure and a decrease in this sector's revenues must have led to the emergence or deepening of the general government deficit, which was observed in most of the European Union. The net borrowing of this sector increased in the EU27 from 0.1% of GDP in 2019 to 6.3% in 2020 and 4.2% in 2021 (in Poland, it increased from 0.7% of GDP in 2019 to 7.1% in 2020 and 1.8% in 2021).

In 2020 in Poland, support for the healthcare sector reached 0.2% of GDP[5], exemptions from the payment of social security contributions and health – 0.6%, subsidies

[4] https://ec.europa.eu/eurostat/databrowser/view/gov_10a_exp/default/table?lang=en (accessed: 22.09.2022)
[5] According to data provided by Polish Ministry of Finance presented in Instytut Finansów 2022.

to the salaries of companies and subsidies for the self-employed and on civil law contracts – 0.9%, non-returnable support for companies – 1.8%, care, solidarity and other allowances – 0.2%.

The analysis of the spatial diversification of the significance of the general government in individual spheres of the functioning of the EU economies suggests some substitutability. In some countries, the government plays a particularly important role in final demand (e.g., Sweden and the Netherlands), and in others in the redistribution of income (e.g., Poland and Italy) – see Figures 1 and 3. However, the simulation results for all EU countries clearly indicate that the government has the strongest impact on GDP through final consumption, slightly less through current transfers, and much less through accumulation and capital transfers.

The multiplier analysis carried out using the linear SAM model gives results with an unambiguous interpretation – an increase in government spending causes an increase in GDP, while the decomposition of GDP multipliers allows the identification of the relationship between the impulse and the effect in the form of GDP growth. Their interpretation can be given a much more universal character, going beyond the subject of public spending during the COVID-19 crisis. These multipliers, therefore, show that in European countries, the increase in net borrowing of general government due to the increase in final demand increases GDP, causing the increase of mainly domestic sectors' primary income, leading mainly to an increase in imports. The conclusions could be much more in-depth if the simulation tool was a social accounting matrix with final demands disaggregated by product classification (an input-output table inside SAM). Unfortunately, such data is released with a delay of several years; therefore, at the time of conducting research for this article, it was not possible to assess the effects of changes in final demand in 2020 based on input-output tables.

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Skutki pandemii COVID-19 z perspektywy finansów sektora instytucji rządowych i samorządowych w gospodarkach Unii Europejskiej. Analiza na podstawie macierzy rachunkowości społecznej

STRESZCZENIE

Przedmiotem analiz przedstawionych w niniejszym artykule jest ocena skutków pandemii COVID-19 z perspektywy procesów cyrkulacji dochodów w gospodarkach Unii Europejskiej. Badanie empiryczne opiera się na danych statystycznych opracowanych według standardów ESA 2010, publikowanych przez Komisję Europejską. Podstawowe ilościowe relacje zachodzące między podmiotami pogrupowanymi w sektory instytucjonalne, zostały syntetycznie przedstawione formie macierzy rachunkowości społecznej (SAM). Analizy prostych wskaźników makroekonomicznych pokazują wzrost znaczenia sektora rządowego w obliczu pandemii. Świadczy o tym wzrost zaangażowania tego sektora w konsumpcję, akumulację, a przede wszystkim w proces redystrybucji dochodów między sektorami instytucjonalnymi. Analizy symulacyjne przeprowadzone w oparciu o model SAM pozwoliły na wskazanie w jakim stopniu wkład sektora instytucji rządowych i samorządowych w tworzenie PKB wynika (bezpośrednio i poprzez sprzężenia zwrotne w gospodarce) z jego popytu finalnego, a w jakim z transferów bieżących i kapitałowych.

Słowa kluczowe: system rachunków narodowych, macierz rachunkowości społecznej, metody input-output, sektor instytucji rządowych i samorządowych

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ENHANCING THE COMPETITIVENESS OF ENTERPRISES IN THE FACE OF CONTEMPORARY CHALLENGES AND TRENDS WITH THE USE OF BLOCKCHAIN TECHNOLOGY

ABSTRACT

The article focuses on blockchain technology as a tool for supporting enterprises' competitive potential. The subject of the theoretical considerations was the issues related to the competitiveness of enterprises in the face of market changes and contemporary trends, primarily events associated with the outbreak of the COVID-19 pandemic and the war in Ukraine. The main part of the publication was devoted to the determinants of the activity of enterprises on the Polish market concerning the implementation of blockchain technology. The empirical part indicated, among others, the essence and areas of application of blockchain technology in large enterprises and the possibilities of its practical use in the conducted business. The research undertaken aimed to analyse the possibility of treating blockchain technology as a factor in strengthening the competitiveness of enterprises. At the same time, it was found that large enterprises in Poland do not perceive the capabilities of blockchain-based technology, which may result from insufficient knowledge of its operation and functionality. Low awareness of the complexity and versatility of blockchain technology applications in the corporate sector may constitute a barrier to further disseminating this technology.

Key words: competitive advantage, blockchain, distributed ledger technology

JEL codes: G15, G20, G29

Introduction

Companies, regardless of their size or industry, participate in market competition. The ability to win is most generally a manifestation of their competitiveness. Irrespective of the period in which they operate, enterprises carry out their economic activities under certain conditions of the broad market environment, constituting the reference point for their activities. Based on scientific analyses, the environment is identified with the impact of factors outside the respective enterprise but that has a direct or indirect impact on its activities – including sales opportunities, the scope of activities or development strategies and plans [Penc 1997, p. 79; Koźminski et al. 2002, p. 33]. This environment should be considered by taking several dimensions into account: economic, technical, socio-cultural, legal-political or environmental. Obviously, the individual dimensions also have their

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components – the form or scope of which may change over time [Pujer 2016, p. 23] and may additionally vary depending on where business activity is conducted.

The functioning of enterprises in a globalised world is characterised by a high level of unpredictability, forcing them to constantly adapt to changes. Changes are closely related to competitiveness, the adaptation of companies to changing conditions and anticipation of these conditions [Gąsior et al. 2022. p. 6]. Taking such external determinants into account is, in a way, a necessity in a situation where the respective entity wishes to maintain its ability to compete. Therefore, external factors are – in addition to internal factors, broadly understood enterprise resources as well as the entrepreneur's experience, know-how and skills – one of the determinants of competitive advantage. Based on the three factors listed above, the model assumes that to achieve long-term competitiveness, enterprises should focus on building competencies in the area of managerial skills and abilities to accumulate resources and take advantage of emerging opportunities and respond to changes taking place in the environment [Man et al. 2002, p. 123-142]. However, depending on the size of the company, its market experience or the current market situation, its ability to undertake specific reactions may vary [Gąsior et al. 2022. p. 16-17].

Blockchain technologies may also be one of the tools used to exploit the competitive potential of enterprises by offering a revolutionary solution in many aspects of the functioning of the economy and modern enterprises. The primary feature of this technology is the attribute of consistent and reliable authentication of every transaction between anonymous users [Zaleska 2019, p. 294]. Blockchain technology and the opportunities it offers are practically applicable in modern enterprises and institutions [Wiśniewska 2019, p. 103-116]. In particular, this technology is often applied in areas such as finance, trade and supply chain management, manufacturing and energy industries, media, healthcare and public sector services [PITT 2022]. Other relevant applications available to businesses, regardless of their size and industry, may also include security and acceleration of transactions, authentication of documents, supply chain management or verification of the business partner's receivables [Wetoszka et al. 2021].

The assumption of the authors of this article is to locate the implementation processes of blockchain technology in the broader context of shaping the competitive potentials of enterprises. The analysis focuses on identifying the applications of blockchain technology in enterprises and describing the actual conditions of such processes.

Taking the above into account, the objective of the present analysis focuses on identifying the possibility of treating blockchain technology as a factor strengthening the competitiveness of enterprises.

Competitiveness of enterprises in a changing market environment

The competitive potential of the business sector is an issue that is widely and thoroughly described both in terms of science and practice. It can be treated as an attribute (i.e., understanding the competitive advantage as a specific feature of an enterprise that allows it to operate and survive in a competitive environment or as a process, as an effort to achieve a specific feature) [Gorynia et al. 2009, p. 48-49]. The attributes that determine the market advantage of one entity over another at a given moment are not objective.

Nevertheless, and without any doubt, the set of these features should determine the company's ability to design, manufacture and/or market better products/services than those offered by its competitors [Moon et al. 1995, p. 37-43, Ajitabh et al. 2004, p. 45-61], as well as implement innovations [Ali et al. 2000, p. 1-3].

The ability to pick the individual attributes to match the place and time may prove decisive when maintaining a competitive advantage is considered. In accordance with this premise, competitiveness is a measurement of an organisation's overall capacity to outperform rival businesses in the market in order to achieve or maintain a certain competitive position. In this approach, the competitive position of an enterprise is defined as its favourable position vis-à-vis its competitors, as determined based on quantitative and qualitative diagnostic criteria [Stabryła 2000, p. 66-67], which is conditioned by the use of one or more factors (so-called "success factors") distinguishing its mode of operation [Moszkowicz 2003, p. 29]. None of the potentially considered success factors (competitiveness attributes) should be treated as leading or superior to the others. Depending on the place and time, various attributes may gain significance.

The aforementioned conclusion is inferred from the requirement that businesses operating in certain circumstances modify their operations in response to emerging trends. It is, in a way, the basic assumption of this article, in which changes in the external environment are treated as an environment for shaping the internal resources of enterprises and a kind of tester for the entrepreneurial attitudes of decision-makers. This assumption takes on significance in the face of the dynamic changes that have been taking place in the globalised environment in recent years. The dynamics of change is another aspect that must be kept in mind. It may be uneven within individual areas of the environment in particular periods or places of business activity. In this context, it is worth recalling two events that significantly reformatted the environment of enterprises: the COVID-19 pandemic and the geopolitical disturbances caused by the war in Ukraine. Both events, due to their dynamic and – to some extent – unpredictable nature, can be described as "black swans" (i.e., unpredictable events or phenomena) [Taleb 2020, p. 11-12].

The first of these events intensified the digitisation of several processes. Due to the progressive development of the coronavirus epidemic, it was decided to limit the manifestations of socio-economic life. Of course, the scope of restrictions was different and varied from country to country, but the consequence of these actions was – apart from the economic slowdown – also the relatively permanent social changes manifested, for example, in changing shopping habits or becoming accustomed to remote work. And although the need to implement digital solutions has been recognised for a long time, it was "thanks" to the pandemic that these processes experienced acceleration. The solutions encompassed a wide range of corporate processes, including communication, dispersed teamwork, remote and digital collaboration with contractors, electronic document flow and providing customers with value in a totally new approach. At the same time, the level of advanced solutions may differ, including, in addition to simple applications, platforms that apply AI to support companies in their marketing and sales activities or data warehouses and analytical tools that enable data pooling [EY 2020]. In addition, the pandemic also had various economic consequences which also required action on the part of enterprises to adapt to new conditions; for example, a collapse in demand mainly related to restrictions on mobility or the activities of selected industries introduced by states, disruptions of supply chains, operational downtime imposed administratively or resulting

from lack of labour resources, unfavourable price trends (due to disruptions of supply chains) or, finally, deterioration of the financial situation of customers – companies in difficulty in the result of the crisis and people losing their jobs [Bank Pekao 2020].

In turn, the war in Ukraine, apart from many negative consequences, caused a crisis resulting in a dramatic increase in the prices of energy carriers, for example. It also stepped up the debate on the need to accelerate the transition processes towards renewable energy sources and, more broadly, on changes that consider progressive climate change and environmental degradation. Challenges in this scope relate to several areas related to energy efficiency leading to the reduction of greenhouse gas emissions and the broadly understood resource management. As a result, the requirement to develop sustainable products, services and business models will become the norm and transform consumption patterns so that waste will be prevented in the first place [Grabowski 2021].

Obviously, the two above-mentioned crucial areas for the modern world are not the only ones that affect the functioning of enterprises, forcing them to take adaptive measures. Societies and economies are experiencing several noticeable changes, especially in the long term. The Infuture.insitute draws attention to them in its Trend Maps published since 2018. In 2022, the map was first divided into seven megatrends (Mirror World, Technocentric Biology, Climate Aftermath, Deglobalisation, Society of Incoherence, Demographic Shifts, Health Crises), to which 54 trends were assigned [Infuture.Institute 2022]. Individual trends are analysed in relation to various aspects of everyday life, taking their maturity into account. The more mature the trends, the faster a response they require. In the 2022 edition of the Trend Map, trends requiring a relatively fast response on the business side were recognised. For example, these were the increasing multifunctionality of services to respond to as many consumer needs as possible without having to incur excessive expenditures, the raw material crisis (related to climate change, growing population, an economy based on continuous growth, but also difficulties in transport or long lead times resulting from the closure of factories), generational changes consisting of reaching the voice of a generation that was the first to be brought up in a completely digital world or, finally, a trend in which technology, merging with everyday human life, becomes almost imperceptible to people (invisible technologies). The latter trend demonstrates direct links with blockchain technologies but, in any case, their application can support the process of adapting to changes in the environment.

Blockchain technology – its essence and application in business

Blockchain technology, also called distributed ledger technology (DLT), collects and stores transaction data. This technology is a distributed, shared and trusted database managed by a network of computers that operate under predetermined rules called blockchain. The distributed database in the form of a blockchain contains the history of all transactions or changes verified and accepted by every participant. The essence of this technology is the phenomenon of joining blocks of subsequent transactions to the previous ones, creating a chain so that the recording of payments is made in parallel on all computers in the network [Michalczyk 2018, p. 42-43].

Blockchain technology can be used in various areas of the economy, both in the corporate and public sectors. One of the applications of this technology concerns the performance of contractual obligations, which is associated with the conclusion of so-

called “smart contracts”. They consist of defining and fulfilling the conditions contained in the contract automatically without third parties [Hulicki et al. 2017, p. 43]. By using the properties of the smart contract, the interests of both parties to the transaction are safeguarded if one of them fails to perform [Żuwała 2018, p. 64]. Blockchain-based solutions can also be used, among others, in verifying entities – the purpose of which is to detect and counteract market manipulations, including money laundering. The distributed ledger technology also renders it possible to create a single database containing all available information about a given customer. This database automatically updates when a new document is shared by one of the users [Ciupa 2018, p. 106-108]. Payment systems are yet another area where blockchain technologies are applied. In the case of international payments, the process of consolidating the data required for the approval of transactions is prolonged due to the need to compare the data records held by all entities involved in transactions. Due to its decentralised and dispersed character, blockchain technology allows each participant to analyse the records and verify the correctness of the details of their transactions [Ciupa 2018, p. 106-108].

The potential of blockchain technology is also noticed in the context of the Internet of Things (IoT). The concept of IoT is based on constant technological progress and is associated with a global network connecting many devices that can exchange information on their own. The use of blockchain technology in this area can support the enterprise in the security dimension, including reducing the risk of hacker attacks, by reducing the number of potential locations that can be hacked [Rot 2017].

Blockchain technology is an attractive solution for enterprises due to incomparably lower operating costs compared to other systems and its significant efficiency, which results from the lack of participation of intermediary institutions in transactions [Muszyński 2016, p. 1]. At the same time, the literature emphasises that an important advantage of the blockchain solution is the decentralisation of various types of data registers. Thanks to the transparency of these records, people who use the blockchain system have a complete insight into the transaction history. This technology also allows direct cooperation between foreign entities by eliminating the intermediary institution, thus offering a breakthrough solution [Hulicki et al. 2017, p. 36]. Particular importance in the functioning of blockchain technology is attributed to the elimination of time-consuming clearing and settlement procedures, which consist of registering changes of ownership and money transfer through central institutions dedicated to these purposes.

Blockchain technology does, however, come with a variety of benefits as well as hazards, such as the possibility of unlawful use. The literature indicates barriers related to the implementation of blockchain technology, including regulatory conditions or issues related to society’s adaptation to the solution. At the same time, it is emphasised that the benefits resulting from the use of blockchain, such as cost reduction, significantly outweigh its barriers – which is an incentive for economic operators to look for solutions that eliminate obstacles to its development and implementation [Zimnoch 2016, p. 227--231]. In addition, the advantages of blockchain technology facilitate business in the digital world and, despite the shortcomings or threats that this technology may generate, it creates great opportunities for further development and wide application in the economy [Boniecki et al. 2017, p. 12-13].

The information in the Deloitte Tech Trends 2022 report confirms that blockchain and other platforms based on distributed ledger technology have already

found practical applications in the business world. Companies operating in global markets are open and ready to introduce next-generation blockchain technology, which significantly changes their approach to managing information [Deloitte Insights 2022]. Blockchain and other distributed ledger technology platforms are fundamentally changing how we do business in organisations and assist many companies in re-designing how to manage their fixed and digital assets effectively. Thanks to advances in technology, companies can experiment with blockchain, which affects the emergence of interesting solutions in many industries [Deloitte Insights 2022]. In addition, the results of a 2021 worldwide survey among managers of financial services companies indicate that digital assets and underlying blockchain technologies are treated as a strategic priority in these organisations. For almost all respondents participating in the survey, digital assets are perceived as very important for their industries in the near future, and they also perceive blockchain technology as widely scalable and widely accepted in business practice [Deloitte Insights 2021].

In Poland, blockchain technology is at the stage of expansion and implementation. An opportunity to further develop and accelerate the implementation of innovations based on this technology in Poland was the 2020 launch of a digital sandbox for startups and companies that can test their solutions in safe conditions [Wetoszka et al. 2021]. The interest in blockchain in Poland itself is as high as in other countries in the world. In many cases, one hears not only about the theoretical applications of this technology, but also about the real implementations and benefits it brings. Particularly numerous implementations can be found in regulated sectors, such as banking or insurance, but also wherever there is a relationship and communication between the company and the customer is required. A number of activities are undertaken by the National Support Centre for Agriculture in Poland to use the concept of a distributed ledger to identify food at every stage of its production. Blockchain technology enables a quick analysis of the entire production chain, thus allowing it to react to any deviation from the guaranteed product quality. Increasing consumer awareness and expectations necessitate new ways to also guarantee quality among food producers. The largest Polish companies producing food meet the regulations and try to use the achievements of technology to increase transparency using blockchain technology [PITT 2022, p. 30].

Research methodology

Topics related to the impact on the competitive potential of enterprises, as well as blockchain technologies, have been described by both scientific and industry literature for several years now. To a growing extent, these two types of literature have recently taken on practical aspects of the issues mentioned above. As the authors' intention was to link both threads, it was necessary to carry out empirical research. It was preceded by a theoretical analysis based on the subject literature. It was the first stage of the research process, during which the focus was on publications in the field of management theory, building a competitive advantage and blockchain technology. These topics were covered by the subject terms used to search scientific publication databases and library collections. At the same time, attempts were made to establish the links and relationships between the implementation of blockchain technology by enterprises and building a competitive advantage in the context of dynamically changing environmental

conditions. This analysis led us to identify a research gap in the lack of studies directly linking these two subjects.

Diagnosing the phenomenon in the above-mentioned scope implied the need to conduct an empirical study. Taking into account the requirements of blockchain technology and its high implementation costs – as well as the fact that it is used by many entities on global markets (such as banks and financial institutions) and, above all, the largest global companies [Wiśniewska 2020, p. 266-278] – large Polish enterprises from various sectors of the economy were selected as our research subject (sample $n = 101$)[1]. The selection of companies for our research was random. However, for the purpose of this study, no more detailed decisions concerning the selection of the sample were made. This is because the intention of the authors of this survey was not to identify specific resources and activities of enterprises in the area of blockchain technology, but to find out attitudes and opinions related to the possibilities of its use in business processes.

The survey was carried out as part of the mixed mode procedure, which assumed the possibility of conducting the survey in the form of a questionnaire made available to respondents via electronic channels or a survey-assisted telephone interview.

Results

A variable and unpredictable external environment requires companies to adapt their business models to specific conditions. Uncertain economic situations, geopolitical turmoil, changing consumer habits and preferences, environmental and climate challenges, progressing digitisation of processes, etc. all somehow force enterprises to verify the methods used so far to implement their business processes by implementing innovative solutions, including solutions at the company level. At the same time, blockchain technologies require the organisation to undertake a specific commitment of resources, which may sometimes constitute a barrier to such implementations. These barriers or challenges that must be met (depending on the perspective that we adopt) may be financial (e.g., high costs of investment in technology), organisational (e.g., a lack of infrastructure or R&D departments in enterprises) or related to human resources (e.g., a lack of adequate IT staff) [Öztürk 2020, p. 14771-14789]. In this respect, large enterprises have an advantage over smaller entities as their capabilities in these areas are relatively greater. This study identifies the activities undertaken by such entities in implementing blockchain technology.

The population covered by the study consisted mainly (more than two-thirds of the sample) of enterprises operating mainly in media and advertising, insurance and IT, but also in healthcare, forwarding and transport. Almost half of the companies have been operating on the market for over 10 (up to 20) years, while companies with a relatively short market experience (up to 10 years) were less numerous in the surveyed population (18.8%). Table 1 presents the characteristics of the surveyed companies, taking into account the area of business activity and market experience.

[1]The original assumption of the research was its implementation on a sample of $n = 100$; however, the approach that combined the telephone interview with an online survey resulted in an additional response from a representative of a company after the survey was closed.

Table 1. Characteristics of the population of enterprises covered by the study

Area of activity [%]	
Services	63.4
Retail	15.8
Manufacturing	12.9
Finance	7.9
Market experience [%]	
Up to 10 years	18.8
11-20 years	47.5
21-30 years	30.7
Over 30 years	3.0

Source: survey among large enterprises, $n = 101$.

The conducted research demonstrates that despite the relatively greater potential for implementing blockchain technology into enterprises, the awareness of the possibilities in this area still seems insufficient. For 58.4% of company representatives, this is a topic so unrecognised that they could not clearly indicate the potential of blockchain technology for use in their business (Table 2).

Table 2. Opinion of the representatives of the surveyed enterprises on the possibility of widespread use of blockchain technology in their business

	Total [%]	**Area of activity**				**Market experience in years**			
		manufacturing ($n = 13$)	**retail ($n = 16$)**	**finance ($n = 8$)**	**Services ($n = 64$)**	**up to 10 ($n = 19$)**	**11-20 years ($n = 48$)**	**21-30 years ($n = 31$)**	**over 30 years ($n = 3$)**
Definitely yes	2.0	0	0	1	1	1	0	1	0
Rather yes	27.7	1	5	3	19	7	14	7	0
It is hard to say	58.4	6	9	4	40	10	31	16	2
Rather not	11.9	6	2	0	4	1	3	7	1
Definitely not	0.0	0	0	0	0	0	0	0	0

Due to the relatively small numbers for the groups distinguished on the basis of the area of activity and market experience, the data is presented in absolute terms in relation to them.

Source: survey among large enterprises, $n = 101$.

In total, some 30% of the representatives of the companies participating in the study saw such possibilities, with only a few indications being decisive. This was relatively the most common in banking (financial sector), while manifested to the smallest extent in manufacturing companies, where the belief that such applications were non-existent was also the greatest. It also seems that the age of the company is such a variable that may be conducive to implementing blockchain technology. This may be indirectly related to the age of the management staff, although this is obviously only an assumption because this aspect was not covered by the study. In any case, in the companies with a maximum of 10 years of market experience, opinions confirming the possibility of using blockchain technology in business appeared relatively often. In the case of the oldest companies, there were no indications of this type of possibility, although one should keep in mind the low number of enterprises in this group.

Table 3. Occurrence of business premises regarding the application of blockchain technology in the surveyed enterprises

	Total [%]	Area of activity				Market experience in years			
		manufacturing (*n* = 13)	retail (*n* = 16)	finance (*n* = 8)	services (*n* = 64)	up to 10 (*n* = 19)	11-20 years (*n* = 48)	21-30 years (*n* = 31)	over 30 years (*n* = 3)
Definitely yes	1.0	0	0	1	0	0	0	1	0
Rather yes	15.8	0	3	2	11	1	9	6	0
It is hard to say	72.3	6	12	5	50	16	37	17	3
Rather not	10.9	7	1	0	3	2	2	7	0
Definitely not	0.0	0	0	0	0	0	0	0	0

Source: survey among large enterprises, *n* = 101.

Awareness of a specific phenomenon, blockchain technology in this case, is the basis for the potential assessment of the possibility of taking appropriate action. However, according to the following data, it is also unfavourable because only some of the representatives of enterprises that perceive the possibility of widespread use of blockchain technology in business perceived business premises for this type of implementation (Table 3).

Table 4. Current involvement of the surveyed enterprises in the implementation of blockchain technology

Specifiation	Total	Area of activity				Market experience in years			
		manufacturing (*n* = 13)	Retail (*n* = 16)	finance (*n* = 8)	services (*n* = 64)	up to 10 (*n* = 19)	11-20 (*n* = 48)	21-30 (*n* = 31)	over 30 (*n* = 3)
Implementation/ /development of blockchain technology is at the stage of plans only		0	1	0	0	0	1	0	0
Blockchain technology is at the research stage	9.9	1	1	2	6	1	5	2	2
Blockchain technology is applied in practice	1.0	0	0	1	0	0	0	1	0
We do not plan to get involved in the development of blockchain technology	88.1	12	14	5	58	18	42	28	1

Source: survey among large enterprises, *n* = 101.

Again, representatives of financial sector entities were the ones who most often expressed such a type of evaluation. At the same time, such conditions were most frequently observed in the case of companies with a slightly longer market experience (21-30 years), while, as indicated above, the general awareness was higher in the case of companies with a maximum of 10 years of market experience. In this case, however, it seems that an objective assessment of the available resources may verify real business opportunities in this area. Just as the awareness of the possibility of widespread use of

blockchain technology in business does not translate into the perception of business premises for their implementation, the perception of opportunities does not automatically translate into real actions in this area. Table 4 presents the state of involvement of the surveyed enterprises in implementing blockchain technology.

Regarding the specific possibilities of applying blockchain technology in the surveyed enterprises, the relatively low awareness in this field identified in the study was generally confirmed. Almost half of the respondents (45.5% – cf. Table 5) indicated the lack of such applications, and another 23.8% could not specify them. Some 24% of the respondents perceive the potential of blockchain technology in the area of payments, which coincides with the results of previous research on the global market [Wiśniewska 2020, p. 266-278] and the undoubted advantages of this technology in the field of finance, often indicated in the subject literature.

Table 5. Possibilities of applying blockchain technology in the surveyed enterprises

Total	**[%]**
None	45.5
Payments	23.8
Digital Records	6.9
Supply chain management	1.0
Customer database management	1.0
I don't know	23.8

Source: survey among large enterprises, n = 101.

The low awareness of the public regarding blockchain technology was further demonstrated by the answers to the question regarding the indication of the advantages of this technology (Table 6). Here, too, the majority of respondents indicated either the lack of advantages of blockchain technology concerning other systems or did not have knowledge in this area (66.3% of indications in total).

Table 6. Advantages of blockchain technology in relation to other systems according to the representatives of the surveyed companies

Total	**[%]**
None	44.6
I don't know	21.8
Increased transaction security	17.8
Lower costs	17.8
It is hard to say	4.0
Transaction speed	1.0

Source: survey among large enterprises, n = 101.

The use of blockchain technology in international payments can significantly reduce the settlement time for various types of business transactions. A significant benefit of using blockchain technology in this field is to enable real-time verification of financial flows, eliminating lengthy data consolidation processes. However, despite the subject of the potential use of technology in the field of finance and banking raised in the literature, many solutions based on blockchain can be referred to many other economic sectors, including manufacturing, commercial and service enterprises. Such solutions may include, for example, intelligent contracts (i.e., autonomous programs) – the launch of which takes

place automatically, thus constituting a guarantee and irreversibility of the implementation of the provisions between the "parties" to such a contract. Improvements in digital recordings can also be perceived as a universal application of this technology. In the area of data security, thanks to the innovative technology applied, there may be a significant improvement in the efficiency of processes in the company (i.e. faster and more accurate process of data analysis, detection of fraud and non-compliance, as well as reporting). Blockchains can be used to protect privacy in terms of data property, data transparency and auditability or access control [Hulicki et al. 2017, p. 38-39].

In many companies, using blockchain technology in the supply chain may constitute an opportunity to enhance their competitive potential. Such action may contribute to eliminating areas characterised by inefficiencies and improving operational processes at various levels of companies' activities. The application of blockchain technology to the so-called "open production networks" would, in practice, mean the emergence of a tool to verify the country of origin of the individual components of a given product (control at every stage of the supply chain) [Hulicki et al. 2017, p. 37]. The potential impact of blockchain on the principles of supply chain operation and the indication of other applications were the subject of both theoretical considerations and empirical research [Szewczyk 2019, p. 591-600, Wang et al. 2019, p. 62-68]. Similarly, the application of blockchain technology in the context of the Internet of Things can also bring numerous advantages for companies [Rot et al. 2018, p. 122-134].

Improvements in digital asset storage, including in liquidity and availability of capital, could be another example of the benefits for businesses in terms of increasing their market competitiveness. Blockchain technology provides market participants with constant insight into the state of their assets, which enables better risk analysis and effective decision-making processes. Retail and service companies, in turn, can significantly improve operational processes through accelerated settlements, synchronised monitoring and management of the flow of receivables or liabilities in real-time by all parties to the transaction.

To sum up, it should be noted that blockchain is a system with massive potential in many sectors of the economy. Companies implementing tools based on this modern technology can gain many benefits, thus increasing their competitiveness and streamlining numerous business processes. Worldwide, this technology is being dynamically developed and improved, therefore becoming an important element of economic growth. In Poland, however, due to the still low awareness of potential users, blockchain technology is not a common solution. In most surveyed companies, managers do not plan to develop it. Attempts, by subject literature, to explain the noticeable lack of trust in the mentioned technology boil down to issues with understanding the essence of the mechanisms on which it operates and the possibilities of using them in economic practice [Wiśniewska 2020, p. 274]. Furthermore, the lack of trust in blockchain technology is due to regulatory gaps directly affecting its application. Even cryptocurrencies based on blockchain technology, popular on the financial markets, are not legally considered a national means of payment. While most regulators accept this technology, the regulatory environment of this area remains unresolved.

Conclusions

Enterprises operating in a changing environment must constantly adapt their activities to the changes occurring in their environment. The COVID-19 pandemic and political events related to the war in Ukraine have significantly affected the processes taking place in Polish enterprises, consequently forcing them to adopt numerous adjustment measures. Challenges in this area referred, among others, to the need to implement digital solutions in several areas related to efficiency, including energy efficiency or skilful management of resources.

At the same time, it is worth emphasising that enterprises operating on the global market function in conditions of intense competition, as well as constantly growing customer requirements. In connection with the above, the technological development of the organisation, aimed at streamlining processes and increasing their market advantage, is becoming an issue of growing significance. Innovative tools, including blockchain technology, can significantly affect how business is conducted, improve the quality of communication with customers and, thus, fully exploit the competitive potential of enterprises on the international market.

The objective of the research was to analyse the possibility of treating blockchain technology as a factor in strengthening the competitiveness of enterprises. Based on the theoretical considerations and empirical research, it can be concluded that the application of blockchain technology by enterprises can support their processes of adapting to changes in the environment and, therefore, their ability to enhance their competitive potential. Blockchain technology offers an innovative economic solution and can be applied in various business areas. The advantages of this method are primarily the lower operating costs (when compared to other systems) and high efficiency at the same time.

Despite the high potential and mood on the Polish market conducive to implementing this technology, the public's awareness concerning the possibilities in this area remains low. The applications of blockchain technology are recognised by Polish entrepreneurs primarily in banking and finance, and rarely in manufacturing, retail or services. As a result, Polish companies rarely use blockchain technology in business activities. Manufacturing companies are the least involved in these processes, with greater activity regarding the practical application of the technology in the financial sector. The potential of blockchain technology was most often seen in the area of payments.

A lack of sufficient knowledge regarding the substantive and technical aspects of blockchain and low awareness of the complexity and versatility of the applications of this concept in business may become a barrier in Poland for the process of popularising and implementing blockchain technology.

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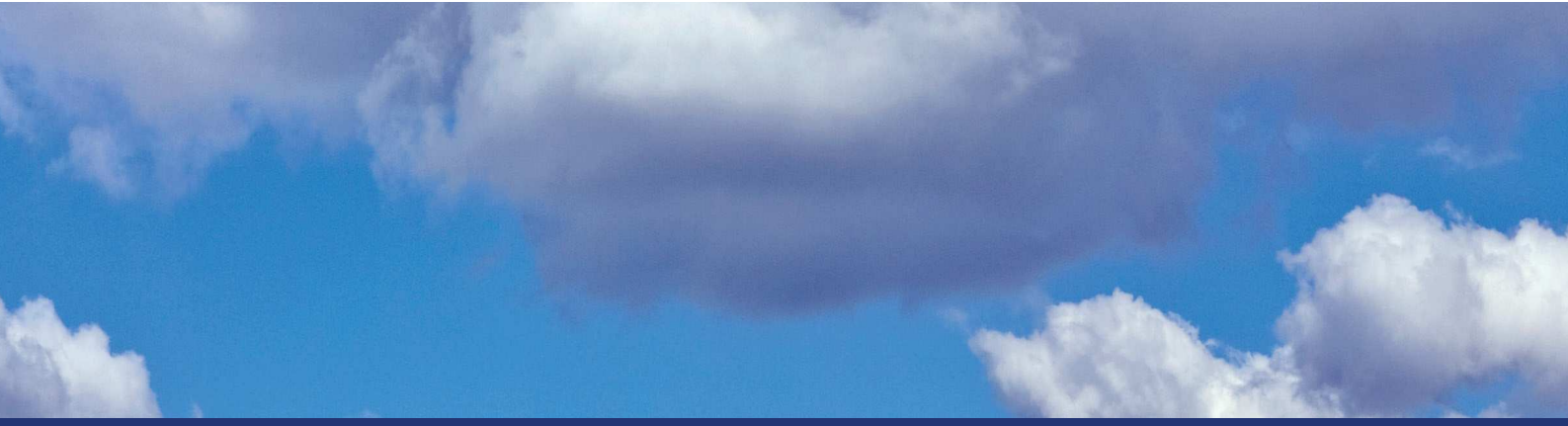
Wzmacnianie konkurencyjności przedsiębiorstw w obliczu współczesnych wyzwań i trendów dzięki wykorzystaniu technologii *blockchain*

STRESZCZENIE

W artykule skoncentrowano się na technologii *blockchain* jako narzędziu wspierającym potencjał konkurencyjny spółek. Przedmiotem rozważań teoretycznych były zagadnienia związane z konkurencyjnością przedsiębiorstw w obliczu zmian rynkowych oraz współczesnych trendów, przede wszystkim wydarzeń związanych z wybuchem pandemii COVID-19 oraz wybuchem wojny na Ukrainie. Zasadnicza część publikacji została poświęcona uwarunkowaniom aktywności przedsiębiorstw na rynku polskim w zakresie wdrażania technologii *blockchain*. W części empirycznej wskazano m.in. na istotę i obszary zastosowania tej technologii w dużych przedsiębiorstwach oraz możliwości praktycznego jej wykorzystania w prowadzonym biznesie. Celem podjętych badań była analiza możliwości potraktowania technologii *blockchain* jako czynnika wzmacniania konkurencyjności przedsiębiorstw. Jednocześnie stwierdzono, że duże przedsiębiorstwa w Polsce nie dostrzegają możliwości technologii opartych na łańcuchach bloków, co może wynikać z niewystarczającej wiedzy na temat jej działania i funkcjonalności. Niska świadomość złożoności i uniwersalności zastosowań technologii *blockchain* w sektorze przedsiębiorstw może być barierą w procesie upowszechniania się tej technologii.

Słowa kluczowe: przewaga konkurencyjna, blockchain, technologia rozproszonych rejestrów



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