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Contents

Articles

ARTICLES

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INTELLECTUAL CAPITAL AND INNOVATIVENESS OF ENTERPRISES IN POLAND IN COMPARISON WITH THE EUROPEAN UNION COUNTRIES

Abstract

The development of enterprises mostly depends on their innovation. Intellectual capital is one of the factors in building the innovative potential of enterprises. The aim of the article is to analyze and evaluate the impact of intellectual capital on the innovativeness of enterprises in Poland compared to the European Union. The article utilized a critical analysis of the literature on the subject, while the empirical section employed statistical analysis, which included a characterization of the sample's selected features, analysis of a series of Pearson correlations examining the linear interdependence of features, and an examination of the obtained results. Data were obtained from the European Statistical Office for the years 2012-2021. The gathered data were processed using descriptive statistics – mean values, changes in dynamics, and Pearson correlation coefficient.

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Introduction

The modern economy is characterized by high turbulence, while increasing competition in the market forces a concentration on intangible and unique resources, including knowledge. It is an essential factor, both from the perspective of enterprise development and the entire economy. One of the most important factors for improving the competitiveness and development of enterprises is and will be innovation, whose role is particularly significant in the currently changing environment (COVID-19 pandemic, armed conflict in Ukraine). Maintaining the competitive position of enterprises requires the implementation of broadly understood innovations. A factor significantly influencing the increase in the level of innovation of enterprises is intellectual capital, defined as the sum of human capital (which the employee takes with him - knowledge, skills and protected knowledge) and structural capital (owned by the company - knowledge and culture of the organization, protected knowledge) (Edvinsson, Malone, 2001, pp. 17-18). Statistical studies have proven that human capital is the main contributor to the success of a company, and its poor management is the cause of failure (Szopik-Depczynska, Korzeniewicz, 2011, p. 178). It is indicated that the survival of the company depends on the proper use of the intellectual capital of the enterprise for innovation, competitiveness and sustainable development (Githaiga et al. 2023, p. 41, Alvino et al., 2020, pp.76-94).

Human capital is understood as the knowledge, skills, qualifications, and experience, as well as the attitudes and behaviors of employees who create innovations. Employees represent immense value for a company and are perceived as a capital that should be developed (Juchnowicz, 2011, p. 85), while the lack of appropriate practices supporting human capital management can be a barrier limiting the innovativeness of enterprises (Beck-Krala, Duda, 2014, p.13). Indicators and measures of innovation suggest that despite investments made for this purpose, the level of innovation in Polish enterprises, as well as the entire economy, is low (EIS, 2022). According to the European Innovation Ranking in 2022, Poland ranked 4th from the bottom, placing in the last group of so-called emerging innovators. The European Commission indicates that innovation is the engine of economic growth in Europe. It is indicated that every euro invested in Horizon Europe's research and innovation program is capable of generating 11 euro of GDP over twenty-five years. The European Commission forecasts that between 2021 and 2027, investments in research, development and innovation will generate 11000 jobs in the research and high-tech sector (Jagodka, 2019, p. 25). The European Commission, analyzing the results of the 2022 EIS, indicated comments and recommendations for Poland in the area

of innovation. These include (EC, 2022): predominance of the low-tech sector (low level of innovation generation and absorption), significant regional differences in the aspect of innovation, fragmented research sector, problems of internalization of Polish science, low level of spending on research and development (1.39% of GDP), also among enterprises (well below the EU average at 0.87% in 2020), small share of innovative companies in the enterprise sector. An accentuated problem is the low level of innovativeness of small and medium-sized enterprises in Poland, which is due to limited financial resources and problems in the application of high technologies, as well as the low level of management, which is related to the limited possibilities of obtaining appropriately educated and experienced management staff.

The aim of the article is to analyze and assess the impact of intellectual capital on the innovativeness of enterprises in Poland compared to the European Union. The article sets the following research hypothesis: there is a statistically significant relationship between the innovativeness of enterprises and the intellectual potential of EU countries. To verify the hypothesis, the article employs a critical analysis of the literature on the subject, while the empirical section utilizes statistical analysis of data acquired from the European Statistical Office (Eurostat) for the years 2012-2021. This analysis includes a characterization of the sample's selected features, an examination of various correlations examining the alignment of features, and an analysis of the obtained results. The gathered data were processed using descriptive statistics – mean values, changes in dynamics and the Pearson correlation coefficient.

1. Intellectual capital and enterprise innovation

Innovativeness determines the development and success of modern organizations. The search for and implementation of changes, which are synonymous with innovation, not only shapes the development of an economic entity, but also determines its survival in an ever-changing environment. Innovation, which is a manifestation of the use of scientific and material potential, stimulates progress in all spheres of socio-economic life. Views on the issue of innovation vary, but all approaches emphasize the element of novelty (Farazmand, 2004, Grudziewski, Hejduk, 2000). The precursor of the concept of innovation in the economic literature is J. Schumpeter (1960), who also pointed out that the willingness and ability to create and implement innovations determines the development of an enterprise, to a greater extent than capital, and therefore constitutes its innovation. It should be noted that innovation processes are complex in nature, as they involve not only the use of existing knowledge and the implementation and actual use of new ideas, but also the creation of new value.

The innovative activities of enterprises are conditioned by many factors, which are dynamic in nature and are most often categorized into internal and external ones. Among the external factors over which the enterprise has no control are: (Rychtowski, 2004, p. 589): administrative and legal conditions, socio-political climate, general market conditions, market and non-market linkages and technical infrastructure. Along with the changing socio-economic and political situation, external factors also include: the development of information and communication technologies, international exchange of scientific and technical achievements, the development of the national innovation system, and institutional conditions for the development of innovative activities, the growth of the service sector, including innovation financing and knowledge transfer. Contemporary innovation policy should be based on technology diffusion, network cooperation, knowledge, and the potential of human capital (Beck-Krala, Duda, 2014, p.14).

In the era of a knowledge-based economy, internal factors constitute the primary impetus for the development of organizational innovativeness. (Drews, 2018, p.83). These include (Radomska, 2015, p.73-74): physical resources, capital resources, human resources with the experience and skills necessary to create, absorb and apply innovations, the management system and organizational culture in the enterprise. Skills of individuals making managerial decisions in the company remain crucial for the development of innovativeness. These skills include: (Dworczyk, Szlasa, 2001, pp. 177-180): identifying innovation needs for all types of innovation, preparing a set of projects and its optimization by management, directing the implementation of individual projects, designing innovative solutions, implementing innovative projectsand products, increasing research and development potential, information potential, increasing innovative personnel potential and its use, providing technical potential for design, experimentation and prototyping, providing financial resources for innovative activities and managing them appropriately, using the innovative potential of the staff. The mentioned conditions for the development of innovativeness in enterprises significantly relate to human capital and the creation of appropriate conditions stimulating its creativity, creative thinking, and innovativeness. (Sieradzka, 2022). Modern market requirements oblige continuous education and acquisition of knowledge by employees, so human capital is a key resource in creating innovativeness of enterprises. Human capital creates innovative solutions in various fields and plays a key role in the creation of an organization's intellectual capital.

There is no one-size-fits-all definition of intellectual capital in the literature (Manzari et al., 2012, pp. 2255-2270). It is understood as the sum of knowledge possessed by the people who make up an enterprise's community and the practical transformation of this

knowledge into components of its value. This capital is the difference between the total value of the enterprise and the financial value (Szopik-Depczyńska, Korzeniewicz, 2011, p. 193, Yang, Lin, 2009, pp. 1965-1984). It is the created wealth, formed from the knowledge of the employed employees of the enterprise involved in the constant process of increasing its value (Ujwary-Gil, 2010, p. 92). It is pointed out that intellectual capital is an invisible resource of an enterprise that creates visible effects (Urbanek, 2007, p.38). It is a compilation of knowledge, practical experience, technology, good customer relations and all the skills that allow a company to gain a competitive advantage (Weqar et al., 2023). Intellectual capital is defined by pointing out its three main elements: human capital, organizational capital (called structural capital) and customer capital (called by various authors: customer capital, market capital, relational capital) (Asare et al., 2021, p. 56, Szulczynska, 2005, p. 236, Sokolowski, 2018, p. 23). Human capital is understood as a human-integrated element, it includes knowledge, experience, skills and individual competencies of employees (Wequar et al., 2021, pp. 1134-1151). It is the source of knowledge creation and is the most important element of intellectual capital (Beyer, 2017, p. 87). It is a form of capital as it represents a source of present and future income. However, unlike other forms of capital (physical and financial), human beings cannot allocate portions of human capital among different uses. Therefore, the opportunity cost of using human capital always pertains to the entire resource of capital (Tyc, 2005, pp. 129-136).

The other elements of intellectual capital are not insignificant for the development of a company's innovation activities. Structural capital refers to the infrastructure that supports human capital and its effective use: management philosophy, organizational culture, management processes, information system, linkage system and financial relations, and intellectual property rights (Szulczynska, 2005, p. 236). It is the element of intellectual capital that remains in the company when employees go home (Gosh, Mondal, 2009, pp. 369-388). A company's assets can significantly improve its innovation capacity - information systems, information technology or processes facilitate the use and adoption of innovations in the company (Mention, 2012, p. 25). Organizational capital can foster the search for and implementation of new solutions and condition innovative activities. On the one hand, information systems, technologies facilitate the use and absorption of innovations, on the other hand, the appropriate organizational structure and culture allow the free transfer of knowledge in the organization (Beyer, 2017, p. 88). Market (relational) capital, which connects human and structural capital with external parties, is defined as all formal and informal relationships of a company with customers, shareholders and suppliers (Stefanska et al., 2019). Building ties with

customers, creating better connections with strategic partners can increase the innovation performance of a company (Zelenrer et al. 2008, pp. 31-40). The important role of relational capital in the creation of incremental innovations is pointed out, while in combination with human capital it is possible to influence the emergence of radical innovations (Delgado, 2011).

2. Research Methodology

The aim of the article is to analyze and evaluate the impact of human capital on the innovativeness of enterprises in Poland compared to the European Union. In the theoretical part of the article, a critical analysis of the subject literature and a library query were utilized, while the empirical part employed statistical analysis, including a characterization of the sample's selected features, an examination of various correlations examining the alignment of features, and an analysis of the obtained results. Public statistics - the database of the European Statistical Office (Eurostat) was used as the data source. The gathered data were processed using descriptive statistics – mean values, changes in dynamics, median, first and third quartiles, and the Pearson correlation coefficient. The study of the relationship between human capital and innovativeness in EU countries used 5 arbitrarily selected predictors, which include:

- student to academic staff ratio,
- public spending on higher education,
- Human Resources in Science & Technology (HRST) aged 25-64,
- spending in the business sector on research and development (R&D),
- applications to the European Patent Office (EPO).

The selection of metrics for the study was guided by literature review and research intuition. The research period covered the years 2012-2021; however, due to incomplete data in public statistics, correlation analysis was conducted in slightly divergent research periods.

3. Intellectual capital and innovativeness – analysis of the results of an empirical study

The first indicator to be analyzed is the ratio of students to academic staff, 2013-2020 (Appendix, Table 1). Analyzing the average ratio of students to academic staff, from 2013 to 2020, it can be noted that the highest took place in Belgium (21.0), while the lowest in Luxembourg (6.2). In Poland, Austria and Portugal it was 14.3, and thus 11 EU countries achieved a higher average. According to the dynamics analysis, the highest positive change in the student-staff ratio was recorded for Cyprus (11.2 p.p.), while the lowest change took place in Spain (0.4 p.p.). A decrease in this indicator was observed in 14 countries, the most noticeable being in the Czech Republic (-5.7 p.p.), which can be interpreted

positively in the context of this particular deterrent. In Poland, the change compared to 2013 was also negative, amounting to -2.1 p.p. Another variable analyzed from the area of human capital is the amount of public spending on higher education in the European Union in 2012-2019 (Annex Table 2). The highest positive change from the base year was in Bulgaria (0.14 p.p.), and the lowest positive change was in Romania (0.03 p.p.). The largest decrease in public spending on higher education was observed for Lithuania (-0.60 p.p.) and Latvia (-0.54 p.p.). In Poland, the difference was -0.05 p.p. In addition, it can be noted that especially the downward trend began in 2016, when the government in Poland changed and a number of social packages were introduced (e.g. 500+), which are an extremely heavy burden on the country's budget. Compared to other European Union countries, Poland ranks in the middle of the pack when it comes to spending on higher education. There were 11 countries that allocated a higher percentage of GDP to this purpose, with the biggest difference in the Scandinavian countries of Denmark (210.6% relative to Poland), Sweden (165.7% relative to Poland) and Finland (156.9% relative to Poland). Tertiary education, a lower percentage of GDP than in Poland, was allocated in 15 EU countries, with the lowest in Luxembourg (41.2% relative to Poland).

Another analyzed indicator is strictly related to innovativeness and concerns human resources in science and technology in EU countries in 2012-2021 (Appendix, Table 3). The results of the calculations show that between the initial and the compared year, changes in human resources in science and technology in each EU country were positive. The highest rate was recorded in Malta (15.4 p.p.) and Portugal (14.4 p.p.). The slowest rate of change was in Italy (2.5 p.p.), Romania (3.7 p.p.) and Finland (4.1 p.p.). In Poland, the percentage of human resources in science and technology increased by 9.6 p.p. between the first and last years analyzed. The average percentage of human resources in science and technology, in 16 countries was higher than in Poland, with the highest difference in Sweden (150.5%) and Luxembourg (147.2%). In contrast, a lower average was recorded by 10 countries. The largest disparity, in favor of Poland, was in Romania (60.7%) and Italy (78.7%).

The further study analyzed business sector R&D expenditures in 2012-2021 in European Union countries (Appendix, Table 4). In 2021, the highest R&D expenditures in the business sector were incurred by business entities from Sweden (1,249 euros per capita) and Belgium (1,053.5 euros per capita). The lowest expenditures were in Romania (35.9 euros per capita) and Latvia (40.2 euros per capita). In Poland, it was 137.6 euros per capita. The fastest growth in spending was observed in Cyprus (up 571.6%), followed by Poland (up 310.7%) and Lithuania (up 309.0%). A decrease in R&D spending in the analyzed sector was

observed in only one country, Luxembourg (-8.6%). The ratio of average R&D expenditures to Poland was higher in 18 countries. The largest differences were in Sweden (1209.8%), Denmark (1052.1%) and Austria (1013.0%). In contrast, the largest disparity, in favor of Poland, was characterized by Latvia (28.0%) and Romania (28.6%).

The last predictor studied turned out to be the number of applications to the EPO between 2012 and 2021 among European Union countries (Appendix Table 5). Analysis of the dynamics of change in the number of applications to the EPO between 2012 and 2021 shows that 23 countries increased the number of patent applications. Lithuania (up 284.2%), Portugal (up 281.3%) and Bulgaria (up 207.7%) showed the highest growth. Poland was also among the countries that had positive dynamics, but in this particular case an increase of 40.0% was observed. The largest decline was in Cyprus (down 17.0%), followed by Romania (down 14.3%) and Latvia (down 12%). Germany (25,784) and France (10,530) had the highest average number of patent applications, during the period under review. The ratio of these countries to Poland was 5,242% and 2,140.8%, respectively, which is a significant disparity and shows the gap separating Poland from the EU innovativeness leaders. Poland recorded an average of approximately 492 patent applications, ranking 12th. Croatia, however, was the weakest in terms of patent activity (3.3% relative to Poland), followed by Latvia (3.8% relative to Poland), and slightly better by Bulgaria, Lithuania, Romania and Slovakia. However, it should be borne in mind that absolute values were analyzed for this measure; surely it would be more meaningful to compare relative values, if only in terms of the number of patents per capita of each EU country.

Conducting the above analysis allowed for the initiation of the next research task, which involved conducting Pearson correlation analysis. The r-Pearson correlation coefficient $(r_{x,y})$[3] was selected for analysis because it allows us to determine whether there is a linear relationship between two variables – if so, it allows us to determine its strength and nature, i.e. whether it is positive or negative correlation[4]. Selected

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[3] The formula for the r-Pearson correlation coefficient is: $r_{(x,y)} = \text{cov}_{(x,y)}/\sigma_x * \sigma_y$, wherein $\text{cov}_{(x,y)} = E(x * y) - (E(x) * E(y))$, where $r_{(x,y)}$ - r-Pearson correlation coefficient between variables x and y; $\text{cov}_{(x,y)}$ - covariance between variables x and y; σ - standard deviation from the population; E - expected value.

[4] The obtained relationships can be perceived as strong, moderate or weak; however, it seems that such an interpretation is arbitrary. Therefore, it was assumed that the strength of the correlation should be interpreted as follows: $|r_{x,y}| < 0.2$ – no linear relationship between the tested features; $0.2 \leq |r_{x,y}| < 0.4$ – linear relationship clear but low; $0.4 \leq |r_{x,y}| < 0.7$ – moderate relationship; $0.7 \leq |r_{x,y}| < 0.9$ – significant relationship; $|r_{x,y}| \geq 0.9$ – very strong relationship.

indicators were correlated with each other, and the results, in descending order of the strength of the relationship, are presented in Table 1.

Table 1. Examination of the relationship between intellectual capital indicators and measures of innovativeness

X	Y	Years	Pearson's correlation coefficient
Human Resources in Science and Technology aged 25-64	Business sector R&D spending	2012-2021	0.699
Public spending on higher education	Business sector R&D spending	2012-2019	0.555
Public spending on higher education	Human Resources in Science and Technology aged 25-64	2012-2019	0.436
Student to academic staff ratio	Human Resources in Science and Technology aged 25-64	2012-2019	-0.235
Student to academic staff ratio	Business sector R&D spending	2013-2020	-0.185
Public spending on higher education	EPO filings	2012-2019	0.100

Source: own study and calculations.

A clear but low linear relationship was noted in the case of the relationship between Student to academic staff ratios vs. human resources in science and technology for 25-64 year old. The obtained result ($r_{x,y} \sim$ -0.24) indicates a negative correlation. In situations where one variable acts as a stimulant and the other as a destimulant (which is the case here), this relationship is rational and justified from an economic standpoint. A moderate correlation described two relationships, including: public expenditure on higher education and human resources in science and technology among people aged 25-64, where $r_{x,y} \sim$ 0.44, as well as public expenditure on higher education and expenditure in the business sector on R&D, where $r_{x,y} \sim$ 0.56. The strongest association, and therefore a significant relationship, was observed in the relationship between human resources in science and technology among people aged 25-64 and expenditure in the business sector on R&D, with $r_{x,y} \sim$ 0.7. In this case, both variables simultaneously increased or decreased - in the same direction, meaning that as human resources in science and technology

expanded, business expenditure related to research and development also increased, and vice versa.

4. Discussion

A high student-to-teacher ratio is often cited as a critique of proportionally underfunded schools or educational systems, or as evidence of the need for legislative changes or increased education funding. Classes with too many students often disrupt the teaching process. In addition, overcrowded exercise/conversation groups result in varying degrees of learning ability. As a result, the group dedicates time to assimilating information for a smaller number of academic students, whereas this time could be used for research experiments or in-depth discussions on scientific issues. In this way, the student-to-teacher ratio serves as a compelling argument in favor of smaller class sizes. However, it's worth noting that in Finland, this ratio is higher than in Poland, yet the education system in that country is so well-constructed that it is recognized as the best in the world (Ustun, Eryilmaz, 2018, pp. 93-114). Therefore, the indicator presented is not the sole determinant that proves the quality of education, but it significantly affects it. E. Graue, et.al (2009, p. 178-201) drew attention to teacher-student interaction as an important aspect of good education and academic achievement. P. Blatchford and K.C. Lai (2012) and T.M. Dette and M. Raghav (2015) showed that smaller classes provide better teaching and learning. This approach has been observed in many countries including Japan and the United States. Nevertheless, the issue is ambiguous in the literature, as J. Keil and P.J. Partell (2002) showed that there is no relationship between class size and student retention. These issues are important because, as R. Mir-Babayev (2015, p. 75-80) stated, employees with higher levels of education improve innovation performance. Similar conclusions were reached by O. Toivanen and L. Väänänen (2016, pp. 382-396), who argued that people with engineering education have a positive impact on invention. This study found that the ratio of students to academics has a very weak relationship with human resources in science and technology, while it has an imperceptible relationship with R&D spending in companies.

A study conducted by B. Kwiek (2021, p. 31) notes that in Poland between 3% and 5% of universities will combine research and teaching missions. In addition, the author emphasizes that in universities, i.e. "In research-oriented positions, individuals perform exactly the same duties in the teaching dimension (following the same teaching workload) as in teaching-oriented positions. However, in research-oriented positions, there is an additional burden of research work, which is not imposed on teaching-oriented positions." (Kwiek, 2021, p. 10).

The study found a moderate relationship between public spending on higher education and human resources in science and technology. In her research, E. Pelinescu (2015, p. 184-190) tried to show the role of human capital as a growth factor. She showed a positive, statistically significant relationship between GDP *per capita* and innovativeness of human capital, as evidenced by the number of patents and employee qualifications. In turn, V. Linhartová (2020, p. 1-11) conducted a study to test whether public investment in areas that develop human capital can effectively support its development. It turned out that spending on education ranked only third in terms of its contribution to human capital development.

R. Villela and J.J. Paredes (2022, pp. 1-13) found that in spending on education, infrastructure and equipment are often overlooked. This is important, since the aforementioned elements are an important aspect in the development of innovation and the expansion of researchers. It is at the level of secondary and higher education that spending on infrastructure and equipment can encourage young people to conduct research. Education shapes individuals who have the potential capacity to innovate and change direction.

It is important to remember that education, which pertains to the way teaching and learning are organized throughout life, plays a fundamental role in societal transformations (UNESCO, 2021). Organizations such as the OECD (2021) and the UN (2022) have highlighted global challenges related to pandemics or military conflicts that may affect issues of science, technology, and innovation. Actions involve the need to increase the importance of science and technology in the economy and society, as well as the need to accelerate digital transformation, literacy skills, and the dissemination of access to technology and its use in various sectors, departments, branches, and industries of the national economy.

5. Conclusions

Changes in the external environment, including globalization, armed conflicts, pandemics, the development of new technologies, increasing customer demands, and the growing role of non-market instruments in competitive market battles, pose significant challenges for business development. They require continuous learning and new competencies from employees. Innovation policy increasingly includes the human factor among the factors determining the innovativeness of enterprises. Human capital creates innovative solutions and plays a key role in creating the intellectual capital of the enterprise. Intellectual capital, understood as a set of intangible resources and capabilities, has been recognized by many authors as a determinant of innovative activity and a source of the company's competitive advantage.

Based on the study, the following conclusions can be drawn:

1. The variable describing the student-to-academic staff ratio between 2013 and 2020 recorded a negative rate of change, which according to numerous studies may be a good sign. It is inferred that the size of student groups is decreasing, which may have a positive impact on the quality of higher education. However, despite this, Poland still has much ground to cover in this regard, as the obtained average only allowed it to be ranked 12th among the EU-27 countries. However a linear relationship clear but low was observed between this indicator and human resources in science and technology. But between this indicator and enterprise expenditure on R&D, it was no linear relationship.

2. A concerning issue seems to be the fact that between 2012 and 2019, public expenditure on higher education decreased. However, it should be emphasized that this was a pan-European trend. Such an approach may lead, in Polish educational institutions, to smaller investments in the already limited infrastructure and equipment, which in turn may have an indirect impact on the subsequent academic careers of students/graduates. A moderate strength of association was shown between public expenditure on higher education and enterprise expenditure on R&D, further reinforcing the above inference.

3. A positive aspect is that Polish enterprises increased their human resources in science and technology by almost one-third. Although this trend was observed in all EU-27 countries, in Poland, the upward trend was very pronounced. However, there is still a lot of catching up to do with EU innovation leaders, as the average human resources in science and technology ranked Poland in 17th place. It is worth noting that a moderate correlation was found between public expenditure on higher education and human resources in science and technology, which, given the research objective, should be considered an extremely important argument confirming the evident and significant impact of human capital on innovation in EU countries.

4. The largest increase in R&D and development in the business sector was observed in Poland. However, despite this, these expenditures were over ten times lower than in countries such as Sweden, Denmark, or Austria. It is important to pay special attention to this aspect because it has been shown that as enterprise expenditure on R&D increases, there is a corresponding increase in human resources in science and technology, and conversely.

5. An increase in the number of patent applications to the EPO by Polish entities has been observed, but their scale is still unsatisfactory. In strong knowledge-based economies, such as the German economy, this indicator was over fifty times higher than that describing the Polish economy. During

the conducted correlation analysis, no linear relationship was confirmed between public expenditure on higher education and the number of applications to the European Patent Office.

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Appendix: Table 1. Ratio of students to academic staff from 2013 to 2020 in the European Union

Year ⟍ Country	2013	2014	2015	2016	2017	2018	2019	2020	M	Me	Q₁	Q₃	Structure [M Poland = 100%]	Changes to 2013 r. [p.p.]
Belgium	21,0	22,5	b/d	21,2	21,2	21,0	21,4	18,8	21,0	21,2	21,0	21,3	147,0	-2,2
Bulgaria	12,9	13,1	12,9	12,4	12,0	11,5	11,3	11,9	12,3	12,2	11,9	12,9	85,7	-1,0
Czech Republic	21,9	22,3	22,9	18,9	18,4	15,0	16,8	16,2	19,1	18,7	16,8	22,0	133,2	-5,7
Denmark	b/d	14,3	18,1	17,3	16,1	15,8	15,7	15,8	16,2	15,8	15,8	16,7	113,0	b/d
Germany	11,7	11,8	12,0	12,1	12,1	12,0	11,9	11,7	11,9	12,0	11,8	12,0	83,3	0
Estonia	b/d	15,1	14,0	13,7	13,5	12,8	12,9	12,2	13,5	13,5	12,9	13,9	94,1	b/d
Ireland	b/d	b/d	b/d	b/d	b/d	b/d	b/d	b/d	b/d	b/d	b/d	b/d	b/d	b/d
Greece	b/d	44,5	39,8	39,6	38,7	b/d	b/d	b/d	b/d	b/d	b/d	b/d	b/d	b/d
Spain	12,1	12,9	12,7	12,2	12,4	12,3	12,2	12,5	12,4	12,4	12,2	12,6	86,8	0,4
France	b/d	b/d	b/d	16,3	16,2	b/d	b/d	b/d	b/d	b/d	b/d	b/d	b/d	b/d
Croatia	12,4	12,8	12,8	12,6	12,8	12,5	12,1	11,4	12,4	12,6	12,4	12,8	86,9	-1
Italy	19,0	18,8	20,2	20,2	20,0	20,3	20,2	20,8	19,9	20,2	19,9	20,2	139,4	1,8
Cyprus	14,3	17,3	17,2	17,1	20,9	22,0	22,5	25,5	19,6	19,1	17,2	22,1	137,1	11,2
Latvia	19,5	18,9	18,7	18,6	16,6	16,3	16,9	16,3	17,7	17,8	16,6	18,8	124,0	-3,2
Lithuania	16,6	16,1	16,5	16,3	16,2	14,4	14,5	15,0	15,7	16,2	15,0	16,4	109,8	-1,6
Luxembourg	b/d	b/d	8,2	7,6	7,2	4,4	4,9	4,8	6,2	6,1	4,9	7,5	43,2	b/d
Hungary	14,8	15,1	14,6	13,7	12,1	11,5	11,4	11,3	13,1	12,9	11,5	14,7	91,3	-3,5
Malta	10,3	10,0	9,6	9,5	9,4	9,0	9,0	8,7	9,4	9,5	9,0	9,7	66,0	-1,6
Netherlands	b/d	b/d	15,4	14,8	14,6	14,6	14,9	14,6	14,8	14,7	14,6	14,9	103,6	b/d
Austria	15,0	14,7	14,4	14,4	14,0	13,8	13,5	14,2	14,3	14,3	14,0	14,5	99,7	-0,8
Poland	15,1	15,2	14,9	14,6	14,3	13,8	13,5	13,0	14,3	14,5	13,8	15,0	100,0	-2,1
Portugal	14,0	14,4	13,9	14,4	14,2	14,3	14,5	14,6	14,3	14,4	14,2	14,4	99,9	0,6
Romania	21,2	19,6	18,7	19,3	19,4	19,8	19,4	19,8	19,7	19,5	19,4	19,8	137,4	-1,4
Slovenia	18,1	17,5	17,1	15,3	14,9	14,4	14,3	13,6	15,7	15,1	14,4	17,2	109,4	-4,5
Slovakia	13,8	13,7	13,0	12,4	11,9	11,4	11,3	11,4	12,4	12,2	11,4	13,2	86,5	-2,4
Finland	13,8	14,2	15,1	15,3	15,5	15,3	14,9	14,4	14,8	15,0	14,4	15,3	103,6	0,6
Szweden	11,0	10,7	10,4	10,4	10,3	10,1	10,0	9,9	10,4	10,4	10,1	10,5	72,4	-1,1
UE-27	**b/d**	**15,4**	**15,4**	**15,1**	**15,3**	**b/d**	**b/d**	**b/d**	**b/d**	**b/d**	**b/d**	**b/d**	**b/d**	**b/d**

Legend: M – arithmetic mean, Me – median, Q₁ – first quartile, Q₃ – third quartile, b/d – no data.
Source: Own analysis based on Eurostat, https://ec.europa.eu/eurostat/databrowser/view/EDUC_UOE_PERP04__custom_4283841/default/table?lang=en; [access date 15.12.2022].

Appendix: Table 2. Public spending on higher education 2012-2019 in the European Union [% of GDP]

Country \ Year	2012	2013	2014	2015	2016	2017	2018	2019	M	Me	Q₁	Q₃	Structure [M Poland = 100%]	Change to 2012 r. [p.p.]
Belgium	1,43	1,50	1,49	1,45	1,44	1,47	1,49	1,53	1,5	1,5	1,5	1,5	130,2	0,1
Bulgaria	0,66	0,65	0,70	0,65	0,59	0,81	0,76	0,80	0,7	0,7	0,7	0,8	62,0	0,14
Czech Republic	1,05	0,88	0,80	0,77	0,70	0,70	0,92	0,93	0,8	0,8	0,8	0,9	74,5	-0,12
Denmark	b/d	2,28	2,35	b/d	2,63	2,39	2,35	2,31	2,4	2,4	2,3	2,4	210,6	b/d
Germany	1,28	1,27	1,27	1,25	1,26	1,25	1,27	1,28	1,3	1,3	1,3	1,3	111,8	0
Estonia	1,03	1,37	1,51	1,42	1,40	1,13	1,18	1,09	1,3	1,3	1,1	1,4	111,8	0,06
Ireland	1,32	1,14	1,03	0,88	0,72	0,97	0,91	0,86	1,0	0,9	0,9	1,1	86,4	-0,46
Greece	0,75	0,66	0,65	0,73	b/d	0,62	0,67	0,70	0,7	0,7	0,7	0,7	60,3	-0,05
Spain	1,02	0,97	0,96	0,96	0,92	0,93	0,92	0,94	1,0	1,0	0,9	1,0	84,1	-0,08
France	1,24	1,24	1,25	1,25	1,22	1,23	1,23	1,21	1,2	1,2	1,2	1,2	108,9	-0,03
Croatia	b/d	b/d	b/d	b/d	0,81	0,86	0,87	0,86	0,9	0,9	0,9	0,9	75,1	b/d
Italy	0,79	0,81	0,80	0,76	0,73	0,75	0,77	0,78	0,8	0,8	0,8	0,8	68,3	-0,01
Cyprus	1,07	1,15	1,08	1,14	1,05	1,16	0,95	0,89	1,1	1,1	1,1	1,1	93,7	-0,18
Latvia	1,36	0,96	1,13	1,18	0,76	0,69	0,74	0,82	1,0	0,9	0,8	1,1	84,3	-0,54
Lithuania	1,40	4,58	1,33	1,18	0,82	0,75	0,79	0,80	1,5	1,0	0,8	1,3	128,6	-0,6
Luxembourg	0,45	b/d	0,51	0,51	0,48	0,46	0,41	0,45	0,5	0,5	0,5	0,5	41,2	0
Hungary	0,82	0,90	0,77	0,66	0,76	0,82	0,81	0,74	0,8	0,8	0,8	0,8	69,3	-0,08
Malta	1,66	1,75	1,67	1,55	1,37	1,21	1,28	1,33	1,5	1,5	1,3	1,7	130,5	-0,33
Netherlands	1,70	1,62	1,69	1,63	1,75	1,59	1,71	1,61	1,7	1,7	1,6	1,7	146,8	-0,09
Austria	1,89	1,80	1,79	1,80	1,78	1,71	1,70	1,56	1,8	1,8	1,7	1,8	154,9	-0,33
Poland	1,15	1,21	1,18	1,22	1,06	1,08	1,06	1,10	1,1	1,1	1,1	1,2	100,0	-0,05
Portugal	b/d	0,90	0,91	0,90	0,81	0,80	0,78	0,79	0,8	0,8	0,8	0,9	74,3	b/d
Romania	0,78	0,72	0,68	0,66	0,71	0,72	0,75	0,81	0,7	0,7	0,7	0,8	64,3	0,03
Slovenia	1,23	1,13	1,05	0,98	0,95	0,95	1,01	1,02	1,0	1,0	1,0	1,1	91,8	-0,21
Slovakia	b/d	0,97	0,97	1,39	0,83	0,79	0,76	b/d	1,0	0,9	0,8	1,0	84,0	b/d
Finland	b/d	2,01	2,00	1,89	1,83	1,66	1,54	1,51	1,8	1,8	1,6	1,9	156,9	b/d
Szweden	2,01	1,96	1,94	1,89	1,85	1,79	1,79	1,78	1,9	1,9	1,8	1,9	165,7	-0,23
UE-27	**1,23**	**1,24**	**1,24**	**1,18**	**b/d**	**1,18**	**1,19**	**1,19**	**1,2**	**1,2**	**1,2**	**1,2**	**106,6%**	**-0,04**

Legend: M – arithmetic mean, Me – median, Q₁ – first quartile, Q₃ – third quartile, b/d – no data.
Source: Own analysis based on Eurostat, https://ec.europa.eu/eurostat/databrowser/view/EDUC_UOE_PERP04__custom_4283841/default/table?lang=en;
[access date 15.12.2022].

Appendix: Table 3. Human resources in science and technology aged 25-64 in the European Union 2012-2021 [% of total population].

Year / Country	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	M	Me	Q₁	Q₃	Structure [M Poland = 100%]	Changes to 2012 r. [p.p.]
Belgium	42,0	41,9	43,1	42,7	43,2	46,2	46,4	46,6	48,4	50,5	45,9	46,3	43,2	47,1	124,9	8,5
Bulgaria	27,6	29,2	30,7	31,2	31,4	31,8	32,3	32,3	33,4	33,6	32,1	32,1	31,4	32,6	87,4	6
Czech Republic	31,8	32,7	33,7	34,0	34,8	36,1	36,5	36,6	37,6	38,9	36,0	36,3	34,8	36,9	98,1	7,1
Denmark	46,6	47,0	47,6	48,2	49,2	50,5	51,4	52,1	52,7	54,2	50,7	51,0	49,2	52,3	138,2	7,6
Germany	41,1	41,6	41,7	42,3	43,0	43,5	44,1	45,2	45,6	45,7	43,9	43,8	43,0	45,3	119,5	4,6
Estonia	45,2	45,0	44,8	43,8	44,6	45,8	46,9	48,2	49,3	51,0	46,8	46,4	44,8	48,5	127,4	5,8
Ireland	44,6	46,1	46,7	47,6	48,4	49,9	50,6	51,6	53,8	56,2	50,6	50,3	48,4	52,2	137,8	11,6
Greece	29,2	30,2	30,8	31,6	33,0	33,9	34,4	34,7	35,7	37,5	34,0	34,2	33,0	35,0	92,4	8,3
Spain	35,8	36,7	37,7	38,3	38,9	39,7	40,5	41,9	42,8	43,9	40,5	40,1	38,9	42,1	110,2	8,1
France	41,1	42,0	42,3	43,2	43,7	44,1	45,5	46,5	48,0	48,3	45,2	44,8	43,7	46,9	123,1	7,2
Croatia	24,9	27,1	28,1	29,3	29,4	30,2	32,0	32,2	32,2	31,6	30,6	30,9	29,4	32,1	83,4	6,7
Italy	26,7	27,0	27,4	27,9	28,2	29,0	29,6	29,9	30,1	29,2	28,9	29,1	28,2	29,7	78,7	2,5
Cyprus	43,9	43,5	44,3	44,4	45,8	46,5	48,1	48,5	48,4	50,6	47,1	47,3	45,8	48,4	128,2	6,7
Latvia	35,3	36,6	36,4	38,0	38,9	40,1	40,0	42,0	44,0	44,9	40,5	40,1	38,9	42,5	110,4	9,6
Lithuania	38,9	40,3	41,4	43,2	44,1	44,5	45,8	47,2	48,0	49,4	45,5	45,2	44,1	47,4	123,8	10,5
Luxembourg	50,8	52,9	56,9	50,5	50,6	48,8	53,0	55,3	57,2	60,2	54,1	54,2	50,6	57,0	147,2	9,4
Hungary	29,3	30,0	30,8	31,6	31,4	32,0	33,0	34,1	35,6	37,6	33,3	32,5	31,6	34,5	90,6	8,3
Malta	26,8	28,7	30,0	31,2	31,9	34,2	37,8	40,2	40,8	42,2	36,0	36,0	31,9	40,4	98,1	15,4
Netherlands	45,5	46,0	46,1	47,0	47,9	48,7	50,3	52,3	54,4	56,7	50,4	49,5	47,9	52,8	137,3	11,2
Austria	34,9	36,3	41,5	42,0	42,7	43,8	44,2	45,1	45,8	46,0	43,9	44,0	42,7	45,3	119,5	11,1
Poland	30,5	31,7	32,9	34,0	35,1	36,5	37,5	38,4	39,3	40,1	36,7	37,0	35,1	38,6	100,0	9,6
Portugal	24,7	25,9	28,6	30,3	31,5	32,0	33,0	33,9	36,0	39,1	33,1	32,5	31,5	34,4	90,0	14,4
Romania	20,1	19,7	20,2	21,4	21,8	22,2	22,5	23,0	23,4	23,8	22,3	22,4	21,8	23,1	60,7	3,7
Slovenia	35,6	36,7	37,2	38,4	39,3	41,0	41,1	41,8	43,9	49,0	41,5	41,1	39,3	42,3	112,9	13,4
Slovakia	28,3	28,5	29,0	29,7	30,4	31,5	33,1	34,3	35,7	37,5	32,7	32,3	30,4	34,7	88,9	9,2
Finland	48,0	48,8	49,9	50,8	51,2	51,9	53,0	54,6	56,2	52,1	52,5	52,0	51,2	53,4	142,9	4,1
Szweden	48,7	49,9	51,3	52,3	54,0	54,9	56,3	56,9	57,7	58,9	55,3	55,6	54,0	57,1	150,5	10,2
UE-27	**35,2**	**35,9**	**36,7**	**37,4**	**38,1**	**38,9**	**39,8**	**40,7**	**41,7**	**42,3**	**39,5**	**39,4**	**38,1**	**41,0**	**107,4**	**7,1**

Legend: M – arithmetic mean, Me – median, Q₁ – first quartile, Q₃ – third quartile, b/d – no data.
Source: Own analysis based on Eurostat, https://ec.europa.eu/eurostat/databrowser/view/EDUC_UOE_PERP04__custom_4283841/default/table?lang=en;
[access date 15.12.2022].

Appendix: Table 4. Expenditure in the business sector on research and development from 2012 to 2021 in the European Union [euro per capita].

Rok / Kraj	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	M	Me	Q_1	Q_3	Structure [M Poland = 100%]	The dynamics of change relative to 2012 r. [%]
Belgium	555,2	570,7	597,1	629,7	658,2	734,1	827,5	972,8	989,1	1 053,5	807,8	780,8	658,2	976,9	881,6	189,8
Bulgaria	21	22,4	30,8	44,3	38,4	38,5	43,2	49,2	50,8	52,3	43,4	43,8	38,5	49,6	47,4	249,0
Czech Rep.	144,7	151,9	162,3	167,5	171,7	204	233,9	251,7	244,3	279	214,3	219,0	171,7	246,2	233,9	192,8
Denmark	891,8	868,9	877,6	935,4	998,3	953,1	979,1	981,5	979	1 007,7	964,0	979,1	953,1	985,7	1052,1	113,0
Germany	669,6	665,2	705,7	750,7	764,5	833,6	870,9	913,4	854,1	904,2	824,6	843,9	764,5	879,2	900,0	135,0
Estonia	165,3	117,9	94,9	106,1	105,8	109,2	117,4	182,3	198,9	231,3	143,2	113,3	106,1	186,5	156,3	139,9
Ireland	427,5	438,6	454,3	477,4	485,1	579	575,1	664	683,1	716,7	579,3	577,1	485,1	668,8	632,3	167,6
Greece	41,4	44,4	46,2	51,7	68,7	92,3	97,7	100,5	107,3	116,6	85,1	95,0	68,7	102,2	92,9	281,6
Spain	151,5	147,8	145,9	149	153,4	166,1	181	186,2	185,2	204,6	171,4	173,6	153,4	185,5	187,1	135,0
France	460,2	466,3	470,5	476,5	485,1	494,2	507,6	524,3	522	536,3	502,1	500,9	485,1	522,6	548,0	116,5
Croatia	35,4	41,7	38,6	45,4	44,3	49,3	58,7	72,2	73,9	83,6	58,3	54,0	45,4	72,6	63,6	236,2
Italy	187	192,3	203,1	212	232,2	244,9	263,4	277,3	259,3	274,8	245,9	252,1	232,2	266,3	268,3	147,0
Cyprus	16,2	19,6	23,3	23	43,1	47,9	62,4	80,7	92,2	108,8	60,2	55,2	43,1	83,6	65,7	671,6
Latvia	16,2	19,5	28,9	18,9	13,7	19,2	23,9	26,7	33,8	40,2	25,7	25,3	19,2	30,1	28,0	248,1
Lithuania	26,7	28,5	39,5	36,5	39,7	49	63,5	75,2	95	109,2	63,5	56,3	39,7	80,2	69,2	409,0
Luxembourg	591,4	591,9	603,8	635	685,5	680,6	623,1	652,9	563,5	540,4	623,1	629,1	603,8	659,8	680,1	91,4
Hungary	83,1	99,2	103,5	112,6	103,4	124,8	158,6	165,9	171,9	196,3	142,1	141,7	112,6	167,4	155,1	236,2
Malta	81,9	72,3	77,9	83,5	80,7	93,6	98,8	100,5	106,3	116,1	94,7	96,2	83,5	102,0	103,3	141,8
Netherlands	423	554,2	561,2	563	589,4	624,5	640,1	685,4	707,4	745,7	639,6	632,3	589,4	690,9	698,0	176,3
Austria	777,9	802	860,9	873,4	899,3	899,2	943,4	987,6	953,1	1 008,3	928,2	921,4	899,2	961,7	1013,0	129,6
Poland	33,5	39,4	47,3	52,9	71,1	82,1	104,7	116,6	120,7	137,6	91,6	93,4	71,1	117,6	100,0	410,7
Portugal	109,4	102,3	99,4	99,9	111,8	126,4	138,4	152,8	179,1	205	139,1	132,4	111,8	159,4	151,8	187,4
Romania	12,5	8,5	12	17,3	22,9	27,3	31,1	31,8	31,3	35,9	26,2	29,2	22,9	31,4	28,6	287,2
Slovenia	342,1	347,5	334,1	315,4	297,8	290,4	320,5	351,4	352,4	388,8	331,4	327,3	315,4	351,7	361,6	113,7
Slovakia	44,8	52,2	45,5	47,8	59,5	74,6	74,6	78,1	83,1	94,3	69,7	74,6	59,5	79,4	76,1	210,5
Finland	869,2	848,1	808,9	739,7	711	732	766,7	798,8	840,6	931,1	791,1	782,8	739,7	816,8	863,4	107,1
Szweden	993	1 039,4	946,2	1 048,3	1 069,5	1 151,9	1 095,9	1 132,2	1 174,8	1 249	1 108,5	1 114,1	1069,5	1157,6	1209,8	125,8
UE-27	**341,1**	**349,5**	**360,4**	**377**	**391,4**	**419**	**440,6**	**465,7**	**455,8**	**484,4**	**424,3**	**429,8**	**391,4**	**458,3**	**463,1**	**142,0**

Legend: M – arithmetic mean, Me – median, Q_1 – first quartile, Q_3 – third quartile, b/d – no data.

Source: Own analysis based on Eurostat, https://ec.europa.eu/eurostat/databrowser/view/EDUC_UOE_PERP04__custom_4283841/default/table?lang=en; [access date 15.12.2022].

Appendix: Table 5. Applications to the EPO between 2012 and 2021 among European Union countries [number of patent applications].

Country \ Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	M	Me	Q₁	Q₃	Structure [MPoland = 100%]	The dynamics of change relative to 2012 r. [%]
Belgium	1 874	1 995	1 964	1 992	2 046	2 213	2 281	2 341	2 306	2 317	2 182,5	2 247,0	2046,0	2308,8	443,7	123,6
Bulgaria	1 892	1 885	1 927	2 041	2 196	2 155	2 348	2 423	2 406	2 485	2 247,6	2 272,0	2155,0	2410,3	457,0	131,3
Czech Republic	13	22	34	33	20	32	31	34	54	40	34,8	33,5	32,0	35,5	7,1	307,7
Denmark	19	10	12	9	14	10	14	19	23	27	16,0	14,0	12,0	20,0	3,3	142,1
Germany	53	45	44	37	37	49	49	47	65	44	46,5	45,5	44,0	49,0	9,5	83,0
Estonia	139	149	167	213	190	205	248	198	206	203	203,8	204,0	198,0	207,8	41,4	146,0
Ireland	1 605	1 929	1 983	1 930	1 869	2 114	2 385	2 404	2 420	2 642	2 218,4	2 249,5	1983,0	2408,0	451,0	164,6
Greece	42	41	38	32	44	54	47	49	57	69	48,8	48,0	44,0	54,8	9,9	164,3
Spain	1 854	1 895	2 182	2 000	1 820	1 818	1 728	1 703	1 899	2 111	1 907,6	1 859,5	1818,0	2027,8	387,8	113,9
France	9 918	9 754	10 614	10 781	10 504	10 559	10 468	10 163	10 614	10 537	10 530,0	10 548,0	10504,0	10614,0	2140,8	106,2
Croatia	83	66	95	86	74	100	120	139	135	198	118,4	110,0	95,0	136,0	24,1	238,6
Italy	1 546	1 504	1 471	1 527	1 560	1 676	1 781	1 887	1 794	1 954	1 706,3	1 728,5	1560,0	1817,3	346,9	126,4
Cyprus	5 063	5 826	6 874	7 100	6 857	7 043	7 142	6 954	6 386	6 581	6 867,1	6 914,0	6857,0	7057,3	1396,1	130,0
Latvia	593	548	622	582	682	593	826	878	980	956	764,9	754,0	622,0	897,5	155,5	161,2
Lithuania	19	22	24	39	27	24	37	29	50	73	37,9	33,0	27,0	41,8	7,7	384,2
Luxembourg	402	398	454	404	564	581	431	427	402	430	461,6	430,5	427,0	481,5	93,9	107,0
Hungary	25	80	8	29	12	15	13	22	30	22	18,9	18,5	13,0	23,8	3,8	88,0
Malta	23	43	62	85	90	107	51	56	63	51	70,6	62,5	56,0	86,3	14,4	221,7
Netherlands	27 276	26 645	25 633	24 820	25 012	25 490	26 663	26 805	25 882	25 969	25 784,3	25 757,5	25490,0	26142,5	5242,0	95,2
Austria	385	371	482	568	411	469	519	469	478	539	491,9	480,0	469,0	524,0	100,0	140,0
Poland	75	94	113	137	158	149	221	272	251	286	198,4	189,5	149,0	256,3	40,3	381,3
Portugal	35	30	28	33	30	50	50	40	55	30	39,5	36,5	30,0	50,0	8,0	85,7
Romania	35	29	26	48	42	41	51	42	54	42	43,3	42,0	42,0	48,8	8,8	120,0
Slovenia	108	135	125	118	114	96	100	121	165	116	119,4	117,0	114,0	122,0	24,3	107,4
Slovakia	3 530	3 668	3 873	3 839	3 555	3 728	4 055	4 381	4 422	4 954	4 100,9	3 964,0	3839,0	4391,3	833,7	140,3
Finland	105	103	114	99	110	94	118	100	109	118	107,8	109,5	100,0	115,0	21,9	112,4
Szweden	3 753	3 704	3 649	3 979	4 172	4 352	4 404	4 456	4 619	4 919	4 318,8	4 378,0	4172,0	4496,8	878,0	131,1
UE-27	**60 465**	**60 991**	**62 618**	**62 561**	**62 210**	**63 817**	**66 181**	**66 459**	**65 925**	**67 713**	**64 685,5**	**64 871,0**	**62618,0**	**66250,5**	**13150,8**	**112,0**

Legend: M – arithmetic mean, Me – median, Q₁ – first quartile, Q₃ – third quartile, b/d – no data.
Source: Own analysis based on Eurostat, https://ec.europa.eu/eurostat/databrowser/view/EDUC_UOE_PERP04__custom_4283841/default/table?lang=en; [access date 15.12.2022

ARTICLES

Joanna Bukowska[1]

THE DEGREE OF INTEGRATION OF THE GOVERNMENT BOND MARKET OF SELECTED EUROPEAN UNION COUNTRIES INTO THE EUROZONE GOVERNMENT BOND MARKET

Abstract

Many studies indicate an increase in the degree of financial markets integration with the accession of a given country to the eurozone. This also applies to the degree of integration of the government bond market. There are studies that also indicate an increase in the level of integration as early as the stage of the country's accession to the European Union.

The article analyzes the degree of integration of the selected European Union countries government bond markets into the eurozone government bond market. The research refers to two countries from the same region, namely the Czech Republic and Hungary, whose socio-economic conditions show quite large similarities. Moreover, these countries joined the European Union at the same time.

In the study an econometric model was applied based on the model of the evolution of the beta coefficient estimated using GARCH (1.1). Monthly data on the redemption rates for 10-year treasury bonds of the surveyed countries were used, while the yield for the redemption of 10-year treasury bonds in Germany was used as a benchmark. The analysis conducted indicates a clear disintegration of the Czech and Hungarian government bond markets into the eurozone government bond market. This is indicated by both the beta coefficient evolution and the analysis of the intercept evolution.

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Introduction

The accession of a given country to the European Union is the first step into deepening of the level of financial markets integration. Another, more advanced step is the moment of this country's accession to the eurozone. International integration of financial markets is a demanding and multidimensional process, and the road to achieving it is quite long. On the one hand, the elimination of various types of barriers related to the accession of a given country to the eurozone, in the form of limited freedom of capital movement, different regulations, or the existing asymmetry of information, has a positive impact on the increase in the degree of financial markets integration, but on the other hand, it should be remembered that it is not it is an irreversible process.

The countries that are joining the European Union differ in their potential and level of economic and financial development, or even in the level of debt. This may significantly affect the process of financial markets integration, including the integration of the government bond market, the effects of which may appear after quite a long time. Accession to the eurozone significantly accelerates the international financial markets integration, for example by eliminating the exchange rate risk caused by the adoption of a common currency or implementing a single monetary policy. The increased degree of financial markets integration, including the government bond market, accelerates financial development in individual economies, increases the synchronization of business cycles, which determines the efficient functioning of the monetary union and the implementation of an effective monetary policy (Bukowski, 2011), as well as releases the allocative function of financial markets and the mechanism for absorbing economic shocks.

The law of one price is the starting point in assessing the degree of financial markets integration, including the government bond market. Full financial markets integration occurs when assets generating identical cash flows in two different countries or regions bring the same rate of return and are characterized by the same risk (Adam et al. 2002). The assumption of the law of one price is complemented by the fulfilment of several assumptions according to which potential market participants with identical characteristics are subject to the same rules for trading in financial instruments and/or services on these markets, have equal access to these instruments and/or financial services, and are treated equally when they operate on the market. Fulfilment of the above assumptions and failure to meet the assumptions of the law of one price creates conditions for arbitration, which restores the validity of this law (Baele et al. 2004).

Two countries were selected to analyze the degree of the government bond market integration of selected European Union countries into the eurozone government bond market, namely the Czechia and Hungary. These are countries belonging to the Visegrad Group, whose location in one region makes them show many socio-economic similarities. Often treated by investors as one market. Both joined the European Union on May 1, 2004. They constitute an important reference point for examining any differences, also those related with degree of government bond market integration in these countries, which is the subject of the following study.

The aim of this article is to answer the question to what extent the Czech and Hungarian government bond markets are integrated into the eurozone government bond market.

1. A Review of Empirical Results

Leschinski Ch., Voges M., Sibbertsen P. in their research showed that the government bond markets in the eurozone were not consistently integrated. The periods of disintegration and integration of each country's government bond markets in the eurozone mainly coincided with periods of stock market booms and busts, respectively. In addition, their research indicates that the markets of central Europe and its peripheral countries were characterized by a high degree of integration until the advent of the financial and fiscal crisis, when a flight to capital characterized by a high degree of safety is clearly evident.

The issue of the degree of integration of the government bond markets of the eurozone countries was dealt with by Sensoy A., Nguyen D.K., Rostom A., Hacihasanoglu E. According to their analysis, in the period before the financial and fiscal crisis, there was perfect integration of government bond markets in the EMU. The advent of the crisis violated the integration structure, which was severely damaged. The variation in the degree of integration of the government bond markets mainly affected the groups of countries that were most heavily indebted, and thus were the main cause of the segmentation of the government bond market. The elimination of fiscal problems did not improve the situation, and this is still reflected in the uneven degree of integration of the government bond markets of these countries.

An analysis on the study of the degree of integration of the government bond markets of selected European Union countries with the government bond market in the eurozone was also conducted by J.E. Bukowska. For the study, she selected two countries that aspire and are closest to joining the eurozone. The study used monthly data on yields to maturity of 10-year government bonds of Bulgaria and Croatia. The yield to maturity of 10-year government bonds in Germany was used as the benchmark. The estimation of the model was done using GARCH (1.1.). The results of the study indicate that both the Bulgarian and Croatian government bond markets are relatively poorly

integrated with the eurozone government bond market. The analysis of the evolution of beta coefficient and the intercept evolution indicated a low degree of integration of both markets into the government bond market in the eurozone for most of the period studied, only for short periods there was a high degree of integration of the government bond market in Bulgaria and Croatia.

The difference in the level of integration between the government bond markets of countries belonging in the eurozone and those newly joining the European Union was addressed in their research by Kim S., Lucey B.M. and Wu E. They used a set of complementary techniques to assess the time-varying level of financial integration, namely the EGARCH model, the Kalman filtering method and cointegration. They pointed out the existence of strong contemporary and dynamic linkages between the Eurozone bond markets and Germany's market. However, in the case of the UK and the three newly acceded countries, including Poland, the Czech Republic and Hungary, the degree of integration of these markets is weak but stable. Pre-accession efforts to achieve economic convergence, which were described by the study's authors as insufficient, are responsible for the reason for this.

Another author dealing with the analysis of the degree of integration of the government bond market of the new European Union member states with the eurozone government bond market is Chaloupka J. The methodology used by the author is based on the use of price-based and news-based indicators. The study adopts two separate periods, namely the period before (2001-2006) and the period of the financial and fiscal crisis (2007-2011). The following countries were analyzed Czech Republic, Slovakia, Poland, Hungary, Slovenia, Latvia, Lithuania, Bulgaria and Romania. The study shows that the process of integration of the government bond market of individual European Union countries with the euro area government bond market differed significantly in the adopted periods. During economic stabilization there was a strong integration of both markets, while during the financial and fiscal crisis their degree of integration decreased. The Hungarian and Romanian government bond markets had the highest degree of integration with the eurozone government bond market, while the Czech market had the highest.

Similar conclusions are presented in his research by Lukic V. The research was based on an analysis of yield spreads and their volatility, as well as the development of the beta coefficient. Strong integration of the government bond markets of individual eurozone countries before 2008 was indicated, while the events related to the emergence of the financial and fiscal crisis led to disintegration of the eurozone government bond market. Disintegration processes were strongly visible especially after 2010.

2. Statistical Data and Methods

The study covered two countries belonging to the European Union, namely the Czechia and Hungary. The research period adopted in the study covers the period from the accession of the two countries to the European Union, up to the current period, namely 2004-2023. Monthly data of yields to maturity of 10-year government bonds of the Czechia and Hungary and Germany were used, which were adopted as benchmarks. The analyzed data came from the OECD Data database. Estimation of the model was done using GARCH (1.1).

A study to examine the degree of integration of the Czech and Hungarian government bond market into the eurozone government bond market constructed the following regression equation (Beale, et al. 2004):

$$\Delta R_{i,t} = \alpha_{i,t} + \beta_{i,t}\Delta R_{b,t} + \varepsilon_{i,t} \ (1)$$

gdzie:

$\Delta R_{i,t}$ − the yield variation in country i, in Czechia and Hungary respectively at time t,

$\alpha_{i,t}$ − constant (intercept),

$\beta_{i,t}$ − the beta coefficient at time t in country i and with reference to beta value adopted as a *benchmark,*

$\Delta R_{b,t}$ − the yield variation adopted as a benchmark,

$\varepsilon_{i,t}$ − the economic (idiosyncratic) shock specific for a given country.

For the study, the assumption was made that the risk in a country's government bond market is identical to that of the benchmark country.

The coefficient for the government bond market in the country i takes the form:

$$\beta_{i,t} = \frac{cov_{t-1}(\Delta R_{i,t}R_{b,t})}{Var_{t-1}(R_{b,t})} = \rho_{i,b,t}\frac{\sigma_{i,t}}{\sigma_{b,t}} \ (2)$$

gdzie:

$\sigma_{i,t}$ − the standard deviation for the yields in country i,

$\sigma_{b,t}$ − standard deviation for assets adopted as a *benchmark,*

$\rho_{i,b,t}$ − the correlation coefficient between yields on assets in the *i*-th country and in the country adopted as a benchmark.

In this case, the coefficient illustrates the level of integration of the country's government bond market and in relation to the country's government bond market taken as a benchmark, representing the eurozone government bond market. The value of the coefficient means no integration of the local government bond market with the eurozone market, while the closer the value of the beta coefficient to 1, the higher the degree of integration of these markets. A beta coefficient equal to 1 means full integration. At the same time,

in highly integrated financial markets, the intercept should be close to 0. In contrast, the greater the deviation of the value of the intercept from 0, the lower the degree of integration of the country's government bond market and in relation to the eurozone government bond market.

3. Empirical results of the model

Empirical results on the evolution of the beta coefficient and the intercept evolution for both the Czechia and Hungary support the same conclusions.
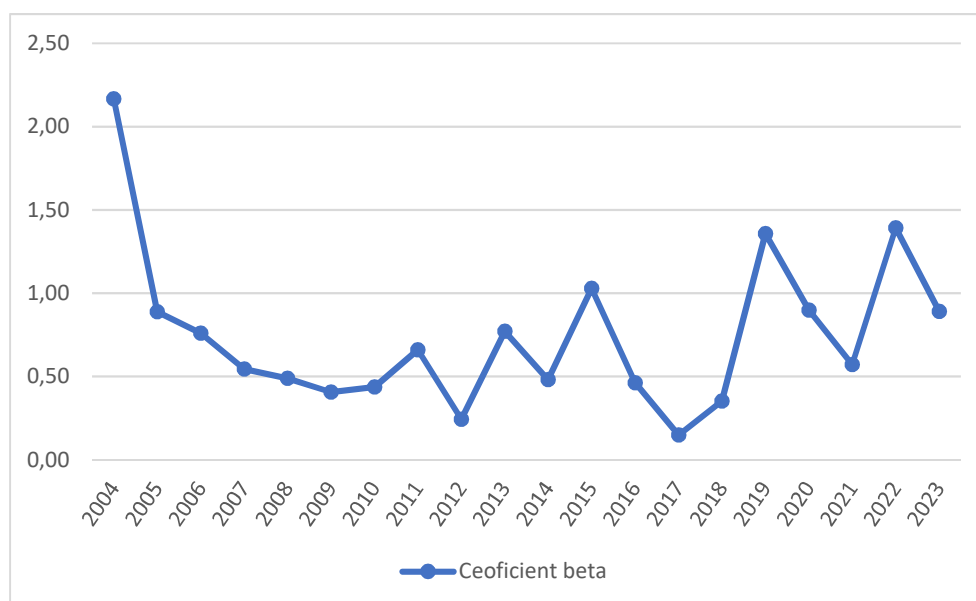

Figure 1. Beta coefficient evolution
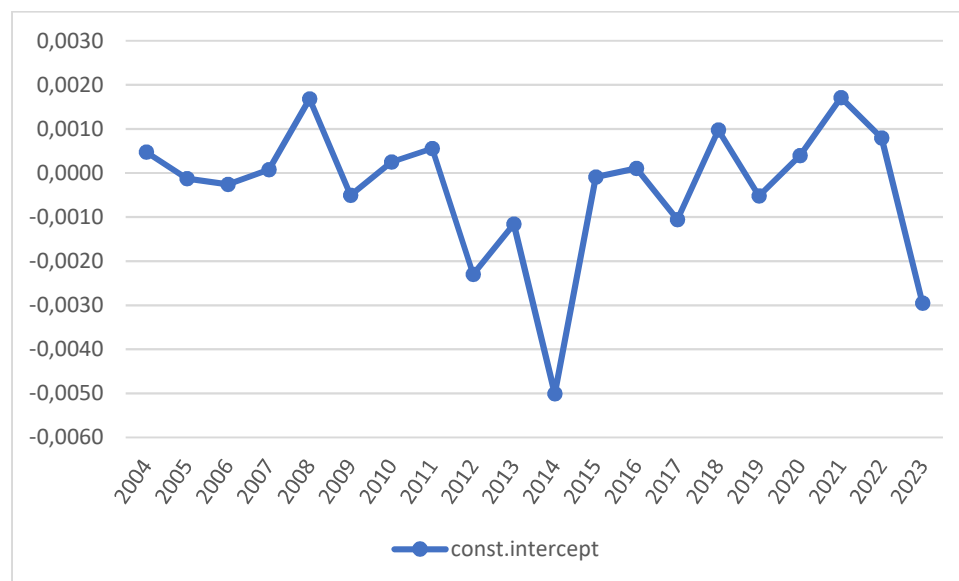**Source:** based on model estimation using software GRETL (1.1.) – *model beta coefficient evolution*

Analysis of the beta coefficient of the Czech government bond market shows a moderate level of integration of the Czech government bond markets with the eurozone government bond market throughout the period under review. In addition, there was a slight but gradual decrease in the level of integration of the Czech government bond market with the eurozone government bond market between 2004 and 2023.

The analysis of the evolution of the beta coefficient is confirmed by the analysis of the intercept evolution (see Figure 2).
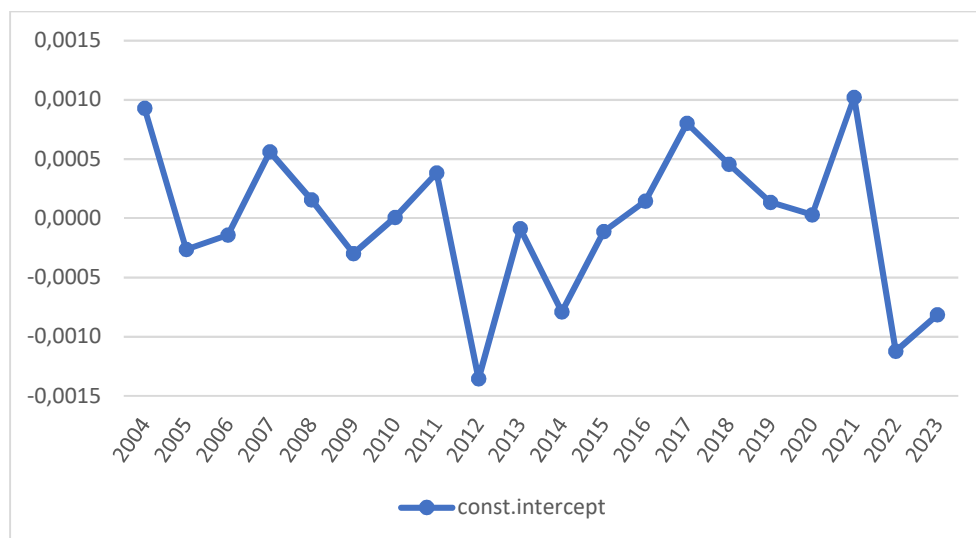
Figure 2. Intercept evolution
Source: based on model estimation using software GRETL (1.1.) – *model beta coefficient evolution*

The results of the analysis of the intercept evolution confirm the conclusions from the analysis of the evolution of the beta coefficient. During the period under review, there was a low degree of integration of the Czech government bond market with the eurozone government bond market.
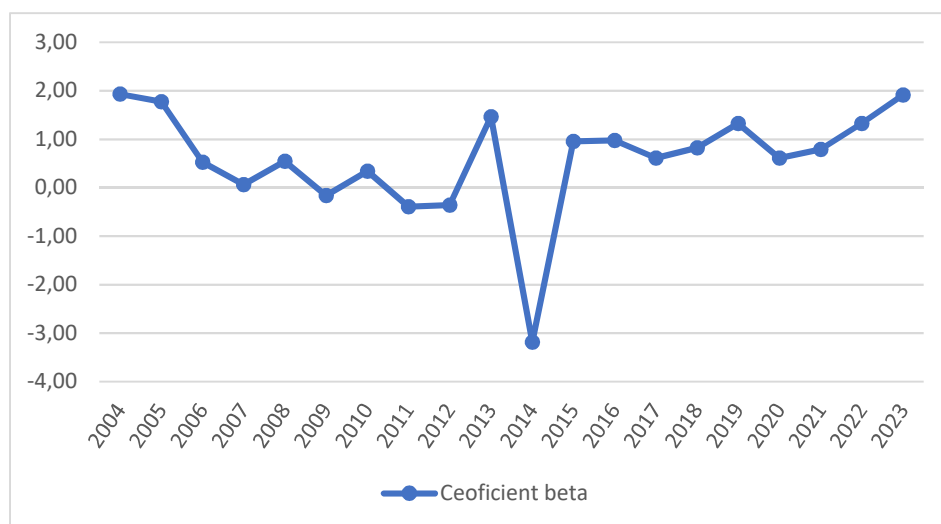
Figure 3. Beta coefficient evolution
Source: based on model estimation using software GRETL (1.1.) – *model beta coefficient evolution*

The value of the beta coefficient for the Hungarian government bond market indicates the disintegration of the Hungarian government bond market into the eurozone government bond market from 2004 to 2014, while from 2015 to the end of the period under review there was a high level of integration of the Hungarian government bond market into the eurozone government bond market.

Figure 4. Intercept evolution
Source: based on model estimation using software GRETL (1.1.) – *model beta coefficient evolution.*

Analysis of the intercept evolution indicates a low degree of integration of the Hungarian government bond market with the eurozone government bond market. Only in the 2005-2007 period was the value of the constant close to 0, indicating a significant degree of integration of the Hungarian government bond market into the eurozone government bond market.

Conclusion
The conducted analysis indicates a clear disintegration of the Czech and Hungarian government bond markets with the eurozone government bond market. This is indicated by both the beta coefficient values and the analysis of the intercept evolution.

In the case of the Czechia, the beta coefficient indicates a moderate level of integration of the Czech government bond market into the eurozone government bond market. This is confirmed by the analysis of the intercept

evolution, whose shape deviates quite significantly from the value equal to zero.

However, in the case of the Hungarian government bond market, the beta coefficient indicates a very low level of integration of the Hungarian government bond market into the eurozone government bond market. This is confirmed by the analysis of the intercept evolution, the values of which indicate a low degree of integration of the government bond market in Hungary into the eurozone government bond market.

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Sławomir Kamosiński[1]

EMPLOYER BRANDING IN THE MICRO, SMALL AND MEDIUM-SIZED ENTERPRISES SECTOR. RESULTS OF QUALITATIVE RESEARCH

Abstract:

Employer branding, succinctly explained as the creation of an employer brand, can be described as the effort by entrepreneurs to undertake focused actions aimed at ensuring stable employment within a company and creating competitive job positions. These positions, in the competition for so-called talent in the labor market, become an asset. This marketing direction is not unfamiliar to entrepreneurs operating in the microenterprise sector and small and medium-sized enterprises (SMEs). Recruiting an employee whose creativity directly impacts the efficiency of the company is a key task for many entrepreneurs.

This paper aims to analyze employer brand management methods in the segment of micro-, small, and medium-sized enterprises. It posits the hypothesis that employer branding for SMEs and microenterprises is, in the era of a constant decrease in available, qualified labor in the market, a fundamental form of employer brand management. The research method used is in-depth qualitative interviews, which the author has continuously conducted since 2017 with entrepreneurs representing SMEs and microenterprises. These interviews enable the identification of practical solutions used in managing the employer brand. Due to this fact, the subject

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matter is presented exclusively from the perspective of entrepreneurs and the actions they undertake and initiate in the organization.

JEL Classification: D9; L2.

Keywords: employer branding, employer brand management, entrepreneurs, small and medium-sized enterprises sector

Introduction

Employer branding, or the creation of an employer brand, can succinctly be explained as the undertaking of targeted promotional actions by entrepreneurs to ensure stable employment within their enterprises and the creation of competitive job positions, which in the competition for so-called talents (Schwab, 2018) in the job market, becomes an asset to the organization.

Global corporations have implemented principles of managing an organization's brand as an employer on a large scale. Similarly, there is considerable interest in employer branding in the microenterprise sector and small and medium-sized enterprises (SMEs). Every entrepreneur, regardless of the size of their company, strives to recruit trustworthy individuals from the labor market who, once they feel comfortable in the workplace prepared for them, will become loyal employees and so-called ambassadors of the company's brand.

The objective of this article is to analyze methods of managing employer branding, or the employer's brand, at the level of microenterprises and small, and medium-sized enterprises. The analysis relates only to the internal environment of the company. This research objective was achieved using qualitative research methods, consisting of an in-depth qualitative interview with the entrepreneur. They responded to open-ended questions, usually while at their business premises, hence in the environment safe for them. The entrepreneur's statement was recorded and then transcribed. These studies have been conducted nationwide since 2017. The interviews include only entrepreneurs who have been in the profession for at least twenty years and represent the microenterprise sector and small, and medium-sized enterprises. The research results presented in this article exclusively reflect the position of entrepreneurs. The analysis is enriched with a series of quotes from these interviews. According to Anna Macnar, the specificity of the microenterprise environment and the small and medium-sized enterprise sector is that these organizations cannot afford a poor image of their own brand. Losing 20% of employees, and especially their competencies, can destabilize them internally and lead to bankruptcy (Macnar, 2020).

In the subject literature, there is a broad discussion on the origin of employer branding and its significance for effective company

management. Wioleta Grzybowska (2022), in the article *"Employer Branding in the Context of Building Competitive Advantage of Enterprises – A Literature Review,"* distinguished four subareas of research based on her analyses. This division includes: employee branding, employer attractiveness (recruitment and organizational attractiveness), family-friendly corporate policies (family-friendly workplace, family policy), and the development of employee value propositions (EVP). Guided by the above classification, the research results presented below fit into the thematic area of employer branding as the creation of an attractive employer offer, which is a derivative of the values and mission adopted in the company.

Employer branding is an issue that was named over thirty years ago. According to some researchers, this concept first appeared in 1990. Others point to 1996, attributing its authorship to S. Borrow (Szczepański, 2013; Wojnicka, 2010). Wioleta Grzybowska (2022), referring to the origin of employer branding, pointed out the intensifying talent wars in the job market, due to the evolution of capitalism towards cognitive capitalism or the entry of civilization into the post-industrial path. This process is unstoppable (Ober, 2016). K. Szczepański (2013), studying employer branding in Poland, identified factors determining employer attractiveness to employees and tools most used by companies in Poland to shape a positive image as an employer (Wojtaszczyk, 2012). Józef Ober (2016) demonstrated that retaining and attracting talented employees to an organization is necessary for its survival. In his opinion, the emerging intense competition for talent has led employers to significantly diversify their messages to differentiate them from those of the competition. Employer branding is an essential element of personnel management and a necessary condition for the success of an organization. In practice, it takes on both internal and external forms (Grzybowska, 2022).

Research methodology

The research conducted for this article was based on a qualitative method. This method was adopted based on the indication that economics, when dealing with a person who manages scarce resources, should focus more attention on the individual and the emotional states accompanying him. A description of the emotions accompanying an entrepreneur who strives to achieve greater efficiency in the use of available resources helps to better understand his intentions and the decisions made. The fear, impatience, distrust and trust that constantly accompany an entrepreneur in his work influence the business decisions he makes. These are unmeasurable categories. They can only be identified using qualitative research.

It should be noted that the qualitative research method is used much less frequently in economic research than quantitative research. Qualitative research has the unique advantage that it gives the opportunity to analyze

observed processes in a precise and in-depth way (among others, through research conducted in the natural environment of the interlocutors). The conclusions drawn from these studies are socially significant, but are not always statistically significant (Czernek, 2017).

Guided by the above comments, the focal point of qualitative research was the entrepreneur. He faces risk every day, and his efficient and effective management allows him to minimize the risk. When making a decision, he is guided not only by rational choice, but above all by emotions that appear under the influence of observations of the immediate and distant environment.

In-depth qualitative interviews have been conducted continuously since 2017. Entrepreneurs who had been working in their profession for at least twenty years and represented the micro, small and medium-sized enterprises sector were selected for this research. The research is nationwide and is conducted both in large cities and small towns. In the years 2017-2023, 38 interviews were conducted (each interview lasted approximately 120 minutes). Taking into account the size of the companies, 20 interviews were conducted with micro-entrepreneurs, 12 interviews with small entrepreneurs and 6 interviews with medium-sized entrepreneurs. The interview technique involved a personal meeting with an entrepreneur who could freely comment on the given problem (open questions asked to all entrepreneurs). The studies were recorded and then transcribed. Each interview received an appropriate identification number in the collection. Due to the volume of the text, only important fragments of several entrepreneurs' statements were selected.

Organizational culture as an attribute of employer branding

The 21st-century capitalism faces a significant developmental hurdle with rapid depletion of traditional resources: land, labor, and capital. Entrepreneurs, particularly, are grappling with a workforce shortage. The aging population in Europe has led to a deficit in the readily available workforce, affecting both globally recognized and local enterprises, including micro, small, and medium-sized businesses.

In companies associated with these sectors, the so-called "culture of pretense" or high tolerance for ambiguity, as mentioned by Richard Sennett (2010) with global corporations as an example[2], is difficult to conceal and is quickly uncovered by employees. For many SMEs and microenterprises, it is crucial to transform how employees perceive the economic compulsion

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[2] In the context of the culture of pretense, the Author pointed out the following situation: "Every time you start a job in a new place, you have to pretend. The boss expects you to know how to perform certain tasks and what they expect from you. But of course, you don't know. That's where the challenge lies."

of work, replacing obligation with sensitivity (Sennett, 2010). This shift in work perception is conditioned by effective implementation of a value system fundamental to the company's operations. Jack Welch emphasized that values are "simply behaviors – distinctive, specific, and so clearly defined that they leave no room for guesswork"(Welch & Welch, 2012). According to the cited manager, these values are a means to an end, which is the company's victory in the free market. Entrepreneurs perceive this victory differently. For some, survival in a turbulent free-market environment for another day, week, or year, is a triumph. For others, it's about strengthening brand image or expanding the market to a new region. Finally, successful succession in the company, passing the leadership baton from the family patriarch to a successor, is also a victory.

Values adopted and implemented in a company should not be merely a result of so-called business correctness (Hausner, 2019). They should be realized in business practice "not through enforcement, but through connection and understanding" (Hausner, 2019, p. 219). The axionormative order, as noted by Jerzy Hausner, operates in a value-based organization on the principle of a vortex drawing in, integrating successive employees into the organization's value system. The culture built by entrepreneurs is based on how employees understand the organization they work for, rather than on interpretations of values imposed by the entrepreneur or their management (Senett, 2010). This notion closely corresponds with Daniel Bell's (1994) view that a critical issue to address in contemporary capitalism, including in enterprises, is the emphasis on participatory culture.

Entrepreneurs in the small and medium enterprise sector, as well as micro-enterprises, emphasize the role of values as components of their organization's culture and point out that this is one of the fundamental attributes of strategies for attracting and retaining employees from the labor market. Values as the building blocks of organizational culture allow a company to stand out in the market and distinguish itself from other organizations. Entrepreneurs with over twenty years of experience in their profession stress in qualitative interviews that capital in the form of money, credit, as well as machinery and production halls are important, as without them a company cannot be built. Equally crucial, for making a mark in the market and effectively competing for access to resources and customers, is the intangible cultural capital of an organization. It is this that differentiates the enterprise, giving it the energy to operate efficiently.

An entrepreneur working since 1988 in a city with over 350,000 inhabitants, associated with the SME sector, unequivocally stated that the success of his company has been built by the employees he hires. In his business, he does not use the terminology of employer branding, yet the adopted personnel management solutions mean that his organization remains an example of the implementation of this management form.

Speaking about building the brand of the organization, the entrepreneur emphasized that graphics, logos, and colors do not determine the success of a company. The brand of the organization becomes noticeable to others only through proper, value-based, interpersonal relationships. The entrepreneur asserted that everything "starts from them." He said: "We can have beautiful logos, beautiful colors, but if we neglect relationships or influence negative relations through our actions, nothing can replace that. So, my philosophy for years has been to instill in my employees, especially those who are on the frontline with the environment, whether it's the supply market or the purchasing market – it doesn't matter, everything is important in the end – to be reliable, to be predictable, to be trustworthy." "It was not easy, and it took many years, but I must say that in my opinion, we have achieved a pretty decent level" (Interview 03) the entrepreneur reflected on the implementation of values in his company and the creation of a specific, distinctive organizational culture. This stems from the entrepreneur's personal belief that he is responsible for every person who collaborates with him and thus contributes to the image of his organization. He added: "In meetings with entrepreneurs, (…) especially if they are young entrepreneurs, I also repeat that it's not just the privilege of creating this reality, influencing it, being more free than others, but it's also a great responsibility. Especially for our employees, we should feel responsible like parents, we account for their behavior, engagement, efficiency, and even moral attitudes for a significant part of their lives. To ensure everything aligns, we must set an example. I can't expect my employees not to use vulgar words in my enterprise if I greet them with an indecent word myself. I strictly enforce this, ensuring that the language culture is maintained at a prominent level" (Interview 03).

A family enterprise operating in the food service industry demonstrated that the uniqueness of their organizational culture is based on a value encapsulated in the simple phrase: "we do hospitality" (Interview 02). Around this succinctly expressed value, the organization's culture was built. The entrepreneur said, "…we knew how to select our staff. It was primarily about the attitude, whether the candidate for a waiter role brought from home an orientation towards relationships and contact, whether they look into my eyes, communicate openly and directly, and whether they have an innate sympathy for the other person. It's not something very definable, we never wrote it down as a condition for employment, but we taught this to our managers, who later recruited these candidates" (Interview 02). The owners consider the most important trait for staff who interact with customers to be their role as an advisor and helper. The entrepreneur firmly stated, "People *must want* to work here..." (Interview 02). Emphasizing the phrase "must want" highlights the autonomy of the potential employee's decision. The principle adopted by this company, allowing an employee to easily

understand the culture of the organization they are applying to, shows the employer's respect for their freedom. On the other hand, an employee's decision to join the company is a voluntary integration into its culture and an acknowledgment of its values as their own. Fulfilling this demanding condition is the fundamental principle of management known as employer branding.

Family businesses are rooted in the values of the founder, which are implemented in the company by successive generations of successors. In these organizations, the identity and experience of the past form the foundation for opening the business to contemporary market demands. These elements are what these companies use to build their own organizational culture. An entrepreneur running a fourth-generation family business stated that fidelity to the founder's values gives him satisfaction from the fact that, "(…) I have employees who worked for my father, they came to me, and have been working in the company for many years, and that is important. Because salary is one thing, that's obvious, but it's about how they are treated, how I demand that an employee respects me; but the employee should also demand respect from the boss" (Interview 01). Mutual respect is a fundamental principle for strengthening the employer's brand in conditions of labor shortage.

Values as an element shaping organizational culture and as an attribute of employer branding are intangible factors that, in an era of standardization of procedures and human behaviors, distinguish a company in the market and enable employees to differentiate one organization from another. This intangible attribute is a principal element in the journey towards building integrated employee teams within the organization. It is crucial that the employee voluntarily adopts the specific culture of the organization, rather than being forced to conform to it.

Openness as an attribute of employer branding

One of the significant intangible attributes that strengthen the image of an entrepreneur, and their brand is honesty and openness in interactions with employees. A sincere conversation between the employer and an employee or a group of employees helps to gain their loyalty and is an important building block of trust, which integrates the team. Openness undermines the foundation of gossip and the exchange of unverified information among employees. It creates an environment where transparency prevails, reducing misunderstandings and fostering a more cohesive and informed workforce.

The surveyed entrepreneur who runs an engineering services company in the construction sector, noted that the people he employs are experts in the service profile offered by the company. However, they often lack basic knowledge in economics and do not understand the principles of running a business in a free market environment. For several years, the entrepreneur did not recognize this fact, unintentionally causing unnecessary negative

emotions within the organization. Upon recognizing this issue, the entrepreneur adopted a principle whereby most of the business tasks carried out by the company are "financially transparent" to the employees. He provided the following example: "The employees say: *you have a contract for 100,000 PLN*. I say, *yes, I do.* Then I ask them to prepare a breakdown in Excel. We've calculated the costs for half a year, including subcontractors' fees. This amount was then divided per employee, and for me, followed by net amounts... and people could see. I always tell my employees that I prioritize paying salaries, taxes, and social security contributions, whether it's for you or the company. I can be in deficit in a given month because this is my business. I am obligated to pay you because you work, even if I may not have the money" (Interviev 04). The experience gained from these observations led him to reflect that transparency in the company is achieved through annual discussions with each employee, or more often if needed, about their salary. The entrepreneur stated: "I try to pay enough to ensure a satisfactory salary, as much as I can. I would like to pay more, but it's not always possible" (Interview 04).

Another entrepreneur emphasized that openness and honesty in interpersonal relationships within his organization were developed through consistent and uncompromising implementation of the values adopted by the company. This persistence, as the surveyed entrepreneur stated, has paid off. As a result, he does not feel lonely in his company. He is a part of his crew and has built a team of people who want to work together. "I try to run things quite differently in my company, and I am one of the few who manage to reconcile these aspects smoothly. So, there's no internal strife, and I absolutely do not feel lonely in my company. I have support from my management and even employees at the lowest level. I feel a sense of identity with them and theirs with me" (Interview 03).

Openness as an attribute of employer branding is another element that supports effective management of the employer brand.

Rootedness in the local community as an attribute of employer branding

Local enterprises, representing the small and medium-sized business sector and micro-enterprises, unlike global organizations, have a solid foundation in the local environment. Jerzy Hausner (2019), citing Michael E. Porter and Mark R. Kramer, noted that there should be a co-dependency between the functioning of a company and its close social environment, especially the local community in which it operates. "A favorably disposed and well-performing local community not only generates demand for the company's products and services, but also provides it with support and access to important public resources". This is a return to the traditions of craftsmanship, when these establishments were intricately connected with the local community: from meeting the needs of this society, through caring

for the city's defensive walls or local temple, to organizing local ceremonies. A company rooted locally, with a long-standing tradition, inspires trust, respect, and has a good reputation. These factors influence the fact that an entrepreneur, who is the fourth successor of a family business, confidently states that he always looks for employees in the vicinity of the company. As he said, it is a safe environment for both parties. The entrepreneur stated: "(...) how we are perceived in the market by people, how we treat these people, our behavior in the market, these are the things that decide our future" (Interview 01). A similar opinion was expressed by a businesswoman representing the gastronomic services sector: "(...) this is also a commitment, and there are a lot of small pleasures in it, like when we hear in the market among employees, among waiters or chefs that maybe we don't pay the most, but we always pay, we don't deceive, so, yes, there will certainly be some individual cases when someone has a different opinion, because we didn't agree on something, understood our obligations differently, but generally, there is definitely an impression that we don't exploit our brand to trick a supplier, an employee, or any contractor" (Interview 02).

In a similar vein, an entrepreneur with a company in a city of up to 250,000 inhabitants expressed, "I believe that we cannot treat our activities or our enterprises as our property in every sense. We must be aware that we are a certain type of element, even in terms of location, among society. If it is situated in any environment where there is an industrial part, next to the residential area, we must take this into account. We cannot run our production all night, emitting noise, and so on. If there is such a neighborhood, we must provide society with conditions by limiting production, noise emissions, internal logistical solutions, etc. We must give the environment what it is due, at least try to reconcile with it" (Interview 03). Running a business for entrepreneurs aware of the importance of their company's image in the local community requires making a large number of compromises with other entities in the company's environment. An organization is not a lonely island; it operates in a specific local environment, utilizes the available infrastructure, and is an active player in the job market.

Being rooted in the local community for entrepreneurs means to actively cooperate with schools, cultural centers, local authorities, and other institutions of public life. This is a commitment, as pointed out by a businesswoman representing the gastronomic sector, to share knowledge and skills with local community entities. The entrepreneur explained that the gastronomic sector, in which she conducts business, gives her the opportunity to conduct workshops on healthy eating for local institutions, such as schools, and to promote a healthy lifestyle and consumption. A significant role in creating a good image for the entrepreneur's brand is also played by her publishing activities. This increases the recognition of the entrepreneur and her company's brand.

As a result, this activity enables effective management of the employer's brand through the building of networks: "Building networks not only for our use, but to share them. For instance, through my writing. This is definitely a pro-social activity, not just focused on the company's profit, but something that is clearly of social, cultural significance" (Interview 02).

No company is detached from the local community. The intensity of the relationships between the entrepreneur and his organization, and the entities in the immediate local environment, affects the recognition of the entrepreneur and his company by that community. Cooperation with the local community helps to gain its trust, acquire a good reputation, and thus become a desired employer in the labor market.

Disappointment with employer branding. Does managing a company's brand make sense?

Managing a company's brand so that inside the organization employees feel like an integrated team, are loyal to the company, and trustworthy, requires drawing on a range of intangible attributes of employer branding. Entrepreneurs collaborating with their staff under good economic conditions, with guaranteed sales of products and demand for their services, is an ideal situation for achieving set goals. However, a crisis, a deterioration in the economic condition of the company, or the emergence of unexpected turbulence reveals a different face of the employed personnel. A challenging period for organizations in the gastronomic and hospitality sectors was the time of the pandemic crisis. By governmental administrative decisions, the operation of many sectors of the economy was halted.

The pandemic crisis, during which a large part of companies suspended their activities, caused them to lose orders and customers overnight. In that tough time, many entrepreneurs faced a fundamental question for themselves and their staff: what to do next? Some entrepreneurs were forced to make the toughest decision, - reduce workforce. An entrepreneurial couple from the gastronomic services sector described the internal relations within the company during the pandemic crisis, when the organization was not functioning, in the following way: "(...) with the pandemic, we absolutely didn't know how to cope. No previous crisis had shaken us emotionally like this one, because as we lost money, we also knew that we could make money. So, okay, can I have one worse year - I can. Can I have a year without income - I can because I know I'm capable, I know the rules, and so on" (Interview 02). The decision to reduce staff due to the lack of capital to continue business operations caused conflicts within the organization. Its course, given the positive experiences of the past, was a shock to the entrepreneur. She stated: "The thing that happened at that moment… because we will financially defend ourselves after the pandemic… but in the relationships with employees - that was the change…We had

always been employing, it was also particularly important to be permanent in those relationships. We had many people employed for many years, 15 or 20, from the beginning of the company, who had cooperated with us. That meant we knew how to grow together, also accepting that someone had reached the limit of their abilities and we still found them a place in the company, to make sense for both them and us. But when we were faced with the fact that we weren't working at all, and we didn't know what would happen, and there was also the risk that we might die, which we feared, then we had to relieve ourselves from the obligation of paying out a lot of money, because we then employed 160 people, every month. Besides, we had to make them realize that it was over. It's not that you can have a safe place here, because you can't. We don't know how long this will last, maybe this is the end" (Interview 02).

Hiring an employee by an entrepreneur is a huge commitment. It encompasses the life, as well as the physical and mental health of the employees they hire, who provide their labor to the organization every day. This commitment, importantly voluntarily taken on by the entrepreneur of their own free will, requires great prudence and caution in challenging times. The pandemic crisis was a test for the strength of the organizational culture and the values adopted within it. The emotions that emerged during that period, both on the sides of entrepreneurs and employees, included fear for their own lives, apprehension about the unknown virus, and the loss of jobs. The halting of many sectors of the economy, the looming threat of bankruptcy, and the need to protect the company from it, forced entrepreneurs to make tough and unpopular decisions. Dismissing personnel who had collaborated with the organization for years, for many employees in that difficult, turbulent, and unknown period, intensified the scale of negative emotions. Usually, in such moments, the question arose of how to manage the brand of the organization as an employer during such completely unknown time. The entrepreneur said, "The cost was unbelievable to us; how quickly our entire planned life investment, which we had allocated to pay off all these people who had to leave us, dissolved. And still, for me, on an emotional level, it would have been bearable, but those few negative shots we received from those leaving; I still live with them and still can't cope with them. (…) Personally. But also, from a business perspective that something like this happened in my company. It had never happened before to part in such a way, where someone kicks me when I am completely cornered, and helpless" (Interview 02). Extreme situations reveal a range of hidden emotions. While this argument may justify episodic situations, it cannot be prejudged. Those incidents influenced the subsequent business decisions of many entrepreneurs. As Richard Sennett observed, "loyalty [of employees] is essential for surviving economic cycles".

Another entrepreneur categorized the employees in his company into two groups: pleasant and unpleasant. As a differentiating criterion he pointed out the following situation: "(...) when there's a nice employee, they can come on Friday and say: *boss, I won't be here from Monday*; but if they're unpleasant, they won't even call" (Interview 07). This remark by the entrepreneur reveals another aspect of the internal environment of the company. Employees do not identify with the organization and leave when a better offer appears. Whether this is due to the character of the construction sector, as the entrepreneur suggested, is hard to determine unequivocally. This comment by the entrepreneur could be perceived as a stereotypical perception of employees representing this professional group. Thus, another space is created that separates the entrepreneur from the employees working in his company. The formation of a stereotypical image of the employee is inadvertently contributed to by both the employer and the employees. Neither group takes any steps to get to know each other better, integrate the team, and replace mutual distrust with trust. A classic example of a stereotype describing the behavior of a specific professional group is the "cobbler's Monday". This situation demonstrates that past experiences, and the image developed in the past affects contemporary judgments. Such situation shall not be changed easily.

However, it is a fact that, regardless of the actions taken by the employer to retain an employee at the workplace, the employee retains full autonomy and always decides independently about leaving. On the employers' side, there is a large group of people who are discouraged to conduct internal organizational activities to strengthen the employer's brand. Entrepreneurs who have experienced the above situations believe that it is impossible to gain employees' loyalty. Each of them is seen as a self-interested individual seeking to maximize personal benefits. Short-term employment episodes in companies are viewed as a negative phenomenon, exacerbated by the act that employees within an organization do not know each other well. This increases their anxiety and does not contribute to trust as an intangible asset of the company (Sennett, 2010). The deficit in employee loyalty towards the company means that the fate of the company is completely indifferent to them. Richard Sennett observed that the quality of social capital plays a significant role in shaping relationships within an organization (Sennett, 2010). Many employees realize that they will not make any career advancements, and that their current job position is merely a temporary stop for a longer or a shorter period.

An entrepreneur running a business in a small town noted that over the years, he had become immune to the fact that people wanting to take up work, having agreed with him on specific terms of employment, consciously broke their word after a few weeks or months. He believes this is a consequence of lack of respect for work, and mutual respect between

individuals. The entrepreneur stated: "(...) you no longer have such enthusiasm for these people afterwards. This factor causes us to develop a thick skin and a kind of numbness towards the person who comes in, because we expect that they might be the same" (Interview 05).

The experience of past disputes and conflicts with employees causes entrepreneurs to doubt the strength of the values implemented in the organization and the loyalty of the employees. The decline in the entrepreneurs' engagement is illustrated by the following statement: "I always took into consideration that it shouldn't be just me walking around proud of owning such a company, but that my people should walk around proud of working in this company. So, I wanted to shape it in such a way that they would enjoy working there; that they would take pride in it. The very step of coming to that company feels completely different from the compulsory one, and it shouldn't be driven only by the financial factor; but uniformity will never be achieved, because these are people, and they are diverse" (Interview 05).

Recommendations and conclusions

Despite some entrepreneurs' skepticism about its effectiveness, internal employer branding should focus on the entire employment cycle of an employee, from their entry into the organization to their departure (Wojtaszczyk 2012). Entrepreneurs should also be concerned about the reasons for an employee's resignation and why they are moving to another company. Such a conversation with an employee is highly informative for both parties.

Table 1 – Intangible Attributes of Employer Branding

Attributes	Entrepreneur's duties	Employee's duties
Organization culture (axionormative order)	Indicating the company's mission	Understanding the company's objective
	Developing values	Implementing these values in daily activities
	Respect for the founder's values	Understanding and co-creating the organizational culture
Openness and dialogue	Honesty	Initiating conversations with the entrepreneur
	Openness to dialogue and cooperation with staff	Honesty and integrity in interactions with the entrepreneur
Rootedness in the local community	Responsibility for co-shaping the local environment	Respect for the brand and company
	Co-creating local culture	The employee as a representative and

	Employing local individuals	ambassador of the company brand

Source: own study.

Table 2 – Factors Influencing Entrepreneurs' Disappointment with Employer Branding

Factor	Entrepreneur	Employee
Disappointment	Question: where I make mistakes?	Lack of loyalty to the employer
	Failing to understand the younger generation and its expectations	Seeking adventure, viewing work as a temporary stop
	Termination of employment contract	Legal proceedings against the entrepreneur

Source: own study.

Research on employer branding using in-depth qualitative interviews provided a unique source of information about entrepreneurs' attitudes towards their staff. The vast majority of entrepreneurs, despite not knowing the rules of employer branding, intuitively manages their internal staff in such a way that the employee becomes an ambassador of the company and a builder of its positive image. In this regard, entrepreneurs' good intentions cannot be denied. However, there is a significant area of disappointment with employees, and more broadly with people, observed among entrepreneurs. The latter feel deceived by employees, disregarded, and harassed. In conversations with entrepreneurs, there is a desire to limit activity on social media, where employees, often under the impulse of the moment, defame entrepreneurs and undermine their authority. Building good interpersonal relations in an organization where there is economic compulsion to work, is difficult or even impossible. Only the employee's voluntary decision to join a particular organization, driven by the desire to co-create the organizational culture, allows the company to financially benefit from the intangible attributes of creating employer branding.

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THE IMPACT OF ESG REGULATION ON MACROPRUDENTIAL POLICY AND BANK ACTIVITIES IN THE EU

Abstract

The aim of the study is to present the impact of legal regulations in the field of sustainable development on the directions of macroprudential policy evolution and the activity of banks in the EU. The main ESG directives and regulations in force in the European Union countries will be presented, in relation to macroprudential policy tools and banks' activities, from operational plans to strategic plans. Regarding ESG regulations, banks' obligations resulting from non-financial reporting will also be presented, which further stimulate the process of evolution of the business models of banks and other public trust entities. The conclusions of the analyses point to the importance of capital requirements and systemic risk buffers in banks and the consideration of the CSRD, ESRS and CSDD regulations. Banks' operational activities and strategies are evolving towards a gradual change in the product offer financing green investments in the form of, for example, green loans and bonds. Among the components of business models, banks adjust primarily in the following areas: balance sheet management strategy and customer profile. The actions taken relate to all activities in the following areas: corporate governance (e.g. business strategy, risk, responsible banking, sustainable supply chains), environmental governance (e.g. green

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finance products, environmental impact of operating activities or TCFD reporting), stakeholder relations – social (e.g. relations with employees, customers, and society).

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Introduction

A wide package of regulations in the form of directives and orders creates the basis for the implemented regulations in the field of sustainable development, covering the following issues: Environmental, Social, Corporate Governance (ESG). These regulations are also closely related to the provisions on financial and non-financial reporting (eligibility and disclosure). These regulations cover a wide subjective scope of financial and non-financial institutions as well as subject matter. Financial supervision institutions, in turn, are obliged to monitor compliance with legal regulations by entities on the financial market and to limit various risks (physical, transfer or ultimately systemic).

Many challenges await supervisory institutions and entities implementing micro- and macro-prudential policy, including in terms of establishing adequate tools to improve ESG implementation processes and counteract the escalation of systemic risks. Among financial entities, banks are one of the first groups of entities that became obliged to comply with ESG regulations and non-financial taxonomies at the earliest. This means that banks are obliged to align their operational, financial, and capital activities and strategic plans in the form of business models and value creation. Since ESG risk, including climate risk, is characterized by a high degree of multidimensionality, the scope of challenges and opportunities for entities wishing to maintain a competitive advantage on the market is wide.

The aim of the study is to present the impact of ESG regulation on the evolution directions of macroprudential policy and banks' lending and investment activities. The main directives and orders in ESG in European Union countries will be presented, regarding macroprudential policy tools and ESG risk management in banks and the possible consequences for lending, investment activities and operational and strategic plans. With reference to ESG regulations, banks' non-financial reporting obligations will also be presented, which further stimulate the process of evolution of business models of banks as well as other public trust entities.

1. Main ESG regulations

Legal regulations in the field of ESG (environmental, social, and corporate governance, ESG) have been developed for several years by the European Commission as part of the work of institutions such as: European Central Bank (ECB), European Banking Authority (EBA), European Financial Reporting Advisory Group /EFRAG Sustainability Reporting Board (EFRAG/EFRAG SRB).

Among main one's regulations EU regulating development balanced they find Aug : Regulation Sustainable Finance Disclosure Resolution (SFDR), taxonomy on reporting : Nonfinancial Disclosure Reporting Directive (NFRD), Corporate Sustainability Reporting Directive (CSRD), European Sustainability Reporting Standard (ESRS), Corporate Sustainability Due Diligence Directive (CSDD) and guidelines Task Force on Climate – Realized Financial Disclosures (TCFD).

The European Central Bank's guidelines on climate risk disclosures have been in force since May 2020. The SFDR Directive on the disclosure of information on sustainable investments by financial market participants (Regulation 2019/2088) aims to increase market transparency and prevent the so-called greenwashing. It covers two groups of entities: financial market participants offering financial products defined in the SFDR (Article 2) and financial advisors providing insurance and investment advisory services. The SFDR Directive entered into force in March 2021 (replacing the previously existing NFRD) and requires financial market participants to present how ESG risks are integrated in the investment process.

The NFRD Directive (2014/95/EU) defined the basis for non-financial reporting. This directive was an amendment to Directive 2013/34/EU on the annual financial statements, consolidated financial statements and related reports of certain types of undertakings. The initial personal scope of the directive included the so-called public interest entities[2]. These entities, in accordance with the NFRD directive, were obliged to include additional statements on non-financial ESG information in their activity reports. While the NFRD did not impose a specific form of disclosure by reporting entities and it was difficult to compare non-financial reports of different entities, the CSRD guidelines already standardized the rules and requirements for non-financial reporting.

The CSRD Directive (EU/2022/2464) is part of a comprehensive package of legislative changes for the sustainable financing of economic growth

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[2] Public trust entities in accordance with Art. 2 of Directive 2013/34/EU implemented through Art. 2 of the Act of 11 May 2017 on statutory auditors, audit firms and public supervision (Journal of Laws, item 1089, as amended) are: domestic banks, branches of foreign credit institutions, branches of foreign banks, pension funds, issuers securities, investment funds, insurance and reinsurance companies, cooperative savings and credit unions.

aimed at achieving climate neutrality by the EU by 2050. The CSRD is Directive (EU/2022/2464) of the European Parliament and of the Council of 14 December 2022) and one of the most important EU legal acts specifying which entities and from what year are subject to the ESG reporting obligation. The CSRD introduced changes to four legal acts:

- EU Regulation No. 537/2014 on specific requirements for statutory audits of the financial statements of public-interest entities (2013/34/EU).
- Directive 2004/109/EC on the harmonization of transparency requirements for information about issuers whose securities are admitted to trading on a regulated market.
- Directive 2006/43/EC on statutory audits of annual accounts and consolidated financial statements.
- Directive 2013/34/EU on the annual accounts, consolidated financial statements and related reports of certain types of undertakings.

The uniform non-financial reporting framework has been prepared in accordance with the ESRS standards (31 July 2023), as mandatory and common standards for sustainability reporting. The unified reporting standards are intended to ensure the comparability and reliability of disclosed data, which will be subject to mandatory verification by statutory auditors and, depending on the arrangements in individual Member States, by other certified assurance service providers.

The ESRS includes three principles for disclosing material information:

- three layers (sector-independent, sector-specific, entity-specific),
- three reporting areas (strategy, implementation, effect measurement),
- three topics (environment, society, corporate governance).

In terms of ESRS materiality analysis (2023): the principle of double materiality has been introduced, i.e. impact on the environment or only on the financial consequences for the company or meeting both criteria.

From 2024, the CSDD corporate due diligence directive will apply. The directive highlights companies' obligations to identify actual and potential harmful impacts on human rights and the environment and establishes liability for breaches of these obligations. The scope of the CSDD directive covers companies' own activities, activities of subsidiaries, and entities in the value chain with which the company has regulated business relationships - direct or indirect.

In addition, banks and other financial institutions have guidelines for granting and monitoring loans in force since June 30, 2021 (EBA/GL/2020/06). From June 2022, disclosures regarding ESG risk are part of the so-called Pillar III under the capital requirements of CRR 2 *(Capital Requirements regulation).*

The amended CRR package includes provisions enabling the EBA [3]to introduce requirements in sustainable finance (ESG):

1. CRD 2 Art. 98(8): EBA was obliged to assess the potential inclusion of ESG risk in the process of review and supervisory evaluation of processes. For this purpose, it is necessary to define: a uniform definition of ESG risk, methods for assessing ESG risk and criteria and methods for assessing | the impact of ESG risk on institutions.

2. CRR2 Art. 434a: EBA was obliged to develop standards to specify disclosure requirements. On January 24, 2022, EBA published the final draft implementing technical standard (EBA/ITS/2022/01 – Final draft implementing technical standards on prudential disclosures on ESG risks in accordance with Article 449a CRR) specifying detailed requirements for ESG disclosures under Pillar III. The regulation applies from June 28, 2022. Large institutions that have issued securities admitted to trading on a regulated market of any Member State will disclose information on ESG risks, including physical and transition risks. In Polish conditions, these requirements are important for other systemically important institutions in accordance with Art. 131 of Directive 2013/36/EU.

The changes introduced in connection with the implementation of Basel IV in EU countries obliged banks to deal with climate risk (ESG) in the risk management system, in terms of: assessing, limiting and monitoring exposures sensitive to this risk.

2. EU taxonomy

The first non-financial reporting guidelines, although initially in any form of reporting by public trust entities, were contained in the NFRD Directive, which was then developed as part of the CSRD Directive, which introduced uniform standards and expanded the scope of entities obliged to comply with it.

The CSRD Directive provides for the mandatory use of EU reporting standards, i.e. European Sustainability Reporting Standards (ESRS). The identified indicators covered by the CSRD reporting obligation include:

- in the field of environmental protection: climate change, drought and water scarcity, biodiversity, land use, raw materials management, pollution and waste;

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[3] EBA plays an important role in supporting the European banking sector in achieving its goals of transitioning to a more sustainable economy and mitigating risks from climate change and broader environmental, social and governance factors. EBA implements the Eco-*Management and* Audit *System Scheme*, EMAS) as part of its commitment to reduce its environmental impact and carbon footprint. EBA's annual environmental statement reflects the Authority's progress in implementing these commitments.

- in the sphere of impact on society: employee issues, occupational health and safety, human rights, relations with the environment, product safety;
- in corporate governance: corporate governance, ethical standards, counteracting corruption and bribery, privacy protection and data security.

Pursuant to CSRD regulations, reporting entities are obliged to include and demonstrate the impact of ESG factors in business decisions and energy and climate transformation programs. These requirements impose an obligation to confirm the need for the company to conduct a reliable analysis of the financial and business impact of ESG factors on its value and strategy. This means it is necessary to include non-financial factors in operational processes. Thus, while ensuring the value of the company in business models, banks are forced to consider ESG assumptions in their long-term management and business strategies.

Mandatory non-financial reporting elements under the CSRD include:
- materiality testing study) in accordance with the principle of two-way materiality,
- preparation of a report in accordance with uniform EU standards for reporting sustainable development issues ESRS,
- analysis and inclusion in the report of the so-called taxonomy, i.e. information on how and to what extent the activities of this enterprise are related to economic activities that qualify as environmentally sustainable (percentage of turnover, CapEx and OpEx),
- presentation in the form of an XHTML report with appropriate tagging,
- submission of an audit report by an independent entity – a company authorized to audit financial statements.

In accordance with the evolution of reporting requirements for public trust entities, the CSRD directive provides for subsequent reporting years 2024-2028 for groups of entities depending on whether they meet 2 of 3 criteria, i.e. balance sheet total, net sales revenues, and number of employees (Table 1).

Table 1. Non-financial reporting obligations according to CSRD

Fiscal year	Report submission deadline	Entities	Balance sheet total	Net revenues from sales	Number of employees
2024	2025	Large entities and those with the status of public interest entities			>500
2025	2026	Other large enterprises	≥20 million EUR	≥€40 million	≥250

Continued Table 1

			<20 million EUR	<EUR 40 million	<250
2026	2027	Medium and small enterprises with issuer status*	<EUR 4 million	<EUR 8 million	<50
2028	2029	Companies from outside the EU	Turnover > EUR 150 million		

*The number of medium and small enterprises throughout the EU is over 50,000 and in Poland there are a total of 3,500 companies (as of June 30, 2022).
Sources: CSRD (2023).

Banks and other entities can choose reporting methods that suit their needs and legal conditions, but usually one of three methods is chosen:

• Activity report with added ESG data, in which the annual report presents key ESG indicators supplemented with more extensive information, e.g. on the bank's website.

• Report in the form of a sustainable development report, i.e. a separate report apart from the annual financial report.

• An integrated report that combines both the financial report and sustainable development issues in one document, showing the strategy and model of building company value. This form of an integrated report is most often chosen by the largest banks, which treat this form as information for clients and investors interested in cooperation with an active entity financing the ESG transformation. Such activities effectively support the bank's competitiveness and increase its market value.

Reported ESG indicators, the so-called greenness, in accordance with the guidelines of the EFRAG group (2023), include two cross-sectional standards and three thematic standards, which were adopted on October 23, 2023. The scope of reporting data and the degree of their detail is significant. Thus, these indicators will enable an in-depth diagnosis of the situation in the reporting company and its investment intentions and cooperation with partners within the supply chain, in addition to the financial data published as part of the annual financial reporting. The transparency of information about the company's activities will have a broad impact on operational, financial and investment activities, and thus on adapting business models to ESG conditions and ultimately on the financial results, competitiveness, and value of the company (Table 2).

Table 2. ESG indicators according to CSRD cross-sectional and thematic standards, according to EFRAG nomenclature

Type of standard		Designation and name
Cross-sectional	General	ESRS 1General requirements ESRS 2General disclosures
Thematic	Environmental	ESRS E1 Climate change ESRS E2 Pollution ESRS E3 Water and marine resources ESRS E4 Biodiversity and ecosystems ESRS E5 Resources and circular economy
	Social	ESRS S1 Own workface ESRS S2 Workers in the value chain ESRS S3 Affected communities ESRS S4 Customers and end-users
	Governance	ESRS G1 Governance, risk management and internal control ESRS G2 Business conduct.

Sources: EFRAG (2022).

The purpose of non-financial reporting is to obtain information by entities obtaining financing (borrowers, issuers of debt securities) and entities providing financing. Banks will be able to more precisely analyze the risks associated with a given borrower (financed project), i.e. determine risk weights and capital adequacy more precisely. Those purchasing securities, e.g. green bonds, will have more detailed knowledge about the use of funds from these bonds for investment purposes.

In banking activities, the entire reporting process (in accordance with the concept of supply chain) includes environmental reporting:

- entities providing financing for the purpose (project),
- entities using financing for a given purpose (project),
- entities related to the entity using financing for a given investment process or project.

Such a reporting process means a wide range of collected individual data: not only between the lender and the borrower, but also, more broadly, between cooperators. This means that decision-making processes will begin in the supply chain: from the borrower (bank) through the borrower to his last contractor. This means that all entities will become interdependent, and the result may be limited cooperation with entities with a low level of ESG transformation.

The EU Taxonomy is a framework for classifying and identifying environmentally sustainable activities. It comprehends a set of technical screening criteria determining whether an economic activity can

be considered environmentally sustainable. By providing a common classification system for sustainable activities, the EU Taxonomy serves as a tool for green finance. It is intended to help financial market participants identify environmentally sustainable economic activities and channel capital toward that (Figure 1).

Figure 1. Scope of the disclosures on environmentally sustainable economic activities under Article 8 of the Taxonomy Regulation (credit institutions)
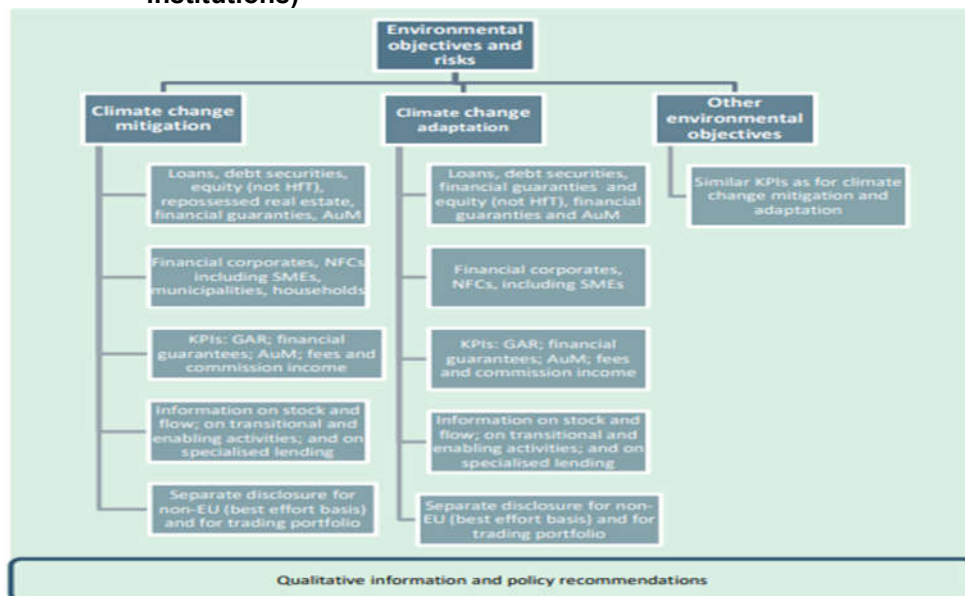
Source: EBA (2021, p. 12).

The Green Asset Ratio (GAR) is a new key performance indicator for EU banks, intended to provide a standard and comparable measure of the percentage of a lender's assets invested in environmentally sustainable projects and activities. This indicator shows the proportion of assets that are environmentally friendly and that contribute significantly to the objectives of climate change mitigation or adaptation, or that enable other actions to achieve these objectives. According to the EBA guidelines, the GAR indicator should cover all exposures in the banking book to financial and non-financial enterprises and local governments. It's a part of a major effort to accelerate the adoption of sustainable banking practices, where the European Banking Authority (EBA) has taken a decisive step by announcing that starting in 2024, about 150 large EU lenders will be required to disclose this new metric.

The EU taxonomy and GAR are strictly related to each other and serve the same purpose of transitioning to a greener financial system and economy. According to taxonomy key performance indicators (KPIs), European banks are currently required to disclose seven KPIs related to their assets (Table 3, Figure 2).

Table 3. Taxonomy key performance indicators (KPIs)

	Range of indicators
1.	Taxonomy-eligible activities
2.	Taxonomy-non-eligible activities
3.	Exposure to undertakings that are not obliged to NFRD
4.	Exposure to derivatives
5.	Exposure to on-demand interbank loans
6.	Exposure to trading books
7.	Exposure to central governments, central banks, and supranational

Source: EBA (2021).

Figure 2. KPIs – quantitative disclosures by credit institutions
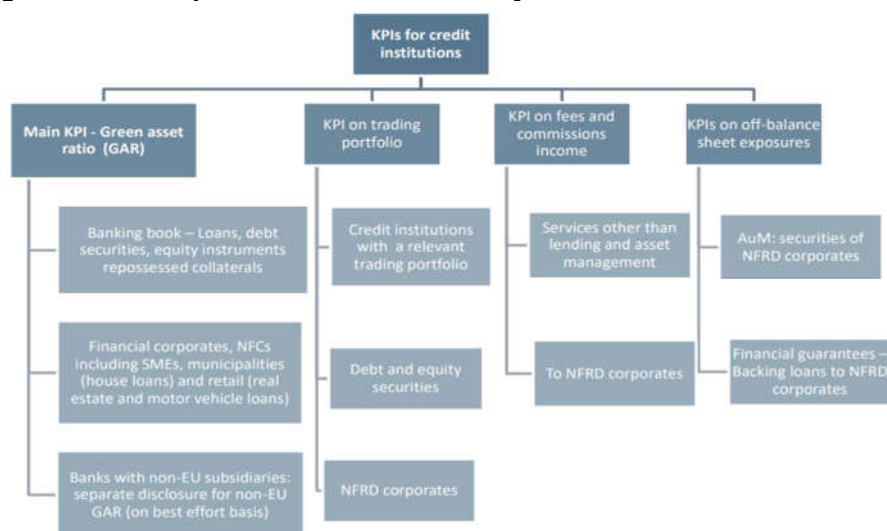
Source: EBA (2021, p. 24).

As show at Table 3 and Figure 2 the granularity required for taxonomy reporting is high, and with the Green Asset Ratio, things are about to level up even further. Therefore, banks require more than granularity and precision in data management to quantify environmental, social and governance (ESG) aspects.

Reasuming, in 2023 year, for the first time, European banks had to include in their reporting ratios related to taxonomy-eligible

exposure and to entities not subject to the Non-Financial Reporting Directive (NFRD). These novelty requirements came from the Article 8 of the Sustainable Finance Taxonomy Regulation and represent the first step towards more comprehensive reporting obligations that will be required starting 2024 year with the implementation of the GAR.

3. ESG risk and macroprudential policy challenges and tools

Generally, ESG (*environmental, social, and corporate) risk governance*, ESG) in financial institutions, including the banking sector, is understood as the risk of negative financial effects that result from the impact of ESG factors on customers and contractors or balance sheet items of banks. The aim of ESG risk management is to support sustainable development and build the bank's long-term value through integrated management of the impact of ESG factors.

ESG risk management considers the perspective of double materiality, i.e. the impact of ESG factors on the bank's operations, financial result and development, and the impact of the bank's activities on society and the environment. The bank manages ESG risk as part of managing other types of risk, due to their interdependence. ESG risk is not a separate type of risk, but a cross-sectional risk [4]that affects individual types of risk. Banks' loan portfolios of companies operating in high-emission industries, i.e. those emitting greenhouse gases (GHG), are directly exposed to ESG risk. Climate risk management (climate-related risk) are supported by all committees operating in the bank. The effect of banks' activities in the ESG area is also the promotion of corporate social responsibility activities social responsibility (CSR).

The changes introduced in connection with the implementation of Basel IV in the EU obliged banks to process climate risk (ESG) in the risk management system. ESG climate risk is also treated as one of the challenges for financial stability. European Systemic Risk Board (ESRB) and the European Central Bank (ECB) are actively engaged in analyzing and monitoring the impact of climate risk on the financial system, recognizing it as one of the main systemic risks in the European Union (EU).

The key scope of sustainable development (ESG) is the environment and the related climate risk. Climate risk can impact the financial system and the real economy through two risk channels:

- Physical risk (*physical risk)* covers the economic costs and financial losses resulting from the increasing severity and frequency of extreme weather events caused by climate change.

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[4] Due to the cross-sectional specificity of socio-environmental risks, which are not separate risks but are part of classic risk categories, banks do not distinguish them as a separate category.

– Transformation risk (*transition risk)* is related to the costs generated
by the need to adapt the economy to a more sustainable and low-
emission development path, will materialize before a significant part
of the physical risk materializes. Climate transition risk is the risk that
arises when, during the transition to a low-carbon economy, there are
adjustments to the value of financial assets that investors do not fully
anticipate or hedge against (UNEP, 2020). There are several reasons
why this may be the case (OECD, 2017; Monasterolo, Battiston 2020,
p. 52–72), e.g. if the transition is late and sudden ESRB (2016),
and therefore "disorderly" (NGFS, 2019).

**The essence of the relationship between ESG (climate) risk
and the appropriateness of using macroprudential policy is the fact that
physical and transformation risks may increase systemic risk in the
financial sector, the monitoring and management of which is the
responsibility**
of supervisory institutions conducting prudential policy.

**Supervisory institutions pursue a micro-prudential policy addressed
to individual institutions (banks) to strengthen their resilience and ability
to hedge financial risks, including climate ones. Macroprudential policy**
applies to the entire financial system or a significant part of it, is a significant
complement to microprudential activities, extends the scope to common
exposures, feedbacks between the real economy and the financial sector.
Macro-prudential policy can help manage unequal risks at the level
of countries and regions, and addresses systemic risk by limiting risk build-up,
increasing resilience to escalating climate risk and mitigating the prospects
of extreme events materializing. Therefore, macroprudential policy is intended
to ensure that all institutions take a prudent approach to various risks and
threats that may become systemic, including ESG risk.

To support the effects of the supervisory institution, cooperation in both
its dimensions, i.e. micro- and macro-prudential, is important, because the
final effects of mitigating ESG risks that may escalate systemic risk depend
on it. The materialization of systemic risk could adversely affect the provision
of products and services by the financial system and, in extreme cases,
seriously harm economic growth. The essence of macroprudential policy
is to protect the stability of the financial system. A strong and healthy financial
system is better able to withstand shocks, which helps avoid the most serious
effects of crises.

Objectives of macroprudential policy including counteracting threats
to financial stability related to ESG (climate) risk, also include: risk
monitoring, increasing resilience to increasing climate risks and mitigating
the prospects for the materialization of extreme events.

The main challenges facing macroprudential policy include the following:
▪ ESG (climate) risk is characterized by a high degree of multidimensionality.
▪ Different degrees of exposure to climate risk in individual EU countries, sectors and enterprises (Kaenzig, 2022; Kalkuhl, Wenz, 2020).
▪ Diversified loan portfolios of banks with corporate credit exposures in dirty sectors or entities related to them.
▪ Climate risks may affect the solvency of borrowers (business entities, households) as well as the value of collateral for real estate loans (residential and commercial).
▪ Banks' vulnerability to combined transition and credit risks through their loan portfolios may exacerbate increased shocks to economies.
▪ Diverse state of climate transformation between EU countries and their financial and non-financial institutions.
▪ The essence of climate risks is the mechanism of increasing and perpetuating losses, especially those related to weather changes (temperature, precipitation, hurricanes, etc.).
▪ The greatest challenges in managing ESG/climate risk concern the sectors most exposed to this risk, i.e. sectors related to electricity, mining, gas and trade.

Since ESG risk is treated as an element of systemic risk, the most important tools that should be used include capital buffers and systemic risk buffers (Table 4).

Table 4. The most important tools of macroprudential policy from the perspective of ESG risks

Level	Tools
Banks	• capital requirements, • concentration thresholds, • supervisory monitoring, • general system risk buffer (SyRB) • and sector systemic risk buffer (sector SyRB)
Customers	• instruments of influence on the borrower (borrower *based measures,* BBM)

Sources: The author`s own compilation: NBP (2022); Giuzio et. al., (2019); Gross, Población (2017).

A particularly important tool, already proven at EU level, is the general systemic risk buffer (SyRB). A sectoral systemic risk buffer could provide additional support, but its application requires ESG data at the sectoral level. In addition to tools addressed directly to banks as institutions, to diagnose credit exposures, tools addressed to bank clients (households, business

entities) should also be used in the form of a more detailed analysis of creditworthiness, allocation of credit funds for green projects, etc. (Vermeulen et.al., 2021; ESRB, 2020; Weyant, 2017, pp. 115-137).

4. The impact of ESG regulations on banking activities

Due to the wide subjective and objective scope of ESG regulations, their impact on the activities of banks is significant. ESG regulations affect both current (operational), financial and capital activities as well as medium- and long-term plans. Since ESG regulations and non-financial reporting also verify the financial products offered to customers, or the cooperation of banks with various entities as a whole, the impact of ESG is observed in the developed business and value creation models.

Banks' business and value creation models also consider ESG regulations and taxonomy reporting requirements. Because the business model reflects the company's operating philosophy and describes all elements of the market environment and the company as well as the relationships between them that are important for achieving the company's goals and creating value (e.g. Saebi, Foss, 2014, p. 2; Zoot, Amit, 2010, p. 216-226; Santos, Spector, Heyden, 2009, p. 5-13). Moreover, business models allow to express the business logic of the company (Nosowski, 2012) and specify strategic assumptions in the area of how to create value in it (Pyka, 2013). Since in banks' business models, in addition to commercial goals, the goals of financial security and market activity are important, ESG risk management is also related to them.

Among the conditions affecting business models, in addition to economic conditions, there are also new legal regulations that affect banking activity profiles, which is emphasized by, among others: Altunbas, Manganelli, Marques- Ibanez (2011); Ayadi , Arbak, Pieter, De Groen (2011); Biron, Córdova, Lemus (2019). Therefore, the changes in ESG regulations as well as economic and social regulations in the banking environment result in the need to adapt banking business models. Gaining a competitive advantage and functioning satisfactorily on the market requires compliance with ESG, which means a growing number of conditions on which banks have limited influence and must adapt.

In the case of banks and other financial institutions, EU sustainable development regulations clearly affect activities related to lending, investing and internal governance, as well as changes in the strategy of the entire institution. Because effective implementation of ESG strategies is only possible with full commitment at various levels of the organization: from management bodies to front- office employees.

Therefore, potential key success factors include:
1) appropriately shaped internal organization and a transparent system of responsibility,

2) expanding the scope of credit and investment analyses,
3) effective internal reporting (effectiveness indicators),
4) adequate control mechanisms,
5) remuneration policy considering ESG,
6) the role of compliance (the process of introducing new products) and
   internal audit.

Although bank business models, as a result of ESG regulations, are evolving primarily in terms of the following components: 1) customer profile – building their pro-ecological awareness and preferences, and 2) product offer – increasing the so-called green financing (Table 3). However, the process of expanding the scope of ESG regulations and taxonomies, which has been ongoing for several years, causes spillover effects on all components of business models, defined differently by individual banks.

Table 3. Types of loans and bonds financing sustainable development

Financial instrument	Characteristic
Sustainability-linked loans (SIL)	These are any type of credit or conditional instruments (such as security lines, guarantee lines or letters of credit) that encourage the borrower to achieve ambitious, pre-defined ESG performance targets. The borrower's performance is measured through sustainability objectives, which include key performance indicators, ratings or equivalent indicators and which measure the improvement of the sustainability profile. Depending on the goals achieved, customers can count on lower financing costs.
Ecological bonds (EB)	These are any development bond instruments the proceeds of which, or an equivalent amount, will be used exclusively to finance or refinance, in part or in whole, new or existing eligible environmental projects.
Sustainability Linked Bonds (SLB)	It is any type of bond instrument whose physical or structural characteristics may vary depending on whether the issuer achieves pre-defined sustainability or environmental, social policy and governance objectives.
Sustainability Bonds (SB)	These are all development bond instruments where the proceeds or an equivalent amount will be used exclusively to finance or refinance a combination of environmental and social projects.

Source: ICMA (2020, 2021), LMA (2019).

In response to ESG regulations, banks prepare various detailed reports in which they present the required reporting elements and their individual implementation practices. In the case of Santander BP SA Group (2023), these are the most important policies and regulations.

G-Corporate Governance: 1) A corporate governance model for the Group and its subsidiaries. 2) Detailed principles of corporate governance and the General Code of Conduct 3) Information policy and counteracting conflicts of interest. 4) Code of conduct on securities markets. 5) Anti-money laundering policy, anti-corruption program. 6) Sustainable development and remuneration policy.

E-Environmental: 1) Minimizing the impact of banking branches and activities on the environment (considering the internal environmental footprint, e.g. energy consumption, facility operation). 2) Promoting pro-ecological products and services and considering and assessing the impact of financed projects on climate change. 3) In terms of operational activities, offering the so-called green products and solutions, supporting the transformation of the economy into low- and zero-emission, educational activities, adapting to the requirements of international ESG regulations, conducting initiatives reducing the bank's environmental footprint.

S-Social – reports from: 1) bank employees, 2) customers and stakeholders, and 3) society.

Regulations regarding sustainable development are important determinants of models and strategies undertaken by banks, which in practice determine opportunities and challenges.

The opportunities include, for example:

1) increased demand for green financial products related to the 2022+ fuel crisis and the search for alternative sources of investment financing, e.g. in the area of energy, construction of new renewable energy sources,

2) growing expectations of investors and clients of financial institutions not only in terms of profitability, but also the impact of the investment or product on the environment, which is why banks see ESG not only as a regulatory necessity, but also as a development impulse and opportunities to improve their competitive position,

3) the product offer includes more and more so-called green sources of financing (loans, bonds) to finance renewable energy sources, projects increasing the share of green energy in the so-called energy mix or financing the increase in electrification, e.g. in transport.

The challenges include:

1) the need to expand source systems with ESG data,

2) some banks' business models and exposure portfolios may be particularly exposed to climate-related risks, e.g. related to economic sectors sensitive to climate-related physical threats, EU regulations on CO_2 emissions or the transformation towards a low-emission economy,

3) the implementation of new strategies and business models in the context of ESG requirements requires appropriate employee competences, the acquisition of which may be a great challenge,
4) an increase in ESG risk in banks, due to its multidimensionality, may escalate a simultaneous increase in credit, market, liquidity, operational and reputational risk.

5. Concluding remarks

The wide scope of ESG regulations in the subjective and objective dimensions determines the need to take adjustment actions at the level of supervisory institutions conducting macroprudential policy and by the obligated entities, including banks. SFDR regulations, NFRD taxonomy, CSRD, ESRS, CSDD and TCFD are the pillars of changes implemented in the entire financial sector of EU countries.

The impact of ESG (climate) risks on financial stability – both for the real economy and the financial system – depends on the interplay of exposures and financial vulnerabilities. Banks with greater exposure to climate-related concentration risk (CRCR) are more likely to suffer significant losses, with large exposures to dirty sectors (Q&M, real estate, trading). The main challenges of implementing ESG regulations include limitations in access to ESG statistics, specificity of some business models and exposure portfolios related to the so-called "dirty" sectors of the economy (mining, extraction, transport, trade), acquiring employees with appropriate ESG competencies, or numerous challenges related to non-financial reporting. Macroprudential policy tools should counteract systemic climate threats by targeting the risk of banks as key lenders to the economy (general and sectoral SyRB), complemented by direct borrower risk mitigation measures (BBM).

Regulatory and market pressure in EU countries leads to pro-ecological evolution of business models and value creation by banks, in which supporting the demand for green financial products (loans, credits, green bonds) and pro-ecological customer-friendly attitudes should be developed and seen as opportunities in competitive competition on the market.

To sum up, the research conclusions indicate the importance of considering the CSRD, ESRS and CSDD regulations. The most important tools of macroprudential policy addressed to banks in the EU include capital buffers and the general and sectoral systemic risk buffer, used to counteract systemic aspects of climate risk, and BBM tools for bank clients. The operational activities and strategies of banks are evolving towards a gradual shift in the product offer financing green investments in the form of, for example, green loans and bonds. Among the components of business models, banks make adjustments primarily in the following areas: balance sheet management strategy and customer profile. The activities undertaken

concern all activities in the areas of: corporate governance (e.g. business strategy, risk, responsible banking, sustainable supply chains), environmental (e.g. products in the field of green financing, the impact of operational activities on the environment or TCFD reporting), relations with stakeholders - Social (e.g. relationships with employees, customers and society).

Limitations

Since the legislative process in the field of ESG regulations has not been completed but is still ongoing at the level of many EU institutions, as is the stage of initial implementation of the regulations by the obligated entities, the analysis presented initially presents the main areas of impact as well as challenges and opportunities.

Recommendations

1. Macroprudential policy should increase the resilience of the financial system and thus reduce the strength of unfavorable macrofinancial feedback reactions resulting from unfavorable shocks, including climate shocks. These benefits will be most visible when they create an additional stock of capital above the minimum requirements that can be released in an emergency. Higher bank capitalization may reduce the financial risk associated with tightening monetary policy (e.g. in the period of high inflation dynamics and debt in the economy). Appropriate buffers will increase the resilience of the financial system and provide greater freedom in monetary policy.

2. Macroprudential policy should counteract systemic climate threats by simultaneously using tools aimed at banks and borrowers. Buffers should be used for banks to increase the resilience of the financial system (general and sectoral SyRB), requirements for higher bank capitalization in order to reduce financial risks. The following should be assessed: the general systemic risk indicator, the sector systemic risk indicator and the differentiated SyRB sector buffer indicator related to the concentration of climate exposures at the bank level. Instruments affecting the borrower should be applied to borrowers (borrower based measures, BBM).

3. In order to reduce ESG risks, financing on the markets for sustainable development needs should be supported through the so-called green instruments, i.e. an increase in the supply of green loans and the development of green treasury and corporate bond markets in EU countries.

4. It is also postulated to increase the scope of macroprudential policy towards ESG/climate risk in the field of non-bank financial

intermediation, which has shown an increase in investment financing in recent years.

Future research areas

Future research should address two areas. Firstly, after the initial implementation period of the implementation of ESG requirements, it will be justified to analyze the first effects and propose corrections of shortcomings and solutions supporting the improvement of the effects of reducing ESG risks in the banking sector of EU countries. Secondly, a comparison of practices in the implementation of ESG regulations and taxonomies between banks or banking systems of individual countries in the EU. Such a diagnosis of differences and implementation problems would be important in finding solutions to them.

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ARTICLES

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RESILIENCE OF SMALL AND MEDIUM-SIZED ENTERPRISES IN THE GERMAN-POLISH BORDER REGION UNDER CHANGING ECONOMIC CONDITIONS

Abstract:

SME resilience, interpreted as the resistant, flexibility and strategic revitalisation capacity of an organisation, takes on particular importance under conditions of extraordinary threats (e.g. COVID 19 pandemic, war in Ukraine). The important role of SMEs in the economies of many countries makes the resilience of companies in this sector, in times of crisis, crucial for the private sector, national economies and the global economy. The aim of this research is to identify the resilience factors of SMEs in changing economic conditions. The research hypothesis is formulated as follows: the resilience factors of SMEs are time-varying and require constant monitoring to maintain enterprise resilience. The verification of the hypothesis and the realisation of the objective will be carried out through theoretical and empirical studies of SMEs in Poland (West Pomeranian Voivodeship) and Germany (Mecklenburg-Vorpommern and Brandenburg). The analysis of the resilience of SMEs in economically and socially highly interconnected areas located in different countries is unprecedented in the literature, which demonstrates the innovation of the research conducted.

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1. Introduction

The frequency and severity of emergency threats is most likely to increase in the 21st century (WEF, 2013). Two previous major disease outbreaks, SARS and MERS, have been overtaken by a new coronavirus, COVID-19, which has evolved into a global pandemic. Business communities around the world have been affected by prolonged measures to prevent the spread of the coronavirus. Additionally, the war in Ukraine is becoming more and more important for the whole world. In the current situation - of extraordinary threats, small and medium-sized enterprises are most at risk of collapse in the business community. This is due to scarce resources and limited capacity to cope with external shocks (Asgary et al., 2020; OECD, 2020). The widespread failure of SMEs can generate unemployment, disrupt large, dependent firms and have a negative impact on the economies of countries on every continent. The important role of SMEs in the economies of many countries (contribution to GDP, value added, employment) makes the resilience of companies in this sector, in times of crisis, crucial for the private sector, national economies and the global economy (Asgary et al., 2020). Hence, the purpose of this research is to identify the resilience factors of small and medium-sized enterprises in changing economic conditions. The research hypothesis was formulated as follows: the resilience factors of SMEs are time-varying and require constant monitoring in order to maintain the resilience of enterprises. The verification of the hypothesis and the realisation of the objective will be carried out through theoretical and empirical studies of SMEs in Poland (West Pomeranian Voivodeship) and Germany (Mecklenburg-Vorpommern and Brandenburg). There is no consideration in the literature of strongly economically and socially linked areas located in different countries. The links are being strengthened by, among others, the Interreg VI A Programme Mecklenburg-Vorpommern/ Brandenburg/ Poland 2021-2027, which aims to strengthen functional links in the cross-border metropolitan region of Szczecin, coordinate cross-border planning and spatial development even more closely, provide and use public services jointly and overcome existing barriers, and increase the attractiveness of the border area for employees, businesses and capital. Thus, the resilience of businesses in the German-Polish border area may be a phenomenon that requires a joint, similar response to changing economic conditions.

2. Background

2.1. The concept of resilience and the SME sector

To date, there is no uniform definition of resilience in management and economics (Williams, Vorley, 2017). However, attention is drawn to the need to organise research in this area in a systematic way, especially referring to the SME area (Tognazzo, Gubitta, Favaron, 2016, pp. 768-790, , 2016; Williams, Vorley, Ketikidis , 2013, pp. 399-415). The resilience, crucial to the economies of many countries, of the SME sector is the subject of a dynamic academic and policy debate (Linnenluecke, 2017, pp. 4-30; Williams, Vorley, 2017). However, research in this area is very challenging, due, among other things, to differences in defining and measuring SME resilience (Dahlberg and Guay, 2015, pp. 975-984.; Tognazzo, Gubitta, Favaron, 2016). The first attempt to define the resilience of an organisation was made by C.S. Holling in 1973 (Holling, 1973, pp. 1-23). He referred to resilience as the ability of an organisation to return to a state of equilibrium (Engineering Resilience) and the volume of disruption that a system can absorb before destruction (Ecological Resilience). In contrast, Ch. Perrings in 2006 referred to resilience in terms of sustainability. According to him, 'resilience' is the ability of a system to cope with disturbances without losing its functionality.It is the ability to withstand market or environmental shocks without losing the ability to allocate resources efficiently (functionality of the market and supporting institutions) or to provide essential basic services (functionality of the production system) (Perrings, 2006, p. 417-427). With regard to regional, local policies, on the other hand, P. Regibeau and K. Rockett define resilience as the ability of an economy, society, organisation or individual to successfully recover from an unexpected shock (Regibeau, Rockett, 2013, p. 107-147). World Bank experts, on the other hand, accept that resilience is the ability of an economy or society to minimise losses in living standards, in the event of extraordinary risks (Hallegatte, 2014, p. 2-3).

In relation to SMEs, one can distinguish, definitions interpreting resilience as:

1. Adaptability, maintenance of positive performance (growth), responsiveness, competitiveness and the firm's ability to minimise vulnerabilities, as well as their rapid recovery from a disruptive state (Ates and Bititci, 2011, pp. 5601-5618; Biggs D., Hicks C. C., Cinner J. E., Hall C. M., 2015, pp. 65-74; Gunasekaran, Rai, and Griffin 2011, pp. 5489-5509).

2. The ability to identify, recognise and seize business opportunities (Hamel, Valikangas, 2003, pp.52-65; Manfield and Newey, 2017, pp.1155- 1180),

3. Combining a 'portfolio of opportunities'; maintaining or even increasing company performance in the face of disruption (Markman, Venzin, 2014, pp.1096-1107).

Taking into account the sources of the concept of resilience and the interpretations to date, it is proposed (and this definition will be adopted in this article), to interpret resilience as the resilience, flexibility and capacity for strategic revitalisation (regeneration) of an organisation under conditions of extraordinary threats.

Resilience is a multifaceted and multidisciplinary concept. It can be analysed at different scales. The World Bank distinguishes between the concepts of macroeconomic resilience and microeconomic resilience (Hallegatte, 2014, p. 3). In this article, the focus is mainly on microeconomic resilience relating to enterprises.

The most essential component of resilience is resistance, which T. Bishop and F. Hydoski defined as 'the ability of a company to return to its pre-stressor state'(Bishop, Hydoski, 2010, p. 23). Organisational resilience can be provided by four interacting elements:

1. Risk assessment – identify, categorise and estimate risk factors and indicate what strategy should be used to mitigate them.
2. Risk prevention – appropriate prevention strategies need to be implemented to anticipate and counteract specific risks.
3. Detection of anomalies in accordance with pre-approved risk areas – e.g. through periodic audits, continuous monitoring.
4. Responding to irregularities – scenarios should be prepared for dealing with irregularities in order to minimise their negative impact on the company.

The second component of the resilience concept is flexibility. An extensive interpretative analysis of proposals by various authors was presented by R. Krupski (Krupski, 2008, pp. 15-17). Looking for the resultant of various concepts, it can be assumed that flexibility is the ability of an organisation to adapt to conditions in its environment. The term adaptation has been used in this case intentionally, as a synonym for adjustment, due to the widespread use in English literature of the term adaptiveness to describe the phenomenon in question (Gibson, Ivancevich, Donnelly, 1998, p. 38; Strategor, 1996, p. 277). Adaptation can be external- consisting of an organisation's ability to influence its environment – or internal – amounting to adaptive change within the organisation. Flexibility may concern various areas related to the functioning of the organisation: the use of machinery, labour, material flows, product offer, operations, development, size of operations, assortment portfolio, introduction of new (modifying)

products (Ziębicki, 2010, p. 387-388). Flexibility is also often considered in the system of organisational subsystems: financial, information, manufacturing, market and strategic management (Krupski, 2008, p. 22).

The third element that contributes to the concept of resilience is the strategic revitalisation of the company. The process of revitalisation is equated with strategic change (Floyd, Lane, 2000, p. 155). B. Nogalski and H. Marcinkiewicz interpret the strategic revitalisation process as a change in the company's focus, which requires a new look at human resource management and the company's organisation (renewing) (Nogalski, Marcinkiewicz, 2004, p. 49). This means that the renewing process is implemented in two cases: the formation of a strategic gap and the anticipation of the formation of a strategic gap between the competences of the organisation and the requirements of the environment. An efficient strategic revitalisation of an enterprise should potentially bring it not only an improvement in efficiency, but also an improvement in its competitive position in the market, the establishment of better relations with customers, changes in the organisational structure favouring its flexibility of response, an increase in the scope of delegation of authority, the adaptation of activities (processes) to the requirements of customers, the development of new skills and key competences, the optimisation of the value chain, etc.(Walas-Trębacz, 2008, p. 97). There is therefore a close relationship between an organisation's resilience, its flexibility and its capacity for strategic revitalisation. All these elements contribute to the concept of resilience.

2.2. Business cycle theories

When the predominant economy was mainly based on agriculture and barter, economic downturns were largely due to natural disasters. With industrialisation and the development of the market, cycles in the economy came to be associated with human economic activity rather than natural phenomena. Wesley Clair Mitchell believed that business cycles appeared in Great Britain in 1790, in the USA in 1796, in France in 1847 and in Germany in 1857. After 1890, business cycles occurred in almost all economies of the world, not excluding communist economies (Mitchell, 1951, pp. 187-198).

In the development of economies, researchers have distinguished cycles of different frequencies:

1. Nikolai Kondratieff, distinguished long cycles (lasting about 50 years). The reason for their occurrence is the fact that infrastructure wears out and is renewed under the influence of technical progress, with the result that the development process took place in waves (Kondratieff, Stolper, 1935, pp. 105-115).

2. Simon Kuznetz, distinguished phrases, fluctuations (he did not call them cycles) that are mid-term (they last from 15 to 23 years). They are associated with demographic processes, waves of migrant inflows and, consequently, construction activity, i.e. investment in infrastructure (Kuznetz, 1930, p. 558).
3. Clement Juglar distinguished the so-called classic cycles (they range from 6 to 10 years). They are caused by fluctuations in fixed capital investment. This is related to the activities of banks and the excessive propensity to lend during economic expansion (Juglar, 1856, pp. 555-581).
4. Joseph Kitchin, distinguished the so-called short cycles (ranging from 3 to 4 years). They are caused by changes in working capital (inventory changes). They result in delays in the flow of information, which affects business decisions. These delays resulted in a mismatch between the volume of production and current demand, an excessive increase in inventories and, as a result, a fall in commodity prices and restrictions on production (Kitchin, 1923, pp. 10-16).

The division of cycles presented above, in terms of their duration, concerns the entire economy. In addition to mentioned, there are cycles associated with individual markets, industries and also cycles associated with changes in human activity during the year. Seasonal fluctuations, however, are often eliminated in business cycle analysis in order to expose the cyclical factor.

The economy-wide fluctuations mentioned so far are largely of historical interest, although contemporary work relating to them, mainly Kondratieff cycles, can be found. Modern approaches to business cycles stem from the development of the theory by Wesley C. Mitchell, Arthur F. Burns and other economists (Table 1).

Table 1. Contemporary view of business cycles

Author(s)	Interpretation of the business cycle	Cycle phases	Comments
Wesley C.Mitchell Arthur F. Burns	Some fluctuations in the overall activity of the economy as a whole	1. Expansion – occurs more or less at thesame time in different areas of business. 2. Recession – a period of economiccontraction. 3. Reconstruction - leading to development.	There are two distinctive points in the fluctuations – an upper turning point (peak) and a lower turning point (bottom)
Joseph Alois Schumpeter	The phases of the business cycle are related to equilibrium	1. The growth phase – is above economic equilibrium. 2. Recession phase – is above economic equilibrium. 3. Depression phase- are below economic equilibrium. 4. Recovery phase – is below economic equilibrium.	Misjudgements bymarket participants about the size ofdemand and supply lead to overheating of the economy
John R. Meyer Daniel H. Weinberg	The phases of the business cycle are closely linked to inflation	1. Recession – a period of decline in overall economic activity, affecting various areasof economic life, which lasts at least 1 year. 2. Renaissance – a period of recovery in economic activity, characterised by relatively stable prices, increasingproduction and productivity. 3. A state of demand inflation – a period of continued economic expansion, but accompanied by a constraint on access to resources, which causes prices to rise and productivity to fall. 4. Stagflation - a period in which growth slows down but inflation remains relatively high.	There is an assumption of pro – cyclical inflation,which counts as an empirical fact

Continued Table 1

Ilse Mintz	Growth cycles can be defined as changes in the growth rates of variables describing the activity of the economy	1. Phase of accelerated growth above trend. 2. Slow growth phase - below trend to date.	Cycles last from six months to about twoyears

Source: own elaboration based on: A.F. Burns, W.C. Mitchell, *Measuring Business Cycles,* NBER, New York 1946; J.A. Schumpeter, *Business Cycle,* McGraw-Hill, New York 1939; J.R. Meyer, D.H. Weinberg, *On the Classificatio on the Recent Cyclical Experience*, NBER INc. 55th Annual Report, September 1975, pp. 1-8; I. Mintz, Dating Postwar Business Cycles: Methods and Their Application to Western Germany, 1950-1967, NBER,New York 1969.

Growth cycles occurring in highly developed economies after the Second World War have drawn the attention of researchers to slowdowns in the growth phase of the economy. A new approach to looking at fluctuations in economic activity, based on the German economy, was presented by Ilse Mintz. The concept of growth cycles, of which she was the author, assumed that cycles as interpreted by Burns and Michell, do not occur. However, cycles do appear, initially called deviation cycles, understood as deviations from the long-term development trend.

The cyclical nature of economic development tends to spread across the world's economies. There is a certain synchronisation of them called the 'contagion effect'. This is due, among other things, to increasing globalisation, the increased openness of economies, the spread of technological progress and, often, the common policies of governments and central banks. An example of the synchronisation of growth cycles for the US and the EU-27 is shown in Figure 1.
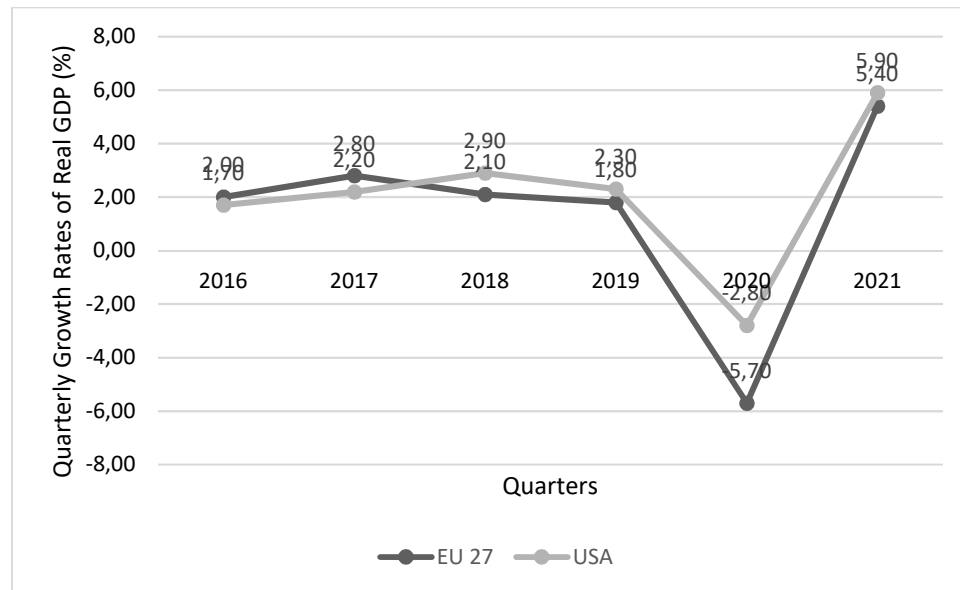
Figure 1. Synchronisation of US and EU-27 growth cycles 2016-2021 (annual data)
Source: OECD,   *National   Accounts   Statistics: Annual national   accounts,*   https://stats.oecd.org/?lang=fr&SubSessionId=1da0a12e-fb1f-40b5-bc65-45bf9ef767aa&themetreeid=-200, 27.02.2023.

Figure 1 shows an index of real GDP growth rates with a base year of 2015=100 for theUS and EU27 economies. Analysis of the figure allows one to see the synchronisation of economic growth rates as expressed by changes in real GDP. In many situations, one can see aslightly delayed reaction of the EU27 in relation to the activity of the US economy, which maysuggest the direction of the spread of changes and the contagion effect. Shown in Figure 1, changes in the activity of the European economies and the US economy correspond to classical cycles. This is because the changes in real GDP with a common base (in this case 2015=100) correspond to real GDP data.

A similar synchronisation of growth cycles can be observed for the EU-27 economies and the Polish economy (Figure 2).
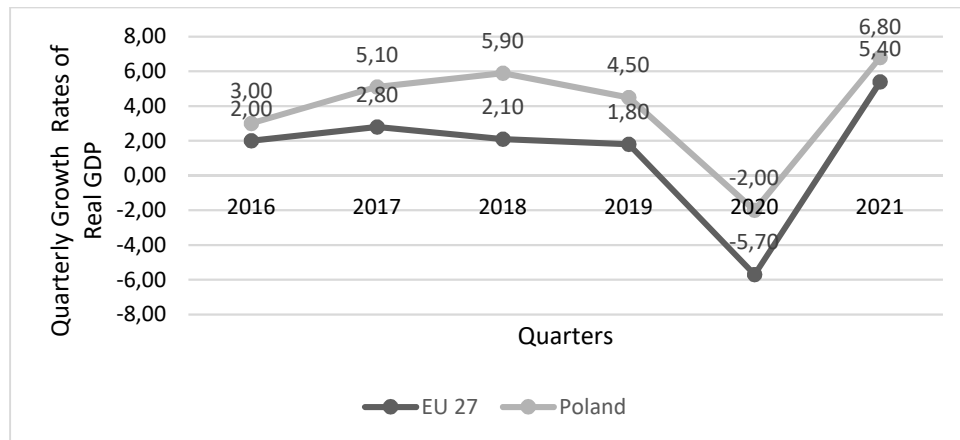
Figure 2. Synchronisation of the EU-27 and Polish growth cycles 2016-2021 (annual data)
Source: OECD, *National Accounts Statistics: Annual national accounts,* https://stats.oecd.org/?lang=fr&SubSessionId=1da0a12e-fb1f-40b5-bc65-45bf9ef767aa&themetreeid=-200, 27.02.2023.

Figure 2 clearly shows the synchronisation of economic development and its cyclicality in the EU27 and Poland, with a slightly delayed reaction of the Polish economy compared to the EU27 economy in many cases.

Synchronisation occurs to a much lesser extent in times of extraordinary threats (Covid 19 pandemic, outbreak of war in Ukraine). This is indicated by the degree of synchronisation of cycles for the EU27 and the US. Due to a change in national accounts methodology at the OECD, data from 2020 onwards are presented in separate graphs (Figure 3 and Figure 4).
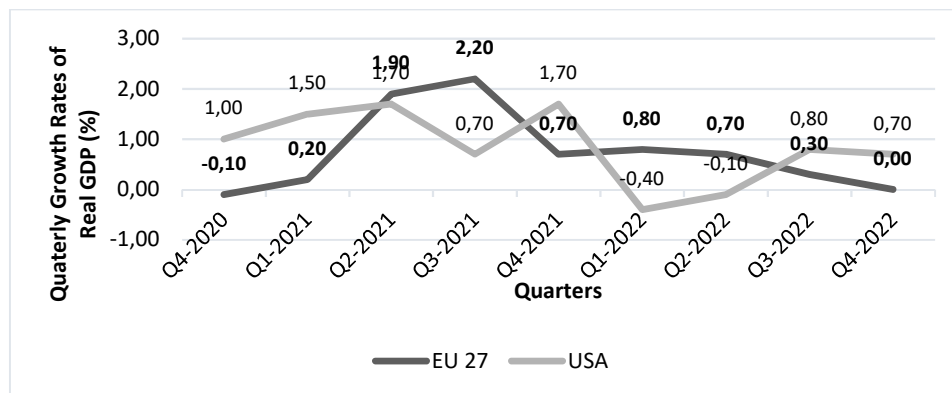
Figure 3. Synchronizacja cykli wzrostowych USA i UE-27 w latach 2020-2022 (dane kwartalne)

Źródło: opracowanie własne na podstawie: *OECD National Accounts Statistics: Quarterly National Accounts,* https://stats.oecd.org/Index.aspx?DataSetCode=QNA, 27.02.2023.

Less synchronisation, in times of extraordinary risks, also occurs between the Polish economy and the EU countries (especially in 2022). However, it can be assumed that the rather strong trade links between Poland and the other EU countries have to some extent prevented a deeper desynchronisation of fluctuations. Factors that increase the risk of desynchronisation of fluctuations, on the other hand, are the challenges in the form of large inflation differentials among EU countries, the impact of the war on EU economies and the 'side costs' of sanctions imposed on Russia due to its varying degree of dependence on raw materials (asymmetric shocks).
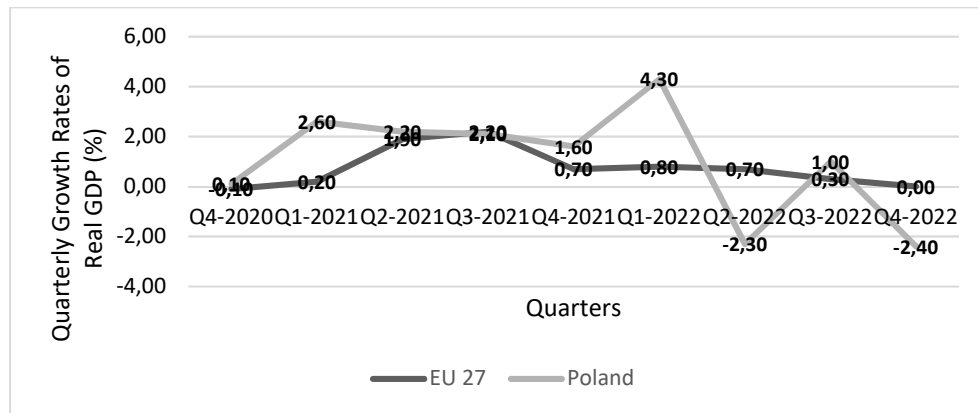
Figure 4. Synchronisation of EU-27 and Polish growth cycles 2020-2022 (quarterly data)
Source: own compilation based on: *OECD National Accounts Statistics: Quarterly National Accounts,* https://stats.oecd.org/Index.aspx?DataSetCode=QNA, 27.02.2023.

In summary, based on the data presented, it can be concluded that Poland
is characterised by a "moderate" degree of real convergence. This prompts the application of the classical business cycle in the following analysis.

2. Research method

The original empirical research was undertaken in October 2022, with a focus on the resilience of SMEs in the German-Polish border area under changing economic conditions. The research hypothesis was formulated as follows: the resilience factors of SMEs are variable over time and require constant monitoring in order to maintain the resilience of enterprises. The verification of the hypothesis was subordinated to the objective of identifying the resilience factors of SMEs in changing economic conditions.

The survey covered small and medium-sized enterprises based in Poland and Germany. The research was conducted in the West Pomeranian Voivodeship and in Mecklenburg- Vorpommern and Brandenburg.

The subject of the study is small and medium-sized enterprises. Business practices indicate that a SME is not a scaled-down version of a large enterprise [Chawla et al., 1997, pp. 47-58].

The research was conducted on the basis of a survey questionnaire, which provided the opportunity to carry out the research in a relatively short period of time. In order to prevent possible artefacts that may occur in survey research based on a survey questionnaire, important measures were taken:

1. The design of the survey questionnaire was based on a 'brainstorming' exercise to which academics (those with at least a PhD) and those with managerial functions in small and medium-sized enterprises were invited to participate.
2. Based on the designed survey form, a survey was conducted in April 2022. Based on these surveys, incomprehensible and ambiguous questions were eliminated.
3. The resilience research was multi-faceted. In addition to internal factors including resilience, flexibility and the ability to strategically revitalise, the environment of changing economic conditions was also taken into account.

In effect, respondents were presented with a form consisting of 16 closed and semi-open questions, four of which were metrics. The survey was anonymous.

In addition to the metric, the form has two other sections shaping the resilience of small and medium-sized enterprises under changing conditions:
1. The impact of cyclical conditions on the resilience of small and medium sized enterprises.
2. Measures taken by small and medium-sized enterprises to maintain resilience in volatile economic conditions.

A total of 276 small and medium-sized enterprises from the West Pomeranian Voivodeship, Mecklenburg-Vorpommern and Brandenburg completed the survey form online and on paper. A similar percentage of companies from Poland and Germany took part in the survey (Table 2).

Table 2. Structure of enterprises by provinces

Territorial units	Relative share of enterprises in the studied sample (%)
West Pomeranian Voivodeship	51,45
The Land of Mecklenburg Western Pomerania	26,45
The Land of Brandenburg	22,10

Source: own study based on conducted research.

In all administrative units, enterprises were mostly run by individuals as sole proprietorships (55.07% of enterprises surveyed), but there were also limited liability companies (18.48%) and civil partnerships (17.39%), as well as partnerships (9.06%) indicated by respondents themselves. The choice of business form was largely dictated by the size of the enterprise. This

is because the surveyed population was dominated by micro-enterprises, which accounted for 75% of the surveyed entities. Small enterprises accounted for 15.58% and medium-sized enterprises for 9.42%.

The sample was dominated by businesses in operation for more than 15 years, accounting for almost 34% of the population. More than 31% were businesses in existence for 10 to 15 years. More than 21% were enterprises in existence for 5 to 10 years and almost 14% were enterprises in existence for less than 5 years. The high share of long-established enterprises (more than 10 years) in the surveyed sample allows us to assume that the research was carried out among people who are well acquainted with the SME sector and the specifics of its operations, which significantly increases the quality of the research. The predominant share of long-established enterprises in the survey indicates that it is possible for small and medium-sized enterprises to remain competitive. Inviting experienced entrepreneurs to the survey will indicate ways of maintaining this competitiveness, which makes the survey legitimate and confirms the correct structure of the target group.

3. Research findings

In the first stage of the research, entrepreneurs assessed the impact of cyclical conditions on the resilience of small and medium-sized enterprises. First, entrepreneurs were asked whether they expected changes in the business cycle caused by external shocks (e.g. the Covid 19 pandemic or the war in Ukraine). Almost 80 per cent of respondents answered affirmatively, with the rest stating that they had at least partly expected an economic recession. Entrepreneurs then assessed the impact of the various elements on maintaining company resilience during the recession phase of the economic cycle.

Businesses were then asked to rate the strength of the impact (on a scale of -2 to +2) of each element on maintaining resilience during the recession phase of the business cycle. Table 4 details the responses obtained.

Table 4. Influence of individual elements on maintaining resilience during the recession phase of the business cycle

Power of influence Elements of resilience	-2	-1	0	1	2	Total number of responses
Organisational resistance	0	0	0	78	198	276
Flexibility of the organisation	0	0	22	120	134	276
Strategic revitalisation capacity	0	0	78	114	84	276

Source: own study based on conducted research.

Of the listed elements of corporate resilience, the most important for entrepreneurs is the organisation's resistance (almost 72% of respondents rated it as 2 and the rest as 1). Slightly less important is the organisation's flexibility (almost 49% rated it 2, over 43% rated it 1 and the rest felt it had no impact) and least important is the capacity for strategic revitalisation (over 28% felt it had no impact on enterprise resilience). This may be due to the selection of entities surveyed. In small enterprises (such is the majority in the sample), strategy generally does not take the form of a formal document. It usually exists in the heads of the owners. At the same time, it is worth adding that strategic resilience was more important for entrepreneurs from Poland than from Germany.

The next three questions were concerned with determining the significance of the impact of individual components on a company's resilience. Entrepreneurs were asked, among other things, which of the components of resisitance is most important in the company. Here, the individual elements were ranked as follows (dominance was used):

1. Risk assessment. Under this term, entrepreneurs mainly understood the identification of risk factors and the development of strategies to mitigate them.
2. Responsiveness to irregularities. This characteristic was often linked to the elasticity of the company and a rapid response. The need to prepare scenarios for dealing with irregularities was also recognised.
3. Preventing risks. Entrepreneurs mainly had in mind anticipating and counteracting risks.
4. Detection of irregularities. Only a minority of entrepreneurs see the need for auditing and monitoring (about 12% in the West Pomeranian Voivodeship, about 11% in the Land of Mecklenburg-West Pomerania and 9% in the Land of Brandenburg).

Entrepreneurs were then asked to rate the importance of the different elements of flexibility in the recession phase by giving them ranks. For this purpose, entrepreneurs ranked the given factors from most important to least important. Table 5 shows the dominance for the determinants.

Table 5. Assessment of the relevance of individual flexibility elements (dominant)

No.		West Pomeranian Voivodeship	The Land of Mecklenburg-Western Pomerania	The Land of Brandenburg	Total
		Territorial units			
1.	Internal flexibility - financial	1	1	2	1
2.	Internal flexibility - information	6	5	5	5
3.	Internal flexibility - manufacturing	5	6	6	6
4.	Internal flexibility - strategic management	3	4	3	3
5.	Internal-information-tecnological flexibility	2	2	1	2
6.	Internal flexibility - human resources management	4	3	4	4
7.	Internal flexibility - other (please specify)				
8.	External flexibility	7	7	7	7

Source: own study based on conducted research

The entrepreneurs surveyed considered internal financial and IT-technological flexibility to be the most important. External flexibility is the least important. Thus, they assume that a company's resilience largely depends on internal factors, which they can directly influence and predict. The answers to the question on strategic resilience are also interesting. Although it is the least appreciated element of resilience, they recognise its positive effects, which include (given by number of indications):
- a)   improving efficiency,
- b)   improving its competitive position in the market,
- c)   establishing better customer relations,
- d) changes to the organisational structure to favour its flexibility of response,
- e)   increasing the scope for delegation,
- f)   adapting activities (processes) to customer requirements,
- g)   the development of new skills and key competences,
- h)   optimising the value chain, etc.

When asked about taking advantage of opportunities arising in the environment, as many as 85% answered in the negative (most from West Pomeranian Voivodeship). They argued that the company was not prepared for external shocks and focused on minimising the effects of the risks. On the other hand, when asked about avoiding risks, 79% of the entrepreneurs (most from The Land of Brandenburg) confirmed that they had managed to do so. They argue this, among other things, with extensive experience, good knowledge of the market in which they operate and a committed workforce

The second stage of the research analysed the actions taken by small and medium-sized enterprises to maintain resilience in changing economic conditions. All enterprises declared that they had taken such measures. These were mainly measures aimed at maintaining the company's resistance (Table 6).

Table 6. Actions taken by entrepreneurs to maintain company resilience

No.	Activities	Territorial units		
		West Pomeranian Voivodeship	The Land of Mecklenburg-Western Pomerania	The Land of Brandenburg
1.	Organisational resistance	62,68	69,86	77,05
2.	Flexibility of the organisation	33,10	24,66	18,03
3.	Strategic revitalisation capacity	4,22	5,46	4,92

Source: own study based on conducted research.

For entrepreneurs in each of the areas surveyed, the most important activities were in the area of company resistance (highest indication 77.05% in The Land of Brandenburg). Far less active was the area of organisational flexibility (highest indication 33.10% in the West Pomeranian Voivodeship). The least action was taken in the area of strategic revitalisation (highest indication 5.46% in The Land of Mecklenburg Western Pomerania). At the same time, entrepreneurs mostly (75.4%) declare that they will take further measures to support the resilience of the company. These will be mainly (62.7% of respondents) directed at building the organisation's

internal resilience (resistance, flexibility, strategic revitalisation capacity), and to a lesser extent at building external resilience (37.3%).

The summary of this part of the research are the views on the resilience of the company made by the management level. The assessment concerned the period before the pandemic and the war in Ukraine, during the war in Ukraine (2022) and the forecast for 2024. In the period beforethe war, for all areas (internal-resilience - resistance, elasticity, strategic revitalisation and external resilience), every second respondent (median) considered their company to be more resilient than others. Entrepreneurs from Brandenburg rated themselves best in relation to their competitors, and those from the West Pomeranian Voivodeship rated themselves weakest. For internal resilience, the majority of respondents (57%) rated themselves at a similar level to thecompetition. For external resilience, they rated themselves mostly (62%) worse than the competition. The rest at a level similar to the competition. The responses regarding the forecast for 2024 are also interesting. There is an optimistic attitude among entrepreneurs. Respondentsbelieve that this will happen after the war in Ukraine. According to entrepreneurs, their resilience inall areas will again be higher than the competition. It is noteworthy that a more optimistic attitude is evident for entrepreneurs from Germany than from Poland. Perhaps this is due to the geographical location and positioning in relation to Ukraine.

4. Discussion of findings. Conclusion

Extensive empirical research, supported by extensive theoretical studies, has led to the identification of resilience factors of small and medium-sized enterprises in Poland and Germany under changing economic conditions.

Resilience is the ability of a business to survive and thrive in the face of change and difficulties. Some of the factors that influence the resilience of small and medium-sized enterprises are:

1. Flexibility and innovation - SMEs that are able to adapt to changing conditions and innovate quickly are more likely to survive.
2. Sustainability – Companies that balance economic, social and environmental development are more resilient to crises.
3. Creativity and entrepreneurship – Businesses that are able to use their creativity and entrepreneurship to grow and expand are more flexible and resilient to change.
4. Good communication – SMEs that have open and effective internal and external communication are better able to deal with challenges and make decisions faster.
5. Human resources – Companies that have well-qualified and committed employees and manage their team well are more flexible and able to adapt to change more quickly.

6. Diversified sources of income – Companies that have diverse sources of income, such as different business lines or markets, are more resilient to crises in one industry.
7. Good strategy and planning – SMEs that have a well-developed strategy and long-term planning are better able to anticipate and cope with difficulties.
8. Financial resources – Companies that have the ability to raise finance and manage their financial resources effectively are more resilient to change and difficulties.
9. Networking and partnerships – Businesses that have a well-developed network of contacts and partnerships are better able to cope with challenges and adapt more quickly to a changing environment.
10. Good reputation and trust – SMEs that have a good reputation and build trust among their customers, employees and partners are more resilient to difficulties and better able to cope with crisis situations.

The determinants presented are certainly not a closed set, and the changing economic reality calls for further, in-depth research into SME resilience.

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ARTICLES

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Krystian Jerzy Malesa

URBAN PARKS AS PUBLIC GOODS: A COMPREHENSIVE REVIEW OF BENEFITS AND COSTS IN METROPOLITAN LANDSCAPES

Abstract:

This article examines urban parks in metropolitan landscapes from a public goods theory perspective, highlighting their significance in providing recreational spaces, improving air quality, and offering ecosystem services. It traces the concept of urban parks from historical roots to modern implications for city planning and environmental management. Focusing on a case study of Warsaw's green areas, the review identifies correlations between the costs of maintenance and user satisfaction, underscoring the economic and social benefits of urban parks. By exploring the non-excludable and non-rivalrous nature of parks, the study advocates for their recognition as public goods that merit sustained investment. The findings suggest that strategic development and maintenance of urban parks are crucial for sustainable urban living, emphasizing their role in enhancing the quality of life in cities. Future research directions are proposed on managing and financing urban green areas.

Keywords: city parks, costs of maintenance, green areas, local government, public goods

JEL codes: Q26, R3

Introduction

The purpose of this article is to analyze the role of urban parks within metropolitan areas through the lens of public goods theory, highlighting their economic, environmental and social benefits to urban populations. It aims to bridge the gap between theoretical concepts of public goods and practical

implications for urban planning and environmental management, with a focus on evaluating the relationship between maintenance costs and user satisfaction within the context of urban green spaces.

As indicated by W. Niemirski (1973, p.60) the urban park is one of the elements of green areas that is areas developed primarily with vegetation, serving recreation". M. Siewniak and A. Mitkowska (1998, p.12) describe a park as a variety of garden composition, within the basic division into gardens and parks. Compared to a garden, a park is characterised by a much larger area dedicated to the plant composition, and also "blurring the boundaries of the composed ensemble and neighbouring areas", and is intended for the general public of the city.

The etymology of the word "park" can be traced back to the 11th century in Sicily, where a vast royal park with woods, mountains and a stone wall was built near the city of Palermo and called "parco", which in Italian still means park today.

A city park is a public organised space within a city, landscaped with vegetation. It has a leisure and recreational function, often also a sporting or other function depending on the particular park setting. It is distinguished from an urban garden by its larger size and the complexity of the functions it performs. In most cases, the park has designated paths and routes for walking, in addition to landscaping, playgrounds, gazebos, monuments, fountains or other water features. As E. Roberts (2001, p.20) describes the parks described, especially those with large areas, are a substitute for a forest in the city, thus transporting the visitor beyond the mental boundaries of the metropolis.

As K. Malesa (2012, p.345) describes urban greenery, and in particular trees, are the 'lungs' for the city. The importance of caring for them, especially the oldest ones, can be seen in the example of a 100-year-old beech tree, which produces 1.7 kg of oxygen per hour, which amounts to 3500 kg of oxygen per year in the growing season, the amount used by around 10 people. The value of such an old tree can be demonstrated by the fact that the same tree can absorb 4800 kg of carbon dioxide as 1700 young ten-year-old trees.

One of the most important needs of the city citizen is the need for contact with nature, and this is made possible by park space. "This need characterises the modern citizen, although it is similar to the needs of citizens of the 19th century city" Wolski (2006, p.10). According to A. Zachariasz (2006, p.25) parks and urban green spaces can be considered as a kind of indicator of civilisation development and living standards. This view is supported by opinions placing access to open spaces on a par with access to basic services, considered essential for a good quality of life and sustainable development at the local level. Trees in the city act as filtering mechanisms

for dust and gas pollutants, and are responsible for absorbing toxic gases and heavy metals emitted by car exhausts and factory chimneys.

As K. Malesa (2009, p.43) describes One deciduous tree is able to absorb the pollutants produced by burning 130 kilograms of fuel during the growing season. City parks, which are generally clusters of large, old specimen trees, are the city's 'oxygen factories', so they should be cared for and increased in number wherever possible. In the city, where traffic is heavier than in rural areas, green spaces play a significant role, especially in terms of cleaning the air of carbon dioxide, but not only. In addition, all vegetation has a beneficial effect on the movement of air masses especially among buildings, temperature regulation and air humidity.

While all the above-mentioned advantages of urban parks are indisputable and valid, it is also worth bearing in mind that these public assets provide many residents with relaxation and a place where they can find an oasis of calm and feel a specific microclimate in relation to the polluted urban climate. It is worth adding here that "the archetype of all parks is the natural landscape" P. Wolski (2008, p.10). This is the secret of urban parks and why residents feel good in them, because unlike the architecture of the city, when entering one feels the natural landscape, which is hard to find or not notice in the daily "urban rush". This is confirmed by A. Lis (2004, p.48), who notes that the perception of the environment through park settings evokes positive emotions, and for this very reason urban parks, being a place of contact with nature, are a source of relaxation and rest. A similar opinion is held by B. Gołębiewska (2004, p.93), who describes the inextricable link that exists between man and nature and the fact that mankind derives countless benefits from the natural environment in the form of goods and services. A good city park is an attractive place for all people regardless of age and social status. It is a unique, unrepeatable part of the city with a strong identity and good landscaping. However, to be such, it needs to fulfil many functions. The above sentences are confirmed by G. Jellicoe (1991, p.373), who argues that "the parks that are set up become a reflection of society and its needs". Parks are needed, people try to fit them to their needs, and sometimes they even set them up themselves, interestingly sometimes illegally, but with very good results. One such interesting example of how determined residents can be in their need for a park is 'Nasz Park' in Warsaw's Kabaty district, where a group of residents decided on their own, it is worth adding, without any permits in an undeveloped area near their housing estate, thus protecting the area in front of their blocks from potential development.

The above example testifies to the resurgence of civil society in people, to the fact of how important urban greenery is to them. One can mention the action of the year in 1980, which urged people to "plant family trees".

The research gap addressed by this article revolves around the comprehensive understanding and empirical evaluation of urban parks within the framework of public goods theory, particularly in terms of the relationship between maintenance costs and user satisfaction. Despite the extensive literature on the benefits of urban green spaces, there remains a scarcity of integrated analyses that connect these benefits to the economic and policy dimensions governing urban parks. Specifically, the gap lies in the quantification of how investment in park maintenance translates into public satisfaction and how this relationship can inform sustainable urban planning and policy-making. This article seeks to fill this void by offering a detailed case study of Warsaw, thereby contributing to a more nuanced understanding of urban parks' role as public goods in metropolitan landscapes.

The structure of the article is designed to methodically bridge this research gap, beginning with an introduction that sets the stage by defining urban parks as public goods and highlighting their significance. This is followed by a methodological section that explains the dual approach of literature review and empirical case study analysis, ensuring a solid theoretical foundation and practical insights. The core of the article is divided into two main parts: the first explores urban parks from the perspective of public goods theory, detailing the theoretical underpinnings and legal considerations; the second part presents the case study of Warsaw, analyzing maintenance costs versus user satisfaction. The conclusion synthesizes findings, discusses implications for urban policy and planning, and suggests directions for future research, thus providing a comprehensive examination of the subject matter structured to address the identified research gap effectively.

1. Methodology

The methodology of this article is anchored in a dual approach, combining a comprehensive literature review with an empirical case study analysis. Initially, the literature review methodically examines historical records, theoretical frameworks, and contemporary research on urban parks, public goods theory, and the economic, environmental, and social impacts of green spaces within urban settings. This review serves not only to trace the evolution of urban parks from their origins to their current status within metropolitan landscapes but also to elucidate the theoretical underpinnings that classify urban parks as public goods. By integrating insights from a broad spectrum of sources—including academic journals, historical texts, and policy documents—the literature review establishes a solid foundation for understanding the multifaceted role of urban parks. This groundwork is crucial for bridging theoretical concepts with practical implications,

providing a nuanced context that informs the subsequent empirical investigation.

The empirical component of the methodology focuses on a case study of Warsaw, utilizing quantitative data to explore the relationship between the costs of maintaining urban parks and the satisfaction of their users. This analysis is predicated on the collection of data from surveys and municipal reports, which detail the unit costs of maintenance and average satisfaction scores across different districts within Warsaw. By employing statistical techniques to assess correlations between maintenance expenditure and user satisfaction, the case study offers tangible evidence of how urban parks are valued by residents and the financial implications of their upkeep. This methodological approach not only grounds the theoretical discussion in real-world outcomes but also highlights the practical challenges and opportunities faced by urban planners and policymakers in managing urban green spaces. Through this detailed examination, the article aims to contribute actionable insights into the effective management and strategic development of urban parks as essential public goods within the urban fabric.

Following K. Malesa (2008), for the purpose of this study a survey was conducted to find out the opinions of urban park users about Warsaw's green spaces, in particular city parks, their equipment and maintenance methods. The survey was intended to give an idea of how residents evaluate parks in terms of aesthetics, accessibility, functionality and the quality of their maintenance.

The survey was conducted personally by the author of his doctoral thesis among users of urban parks in the districts where such parks were located, i.e. in fifteen of the eighteen districts of Warsaw.

The study used an author's survey questionnaire; in addition, the budget execution reports of the City of Warsaw for individual districts were used. From the budget reports, detailed data was selected on the maintenance of parks, the average monthly cost of maintaining one hectare of park, greenery maintenance with particular emphasis on the purchase and planting of plant material, weeding and grass cutting, as well as park cleaning, costs related to electricity and water for park facilities, costs related to repair works of park infrastructure and landscaping in parks, purchase of baskets and park benches, expertise, maintenance and operation of fountains and water cascades, sewage disposal fees and snow removal from park alleys were also examined. For the purposes of the research, the choice of statistical methods was based on a questionnaire survey and statistical analysis of detailed data from the city's budget reports based on the area and maintenance costs of green spaces. All results were then compared and the level of satisfaction was determined in relation to the expenditure made.

2. Urban parks in public goods theory perspective

"The theory of public goods is one element of a broader theory of public choice that includes, among others, the economic theory of democracy, the theory of interest groups, the theory of common goods and the analysis of the mechanisms of rent-seeking" M. Maciejczak (2009, p.10). The above-mentioned theories operate in the trend of new institutional economics, which is a successful synthesis of neoclassical economics and institutionalism. It is currently one of the fastest growing currents in contemporary economics and is of interest to numerous social sciences, including political science, sociology and law. Public choice theory is also referred to as the economic theory of politics. This relatively new field of economic science uses the methodological tools and assumptions of standard economics to analyse people's behaviour in activities of a political nature and in other areas of the public sphere. The sphere of research and analysis of public choice theory is the area of political decisions, the formation of public order and the mechanism of public goods provision. As indicated by J.Wilkin (2005, p.7) the scientific literature emphasises that including the category of institutions in the analysis not only enriches the economic sciences, but also brings economics closer to other scientific fields such as law, psychology, sociology or political science. The concept and theme of public goods appeared in Polish legal doctrine and economic thought in the interwar period. Polish pre-war science in building their concept reached to normative and doctrinal solutions formed in Western Europe. The issue of public goods, then called public things, was also dealt with in the first years of the People's Republic of Poland, but the pre-war concepts were rejected as not being suited to socialist reality. A renewed interest in this topic in Poland was brought about by systemic and economic reforms initiated at the turn of the 1980s and 1990s.

The originators of the theory of public goods from their inception are considered to be the Americans, who described them during the period when the Second World War took place in Poland. The currently cited definitions of public goods come from the inter-war and early post-war literature, and classifications of this concept are also drawn from this period, which form the basis for consideration of contemporary public goods, which belong to the category of public property and are the subject of public ownership by I. Sierpowska (2009, p. 315).

Forerunners of the concept of public goods were economists working on problems of the purpose and scope of state spending and taxation, among them: David Hume(2010, p.143), John Stuart Mill, Richard Musgrave (1939, p. 214), as well as Erik Lindahl, Emil Sax and Knut Wicksell. One of the earliest definitions concerning the theory of public goods, however, was created by Paul Samuelson (1954, p.388) in 1954, who in his work 'The Pure Theory of Public Expenditure' considers collectively consumed goods as those

that are non-excludable and non-rivalrous. Public goods, moreover, have a utility function for individuals, no one is excluded from the benefits of their use, and they can be used by a great many economic agents. R. Sturn (2010, p.281) in his article presented the situation of the subject of public goods before the promulgation of the theory of P. Samuelson. He describes that R. Musgrave had already dealt with the income and expenditure theory of public goods in 1939, where he noted that despite the penetrating insights of D. Hume, J. Mill, and H. Bowen (2010, p.288) they did not point out the differences that exist between goods in the broad sense and public goods. R. Sturn (2010, p.301) describes that despite the many similarities linking the two concepts described by these authors and the fact that in some cases public goods can also be commodities, it was R. Musgrave who essentially separated the concept of public goods and commodities. More than twenty years later, R. Musgrave (1959, p.129) introduced, and in fact expanded, the definition of a public good by referring to its non-excludability and non-rivalness.

R. Musgrave(1959, p.129) pointed out that the non-rational character of consumption implies the existence of positive externalities. In doing so, however, he noted that this does not mean that every beneficiary of such a good obtains the same subjective satisfaction – utility – from it, or even that the good or service so obtained will have the same quality in each individual case. R. Musgrave noted that a good or service available to the public need not have the same quality for each recipient and that beneficiaries of an equally available public good may derive different subjective satisfaction – utility from it. Urban parks are an example of this observation. While they are available to the public, the assessment of their quality and the inhabitants' satisfaction with how they look and the assessment of how a given local authority manages them may differ. In addition, residents of a given local authority may have access to unequal amounts and quality of goods provided by the local authority, as some will be closer and others further away from a given park setting. If there is a need to study accessibility and satisfaction with these goods from the consumer-demand side and not only from the supply side, a survey is necessary.

The zero-one assumption of the traits described by Samuelson leads to a division of the set of goods into pure private and pure public, a division that is in principle impossible to apply in empirical research, not least because excludability is understood as the level of cost at which it can be achieved, not as excludability at zero cost of providing it. It is therefore accepted that both characteristics can vary continuously from zero – the absence of a characteristic, to unity - its full presence A. Kondratowicz (2009, p.19). D. Pearce (1983, p.360) described that economists tend to regard the pure public good construct as purely hypothetical, with no factual rationale, but necessary and beneficial for public choice analysis.

The definition of a public good is therefore clear and precise, saying that these are goods characterised by the fact that they cannot be excluded from consumption - non-excludability - and at the same time are not competitive in consumption - non-rivalrousness. The first principle means that if a unit of a good has been provided, it is not legally possible to prevent others from using the good. The second principle, on the other hand, means that the consumption of a good by one person, does not deprive other people of the possibility of consuming the same good, and therefore, without any consequences, the good can be consumed by many people at the same time.

Public goods are a type of public thing in the strict sense. Public goods include roads, bridges, rivers, canals, beaches, sea water and parks, among others. The public nature of a good as defined by I. Sierpowska(2009, p.310) may arise either due to its natural characteristic, as is the case of a river or a sea coast, or through legal designation, as, for example, a city park, which, assuming that it is not a historical establishment, arises on a place that previously had a different designation. This division also refers to the distinction between natural and manufactured goods. The former were created by natural forces, the latter are the product of human activity. Nowadays, in the case of many public goods, this division is becoming more and more indiscernible, as many natural goods are subject to constant human intervention. Examples of this include the regulation of rivers and coasts, which involve significant amounts of labour and capital, which are necessary to adequately maintain the goods described.

As A. Błaś (2003, p.292) describes the literature points out that in the case of public goods, whether they are natural goods such as a national park or manufactured goods such as a city park, in order to become public property, they must undergo a phase of legal qualification in forms considered appropriate, usually this is done through an administrative or normative act, for example the creation of a national park, a nature reserve, a landscape park or a resolution of a municipality, a city to create a city park.

Public property, as an object of public ownership, is subject to a specific legal regime, which refers primarily to the limitation of the owner's power to dispose of the thing. Already in the pre-war literature it was emphasised that "public property is inalienable as long as it serves a public purpose, is not subject to prescription, lien and compulsory execution" described by I.Sierpowska (2009, p.309).

When describing urban parks as an example of public goods, it is therefore worthwhile to lean into the legalities that detail what can and cannot be done with all public goods, including parks. These conditions are also an indicator confirming that urban parks belong to the group of public goods.

Public goods with special historical, cultural, national values are excluded from circulation and are subject to special legal protection. Some of them

can only be the subject of public ownership, they cannot become entirely the subject of market transactions, and unlike private property, the State Treasury cannot relinquish the right to their ownership either. Public goods such as, for example, city parks, state schools, prisons are subject to administrative supervision and special protection against, for example, wear and tear, destruction or change of use pointed by J. Szałuchowicz (2000, p.19).

Public assets are subject to public ownership, owned by the state, which in individual cases delegates the authority and care of them to local government units, which take direct care of the entrusted objects in their area. Sometimes, however, individual objects are handed over to other entities, for example scientific entities, for a given period of time. Public property belongs to the state or local government, but the users of sites designated for public use under specific legal provisions, such as a lending agreement with a scientific institution, may also be other entities, but in this case the site loses the character of a public property. Such an example is the palace and park complex in Natolin in Warsaw's Ursynów district. More than a hundred hectares of city parks and a historic palace together with numerous buildings were transferred in the early 1990s on a long-term lease for educational purposes to the College of Europe, a branch of the College of Europe in Bruges, Belgium. On the one hand, this resulted in the park being closed to people not connected with the European College for many years, making it impossible for local residents to enjoy the charms of the place on a daily basis; on the other hand, however, the Natolin European Centre Foundation, which looks after the monument, has carried out conservation and adaptation work on the buildings of the former palace complex, thanks to which the building has retained its splendour. In addition, during the more than twenty years of the facility's use, several new buildings were erected for the use of lecturers and young academics, the Rector's Office and conference and lecture halls. The architectural form of the new buildings referred to the restored historical buildings described by M. Drozdowski (1972, p.47).

J. Owsiak (2005, p.28) includes national parks to public goods, without referring to their size and location, so they can be compared to city parks, which, according to this theory, also belong to public goods. The situation regarding this division becomes unclear, according to J. Owsiak, when a significant number of visitors come to a city park, as described earlier, or when a fee for entering it is introduced. This problem is clearly solved by P. Samuelson , who argues that an increase in the number of users does not eliminate or diminish the possibility for all users to benefit from a given good, so this is an important statement to take into account when classifying urban parks as public goods.

The criteria that determine whether a good is public or private are the criterion of utility, considered as social, and the criterion of retribution, understood as economic.

Public utility is not uniformly defined, in a broad sense it is sometimes equated with public tasks, the implementation of which is the responsibility of government and local government administration. The Act of 8 March 1990 on municipal self-government defines public utility tasks as those tasks whose purpose is to satisfy the collective needs of the population on an ongoing and uninterrupted basis through the provision of universal services. Taking this definition into account, it can be assumed that the public utility of the goods in question consists in their use to meet the needs of the population on an ongoing and uninterrupted basis as a result of universal accessibility to the good in question. The economic criterion, on the other hand, determines by means of the source of payment whether a good can be classified as a private or public good. According to E. Denek (2003, p.11) the distribution of goods, social services may be performed by various methods, in other words, their provision may be free of charge, partly payable and fully payable. This implies that some social services are included in the broadly defined public goods. Pure public goods are those goods, commodities or services that are entirely financed by public funds such as, inter alia, local government budgets or the state budget. This creates the collective consumption of society, which is financed by public funds. Pure public goods are free of charge for their recipients, whereas private goods are partially or fully chargeable.

The difference between the two approaches lies in their benefits. The benefits of private goods are limited to one user or his or her family, whereas public goods have a wider reach. If one person uses a private good such as a car, it is inaccessible to other people, the opposite is true for public transport, which, as A. Skrzypek (2017, p.204) notes, should outpace the development of other sectors of the economy. One of the characteristics of private goods is the rivalry of their users, in order to own them they have to compete among themselves R. Musgrave (1984, p.8). The situation is different with public goods, which are not affected by the rivalry described earlier.

The universality of the use of different types of public goods is unlimited, which means that everyone can use a public good at the same time and to the same extent. This use may be unconditional, when, for example, a city park is open twenty-four hours a day to all wishing to visit it, or it may experience various restrictions, for example, through the opening hours of the park, relevant laws or actions of administrative bodies may extend or tighten the use of the good, make it subject to additional conditions or the payment of fees. Paid admission to a park means that not every citizen will be able to enter it, if admission is paid for everyone, including in particular

residents of the area in which the park is located, in which case the park should be classified as private property. In the case of the discussion on charging for entry to city parks, the statements of J. Owsiak who believes that free public goods are controversial among economists and politicians, should be cited. The fact that public goods are free of charge and that there is no charge at all can lead to waste, causes users not to respect green spaces such as city parks, not to take proper care of them. "This is because public goods are used by everyone, regardless of whether those who use them contribute to the costs of their maintenance or not" P. Gołasa (2015, p.134).

Admission to most city parks in Poland is free, in some cases they are closed for the night and well-maintained, in others, generally open 24 hours a day and without adequate protection, one may encounter painted benches, scattered rubbish on the lawns or various acts of vandalism. Such a situation is not observed, among others, in Japan, where admission to most city parks is paid. These are small fees, equivalent to a few euros47 , but this ensures that city parks are visited by interested parties and not by random people who, in some cases, do not respect the place where they find themselves.

Another example of a city park entrance fee is the Giardino dei Boboli and Giardino Bardini in. Florence, one of the most visited cities in Italy by tourists, with over 8 million visitors a year, introduced an entrance fee to its two most beautiful and oldest parks a few years ago. The purchase of a ticket to enter the two parks mentioned is ten euros and applies to all tourists. Free admission to the parks is available to those living in Florence and to people over 65. In this case, the gardens described are public goods, but only for people registered and paying taxes in the city where they live. Tourists, in order to enter them, have to pay an appropriate fee, part of which goes to cover the maintenance costs of the park described by G.Malin (2014, p.93).

Another different example of an entrance fee can be found in India, where the Taj Mahal temple, considered one of the seven wonders of the world and surrounded by a beautiful garden, also has an entrance fee, except that Indian citizens pay an entrance fee of 10 rupees and tourists of other nationalities pay 75 times more, or 750 rupees. This imbalance is mainly due to the desire to get as much money as possible from tourists and the price differences prevailing in India and, for example, in Europe. The Indian example excludes the Taj Mahal as a public good because regardless of nationality or place of residence everyone has to pay a fee to enter it, only the amount changes.

The examples listed above show how the criteria of usefulness and chargeability influence the classification of individual park facilities as public or private goods, and what benefits these criteria have for urban

parks, which in Poland are in the vast majority of cases classified as public goods due to, among other things, their non-excludability from consumption and non-privatisation in consumption.

3. Costs of green area maintenance versus user satisfaction: case of Warsaw

As described by K. Malesa (2018, p.282), Table 1 summarises the unit maintenance costs and average satisfaction scores for urban parks, street greenery and residual greenery in the various districts of Warsaw.

Table 1. Average satisfaction with green spaces and unit maintenance costs in 2014
District

District	City parks		Street green areas		Other green areas	
	Medium satisfaction	Unit cost maintenance (thousands PLN/ha)	Medium satisfaction	Unit cost maintenance (thousands PLN/ha)	Medium satisfaction	Unit cost maintenance (thousands PLN/ha)
Bemowo	3,45	20,7	3,16	6,8	3,43	8,3
Białołęka	3,44	18,4	3,13	6,0	3,30	5,7
Bielany	3,50	43,0	3,41	18,4	b.d.	b.d.
Mokotów	3,65	10,6	3,50	9,9	3,31	13,3
Ochota	3,58	13,2	3,13	10,8	3,13	8,3
Praga Płd.	3,81	24,5	3,12	19,0	3,30	43,5
Praga Płn.	3,02	12,9	2,79	25,0	3,14	12,9
Śródmieście	3,75	14,1	3,10	43,4	3,20	37,2
Targówek	3,74	22,7	3,28	13,1	3,60	25,3
Ursus	3,87	45,9	3,46	19,8	3,81	13,7
Ursynów	3,58	40,9	3,38	61,9	3,43	16,3
Wesoła	3,45	26,6	3,61	69,1	b.d.	b.d.
Włochy	3,42	28,2	3,00	16,2	2,87	24,6
Wola	3,06	13,5	3,02	13,1	2,77	15,4
Żoliborz	3,73	26,4	3,49	24,3	3,56	19,1

Source: research on the basis of surveys and reports on the implementation of the budget of the City of Warsaw and The Role and Costs of Maintenance of City Parks by the Example of Warsaw K. Malesa (2018, p. 247)
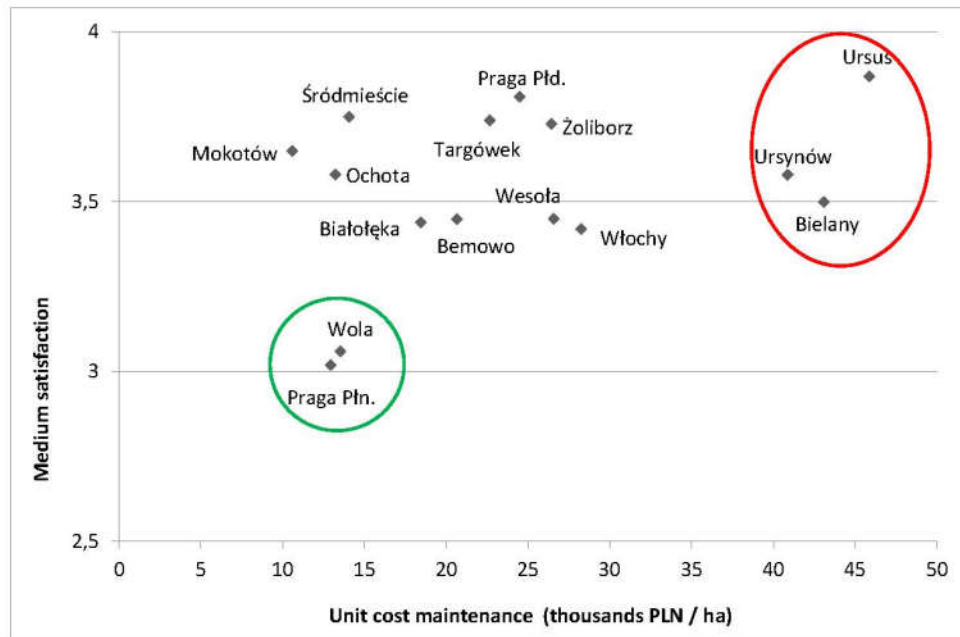
When comparing unit maintenance costs for 1 ha of city parks and satisfaction with of them in individual districts of Warsaw (Table 1), two clusters of districts can be seen, differing from the others.The highest unit costs for maintenance of urban parks in 2014 were found in 3 districts: in Ursus (PLN 45.9 thousand), Bielany (PLN 43.0 thousand) and Ursynów (PLN

40.9 thousand). At the same time, users of city parks in these districts rated their satisfaction with these parks similarly: mean score of 3.5 in Bielany, 3.58 in Ursynów and 3.87 in Ursus.

The lowest satisfaction with city parks was among surveyed users in two districts: in Praga Północ (mean score of 3.02) and Wola (mean score of 3.06). These ratings mean that, on average, users of urban parks in these districts were neither satisfied nor dissatisfied with these parks. At the same time, unit maintenance costs for 1 ha of urban parks in these two districts were low and amounted to 12.9 thousand PLN in Praga Północ and 13.5 thousand PLN in Wola.

In the remaining districts of Warsaw, unit maintenance costs for 1 ha of urban parks ranged from 10 to 30 thousand PLN, with average satisfaction scores oscillating around 3.5.

Figure 1. Average satisfaction with city parks and unit cost of maintenance in 2014
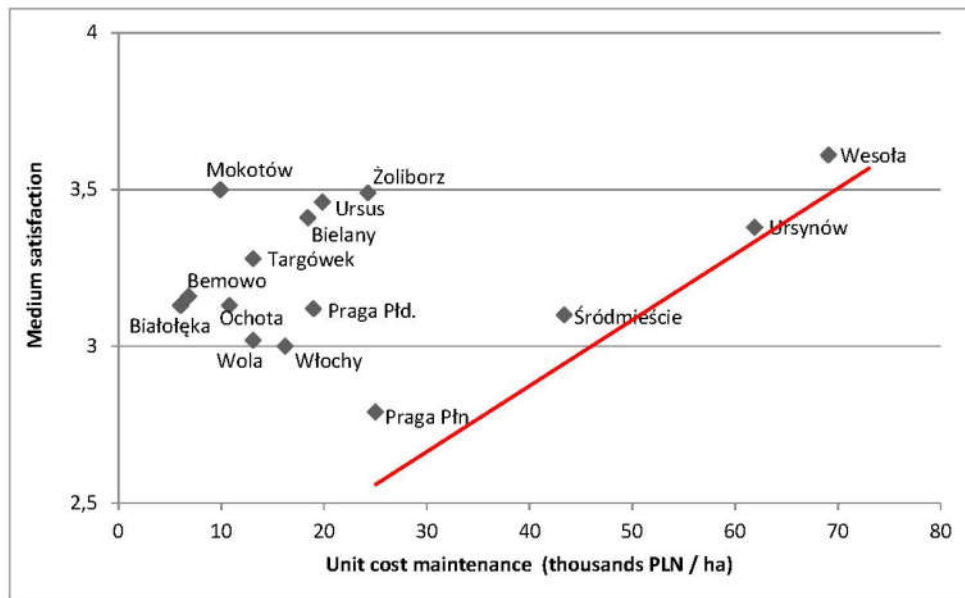

Source: The Role and Costs of Maintenance of City Parks by the Example of Warsaw K.Malesa (2018, p. 249)

Comparing the unit maintenance costs of 1 ha of street green areas and satisfaction with it in individual districts of Warsaw (Figure 2), one can see a linear, positive and very strong relationship between unit maintenance costs for 1 ha of street greenery and satisfaction with it in 4 districts: Wesoła, Ursynów, Śródmieście and Praga Północ (correlation coefficient 0.993). This means that the higher the unit cost of maintaining 1 ha of street green areas,

the more satisfied on average the residents of these 4 districts were with these areas. Unit maintenance costs for 1 ha of street greenery were highest in Wesoła (PLN 69.1 thousand), lower in Ursynów (PLN 61.9), even lower in Śródmieście (PLN 43.4), and lowest in Praga Północ (PLN 25.0). At the same time, satisfaction with these areas decreased on average in these 4 districts: it was highest in Wesoła (mean satisfaction score of 3.61), lower in Ursynów (3.38), even lower in Śródmieście (3.10) and lowest in Praga Północ (2.79). However, in the remaining districts of Warsaw, the unit maintenance cost of 1 ha of street greenery ranged from PLN 6 to 24.3 thousand, with average satisfaction scores ranging from 3 to 3.5, and no correlation between the two was demonstrated.

Figure 2. Average satisfaction with street green spaces and unit maintenance costs in 2014

Source: The Role and Costs of Maintenance of City Parks by the Example of Warsaw K.Malesa (2018, p. 250)

Figure 3: Average satisfaction with residual green spaces and unit costs
of their maintenance in 2014
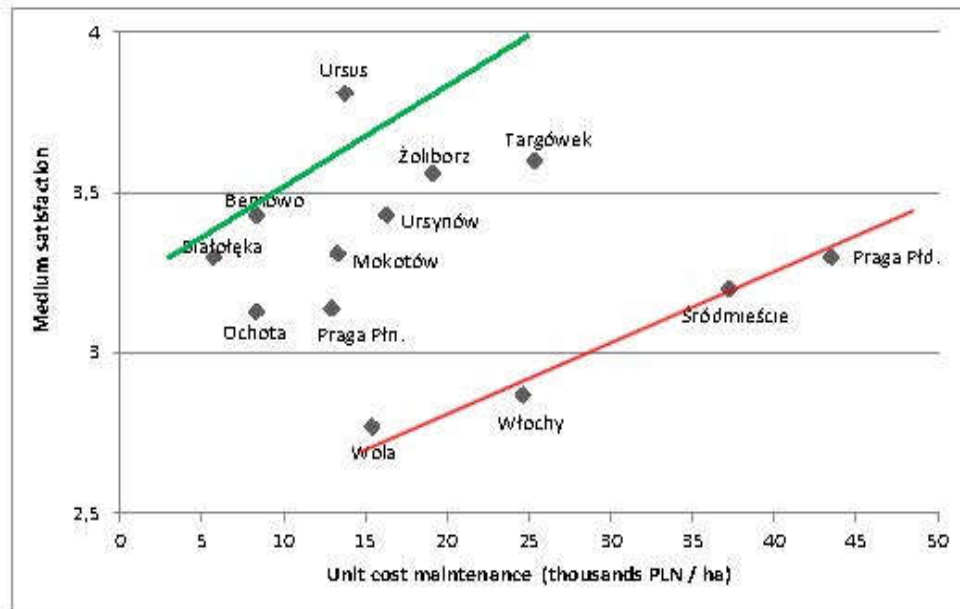
Source: The Role and Costs of Maintenance of City Parks by the Example of Warsaw
K.Malesa (2018, p. 252)

Comparing the unit costs of maintaining 1 ha of residual green space and
satisfaction with it in individual Warsaw districts (Figure 3), two partial linear
positive correlations can be seen between unit maintenance costs for 1 ha
of residual green areas and satisfaction with it. The first of these relationships
concerns 4 districts: Wola, Włochy, Śródmieście and Praga Południe
(the correlation coefficient of 0.989 indicates a linear, very strong and positive
correlation between unit maintenance costs of 1 ha of residual greenery and
satisfaction with it). Unit maintenance costs for 1 ha of residual green areas
were highest in Praga Południe (PLN 43.5 thousand), lower in Śródmieście
(PLN 37.2), even lower in Wochy (PLN 24.6), and lowest in Wola (PLN 15.4).
At the same time, satisfaction with these areas decreased on average
in these 4 districts: it was highest in Praga Południe (mean satisfaction score
of 3.30), lower in Śródmieście (3.20), even lower in Włochy (2.85), and lowest
in Wola (2.77). This means that the higher the unit cost of maintaining 1 ha
of residual green areas, the more satisfied on average the residents of these
4 districts were with these areas.

The second correlation relationship applies to the remaining districts
of Warsaw (correlation coefficient of 0.523 indicates a linear and positive
correlation of moderate strength between unit costs of maintenance of 1 ha

of residual green areas and satisfaction with it). Lower unit maintenance costs for 1 ha of residual greenery (from PLN 5.7 to 16.3 thousand) and lower satisfaction with this greenery (from 3.13 to 3.43) were in 6 districts: Ochota, Praga Północ, Białołęka, Bemowo, Mokotów and Ursynów. Higher unit costs of maintenance of 1 ha of residual greenery and higher satisfaction with this greenery (was in 2 districts: in Żoliborz and Targówek (average satisfaction of about 3.6, and unit costs of 19.1 and 25.3 thousand PLN/ha respectively). The users of residual greenery were the most satisfied with their greenery in the Ursus district (3.8 on average), and the unit cost of maintaining one hectare of it was PLN 13.7 thousand.

4. Conlusions

Based on literature review and analysis of current economic theories, including the theory of public goods shows that urban parks are sample of public goods and should be recognized as such. They are financed from common funds coming mainly from budgets of local governments and are available to all users. Analyzes carried out for this work indicate that urban parks play a significant role in shaping the city and the life of its inhabitants as public goods.

The author has presented that green areas play an important role in the life of the city and in the life of its residents, among others through the fact that they have a positive impact on the quality of life and on everyday well-being. City parks as public goods provide rest for many residents and a place where they can find an oasis of peace, feel a kind of microclimate in relation to the polluted urban climate, the hustle and bustle of everyday life. Residents going to the park, although they know that it is created by a man, have the impression that they are surrounded by nature, a natural landscape in which they feel much better than sometimes a few hundred meters away amid the street hustle and bustle. These are places that, in the residents' opinion, deserve them, should simply be in the city as many as possible, moreover they should be neat, clean and systematically nurtured.

In the article, the author compared the unit maintenance costs of 1 hectare of city parks and the average satisfaction of residents, park users in different districts of Warsaw, and showed a correlation between them.

The research has a chance to support the development of the city and green areas through savings and better management of public funds. They will expand issues related to the issues of city management and economic approach to the problem of green areas.

Deepening knowledge about the functioning of green areas as an example of public goods and understanding how other cities in the world manage and finance their green areas are possible topics for future research.

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ARTICLES

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HOUSEHOLD SAVINGS IN POLAND – SIZE, STRUCTURE, AND MAIN DETERMINANTS

Abstract
Household savings are major elements that determine, alongside other factors, the equilibrium in the financial market and thus in the national economy. They are an important macroeconomic variable and a potential source of investments and economic growth. They play a major role in the money circulation in the economy and create conditions for the normal functioning of both the whole market and the households themselves. Given the macro- and microeconomic significance of the savings, they are discussed at length in specialist literature. Their volume and structure are affected by a broad variety of factors, both subjective and objective, internal and external, those connected with the macro- and micro-environment (Harasim, 2010, pp. 29-30). They can be analysed from the perspective of factors determining the decisions of an individual household, where qualitative factors are important, and of macroeconomic equilibrium, where quantitative factors and conditions prevail. In the case of individual household decisions, these are inter alia financial, fiscal, economic, legal, technological, demographic, psychological, sociological, educational, and cultural factors. The literature classifies them in diverse ways, depending on criteria adopted by a given author. The major schools of economics claim economic crises are as a rule accompanied by increasing rates of household savings. This is primarily, though not exclusively, due to precautionary measures.

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The size and structure of household savings in Poland have changed in recent years. The pandemic experience suggests the emergence of savings which are as if forced by a reducing 'activity' of households. The war in Ukraine is an additional factor affecting not so much the volume as the structure of the savings.

This paper is an attempt at answering the question to what extent these factors have determined the size and structure of household savings in Poland.

The following research methods are applied: a review of literature and state of the art on household savings in the Polish economy, a diagnosis and interpretation of available data concerning the volume and structure of household savings in Poland.The statistics from Eurostat, OECD, and the Polish National Office for Statistics (GUS) and the National Bank of Poland (NBP) reports on the development of the financial market in Poland are the key sources of data for this study.

Household savings – a theoretical view

Savings are monetary resources that have not been spent on the daily needs of customers. They are, therefore, disposable income less the value of consumption. They can be divided into private and public savings. The former are based on the current disposable income of households and enterprises. Public savings are created by the state and constitute budget surpluses. Savings may be voluntary or compulsory. Voluntary savings mean a household resigns from spending some of its disposable income on day-to-day consumption consciously and independent from any external pressures. Compulsory saving, on the other hand, is a result of legal or economic obligations (Bywalec, 2012, p. 197). The legal compulsion may be for instance a result of national insurance regulations, while economic duress may arise from commodity deficits in the market. In the instance of Polish households, these conditions have played important parts in the past.

Savings are a result of the saving process, which consists in the ability to withhold all or part of monies from profits or earnings for future use (GUS). Saving is thus deferred consumption. Although it bases on monies generated, savings themselves may take a range of forms. In the narrow sense, these can be: cash at hand (at home), money bank deposits, term deposits, insurance policies, investment fund units, Treasury and other

securities (shares and bonds). Broadly speaking, savings are anything households amass to multiply their assets, including material assets.

Any time a household temporarily spends on consumption less than its disposable income gives rise to positive savings. Households may also generate negative savings where they temporarily spend on consumption more than their disposable income. The difference is financed with loans, credits or earlier savings. Where a household spends its entire disposable income on consumption and has neither positive nor negative savings is known as the point of parity.

The process of saving is a result of an inclination to save or an individual's ability to defer consumption in time. This inclination is a psychological and sociological process that depends on social norms and attitudes to consumption prevailing in a household's micro-environment.

There are several theories of savings and saving in economic science that differ in their approaches to savings and their impact on the development of financial markets and economic growth. The differences relate to the role of stimulating savings as a value in themselves, on the one hand, and the need to stimulate effective consumer demand, seen as an opportunity for triggering continued development processes, on the other hand. This in turn requires allocation of more disposable income to consumption at the expense of savings.

The theories which address savings and their significance to household and the economy as such can be broadly divided into two major currents. The endogenous trend assumes the effect of savings and saving-related habits on the development of financial markets and economic growth. J. Keynes' absolute income hypothesis or D. Ricardo's and R. Barro's equivalence theorem are the most characteristic for this approach (Tobin, 1979, pp. 217-236). The assumption earlier investments translate into higher income at present is the common denominator of these concepts. In turn, the higher income drives greater rates of savings that, given a rate of return on risk-free assets, adjusts the savings to the investment rate in earlier periods. In the event, a growth of consumption financed with current income at the expense of lower savings is good as it contributes to a higher global demand, which encourages more business investment.

M. Friedman's permanent income hypothesis (Friedman, 1957, pp. 20-37) and F. Modigliani's and A. Ando's life cycle hypothesis (Bywalec, 2007, pp. 124-127 and (Kulpaka, 2013, pp. 42-43) are some examples of the exogenous approach, which assume no such impact. Both are parts of the classical economics, sharing the assumption investments and savings are automatically equalised in the conditions of a perfectly flexible interest rate mechanism in the financial market. Investments, dependent on market interest rates and returns expected by enterprises, promptly adjust to the value of savings. Since savings are instantly transformed into investments in the market, a lower current consumption is desirable in order

to stimulate the growth of savings. In effect, more investments can be financed in future. The life cycle hypothesis, in spite of the same assumptions as the permanent income hypothesis, differs as to factors determining household income on which their savings are built. F. Modigliani and A. Ando assume households prefer a constant or rising level of consumption. Therefore, savings will depend on income from work activities at the subsequent life cycle stages. Household savings will be positive if generated by active workers and positive in pensioners' households. The application of the life cycle hypothesis to the analysis of the volume and structure of household savings may be particularly useful for countries whose demographics suggest ageing societies.

Another approach to the saving process and the structure of savings is shown by D. Kahneman and A. Tversky (Kahneman and Tversky 1979, p. 225) in their theory grounded in behavioural economics (Warneryd 2004, pp. 26–28). The authors replace the notion of utility with that of valuation, defined as deviations from a reference point. This leads to the conclusion households or individuals assess their choice decisions based on results achieved in the conditions of risk. The inclination to risk associated with the saving process mainly depends on demographic and economic variables. Disposable income, satisfaction of higher needs, and wealth understood as the sense of financial security at a given time are the key economic factors differentiating approaches to risk. An individual's subjective point of reference to information coming from their surrounding is the last factor. They may ignore, under- or overestimate it in their decision-making processes. In the same circumstances, individuals or households may assess risk quite differently and make completely different decisions as to the volume and structure of their savings they find to be subjectively best. This theory may be of special use with regard to various crises.

J.S. Duesenberry's relative income hypothesis (Warneryd 2004, pp. 26–28) is an instance of psycho-sociological approach to the process of saving. He observed households' tendency to consume declines as their income and that of their community change proportionally. However, households with below-average income consume more at the cost of savings. This behaviour is called the imitation effect.

The determinants of household savings' size and structure

It has already been mentioned a variety of factors affect the levels and structures of savings. Some assumptions need first of all be to made regarding the object of this analysis itself. If household savings are to be studied from the macroeconomic perspective, quantitative factors and conditions, independent from households themselves, will be crucial to the analysis. These comprise the key measures of macroeconomic equilibrium. Where a single household is examined, on the other hand,

qualitative factors become important, including financial, fiscal, economic, legal, technological, demographic, psychological, sociological, educational, and cultural factors.

The literature classifies factors influencing savings and the very inclination to save in several ways. A division into subjective and objective factors is one. The former focus around the assessment of one's financial standing and the sense of financial stability. They are a result of such factors as age, the structure and membership of a household, education, economic knowledge, profession or an individual tendency to risk. Public confidence in financial institutions, commonly conditioned by historical experience, also plays an important role in explicating the variety of inclinations to save and the structures of household savings when international comparisons are undertaken. The objective factors comprise the current economic position of a country, interest rate levels and their expected developments in future, the standard of a financial market's development that determines the supply and availability of saving products (Bretyn, 2014, pp. 135-138)

It's necessary to determine over which internal and external factors a household has control. The internal factors dependent on a household include: its income, a stage of life cycle, present living standard, the environment it lives in and aspires to, and the inclination to intergenerational asset transfers. The latter is of particular significance to households in ageing societies and in developing countries like Poland (Rytlewska, Kłopocka, 2011 p. 519). The external factors are independent from a household. They include: the rate of GNP growth, inflation, rates of interest, unemployment or tax burdens (Nosal-Szczygieł, 2011, pp. 100-101).

Households operate in both micro- and macro-environments in parallel. The micro-environment is where households make decisions and cooperate with one another and with enterprises. It determines day-to-day behaviour. Macro-environment, on the other hand, is determined by the condition of a national or regional economy and, in the case of open economies, encompasses international environment as well. This is also the demographic and legal environment (Bogacka-Kisiel, 2012, p. 28).

The purpose of saving itself influences household preferences as to the process of saving (the volume and forms of savings). These purposes vary depending on the characteristics of household members. Based on available studies, socio-demographic factors, in particular, the transition to the successive stages of household life cycle, are crucial (Rytlewska, Kłopocka, 2011 pp. 520-521). Other socio-demographic factors comprise education, professional status, and financial awareness of household members, especially its head, the number and ages of household members, and (economic and social) relationships among them. Non-economic conditions relate to historical experience, trust

in government and financial institutions, consumption and saving customs, habits, and stereotypes (Wierzbicka, 2018, pp. 64-65).

Both micro- and macro-economically, income and interest rates are the key factors affecting saving levels. Income determines the demand for transactional savings (technical and organisational) and precautionary (provisions for unexpected expenditures or income drops) balances, whereas the demand for speculative monies is a function of interest rates and returns on financial instruments. In line with the Keynesian theorem, economic entities prefer liquidity. In the opinion of classical economists and monetarists, on the other hand, entities tend towards a subjectively balanced structure of their portfolio. Households are not guided by any theories in their saving processes and strive for a required 'financial security'. A household's financial security consists of liquidity required to satisfy day-to-day needs, on the one hand, and 'surpluses', that is, an asset portfolio of a maximum marginal utility. The latter depends on returns on the particular assets, determined by objective external factors, and on the subjective, internal preferences of household members. The rate of return, liquidity, risk levels, and availability are the most common parameters used to assess the attractiveness of particular assets (Zaleśkiewicz, 2012, p. 227).

Economic models assume people making economic decisions, including those to consume and save, have clear preferences and attempt to maximise the expected utility of their choices. Economic entities are assumed to act fully rationally and, in complex economic environments, are capable of noting, correctly interpreting and comparing all possible alternatives of income distribution between consumption and savings, and of choosing the best. They are additionally able to choose from among equal forms of saving and investing to construct an effective portfolio (here defined as an effective structure of savings, too).

In uncertain conditions, liquidity preferences in saving processes shift towards protecting assets against depreciation. Regardless of external conditions, liquid resources must objectively be maintained for transaction purposes in a trade economy (Musiał, 2014, pp. 1148-1152). What is more, a growing uncertainty associated with economic shifts requires more commitment and knowledge of households making decisions regarding the size and structure of their savings. Any decision made in a crisis is more risky than one in normal conditions and often relates to a longer time horizon.

Polish households have for years tended to preserve the real value of their income by investing in material assets. This is conditioned by non-economic factors that reach back to historical experience, such as the 1950 currency reform, which cost households about 2/3 of their savings, a ban on currency holding and trade or martial law restrictions. The 1995 denomination, though following on an educational campaign and not jeopardising household savings, triggered a huge upsurge in demand for consumer credits. Everyone

tried to 'convert' liquid into material assets. The value of loans to households rocketed from PLN 2332.4 to 3344.3 m during 1994. The low inclination of households to save is additionally due to inflation. As inflation rises, the public tend to trust the government and financial institutions less. In the circumstances, even if real interest rates grow, the inclination to save refuses to rise, which it does in periods when inflation is not experienced.

The size and structure of household savings in Poland – the responses to the pandemic and the war in Ukraine

91.6% of household assets in Poland are material, first of all real estate. Approximately 12% of their value are household liabilities, chiefly mortgage loans – 86% (NBP, 2016). Financial assets form the remaining part of an average Polish household's property. Some analysts believe (Polityka Insight, 2016, p.5) material assets are overestimated and their actual share in an average household's property is not more than 80%. Regardless of the different valuations of material assets and their shares in overall property, the fact is Poles display a strong need to possess. This is to a large extent due to the historical background. The value of intergenerational transfers in Polish society is very high. Inheriting material assets, mainly flats and houses, is the key source of wealth for the successive generations. With their low liquidity, material assets don't tend to lose their value in crisis situations. What's more, they are in increasing demand. Neither the pandemic nor the war in Ukraine reduced the value of this asset group of Polish households. The lockdown caused by the pandemic did restrict the demand for flat rental, yet the influx of Ukrainian refugees boosted the demand and raised rent payments. All in all, the return on real estate has grown.

The size and structure of Polish households' financial assets suggest the households prefer to invest their surpluses in such ways that funds can be easily available or easily withdrawn in the least risky manner. Bank deposits, cash, and investment units prevail. Table 1 shows changes in the volume and structure of Polish households' savings in 2009-2022. Data for Q4 of 2022 are not available at the NBP or GUS website.

Table 1. Financial assets of households in Poland in 2009-2022

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Q1, 2022*	Q3, 2022*
	Financial assets of households														
Total, PLN bn	675.8	724.6	761.4	814.5	889.5	968.1	1054.8	1160.7	1218.3	1289.5	1423.9	1644.5	1773.1	1629.1	1884.2
Relative to GDP	50.3	51.2	49.8	51.1	54.4	56.0	58.7	62.4	61.2	60.9	62.3	70.3	67.6	44.2	62.8
	Percentage of total assets														
Bank deposits	57.2	57	61.4	61.9	60.3	61.2	61.7	61.5	61	63.5	63.1	60.5	59.8	55.1	67.3
SKOK deposits	1.7	31.12.1899	1,9	1,9	2,0	1,3	1,1	0,9	0,8	0,7	0,6	0,5	0,5	0,5	0,5
Investment fund units	8.01.1900	10,2	8,2	8,9	10,2	10,7	10,6	10,7	11,8	10,0	10,4	9,3	9,4	8,3	4,3
Unit-linked insurance funds and life insurance savings	10,3	10,2	9,2	9,5	9,0	8,5	7,8	7,2	5,6	4,8	4,3	3,8	3,2	4,1	7,1
Treasury securities	1,9	1,4	1,2	1,0	1,0	1,0	1,0	1,0	1,3	1,6	1,9	2,5	3,1	3,2	3,4
Other than Treasury securities	0,4	0,3	0,3	0,2	0,1	0,1	0,2	0,2	0,3	0,4	0,5	0,2	0,1	0,1	0,6
Quoted stock	6,3	7,1	5,1	4,5	5,0	4,2	3,8	3,9	4,4	3,7	3,9	4,9	5,0	6,2	3,0
Cash out of banks	12,7	12,0	12,7	12	12,3	13,0	13,8	14,6	14,8	15,3	15,4	18,3	18,9	22,5	13,7

Source: (NBP, *Raporty o rozwoju rynku finansowego*).
* The author's calculations based on NBP, *Kwartalne rachunki finansowe Q3,2022*

Figures 1 and 2 illustrate change dynamics for the data in Table 1. Savings clearly rocketed in 2020 owing to the prosperity and rising income in earlier periods. The pandemic halted the growth of consumer demand due to the lockdown restrictions. The value of households' financial assets rose at the time. Their structure shifted towards cash in hand and Treasury securities, whereas bank deposits shrank. The National Office for Statistics 'Household budget" survey in 2019 and 2020 (NBP, 2021, p. 25) implies households in Poland responded to the pandemic by limiting their expenditure or resorting to their savings. This is corroborated by the GUS data on the share of household consumption in the changes of real gross domestic product in Table 2, which show a 'forced' nature of those savings. Households couldn't consume in line with their preferences due to the restricted access to public space where certain goods and services can be consumed. Savings rose in 2021, little compared to the preceding periods, in spite of income reductions caused by the lockdown. Despite a slight increase of households' financial assets, their value relative to the GDP fell.
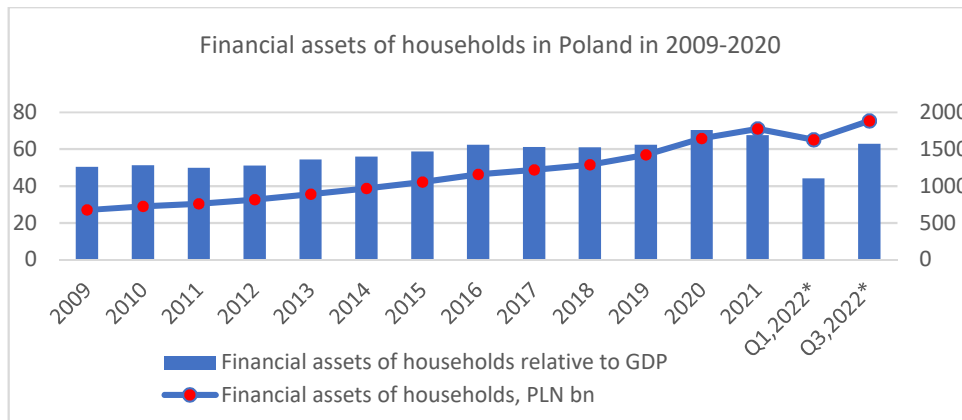
Figure 1. The financial assets of households in Poland in 2009-2022
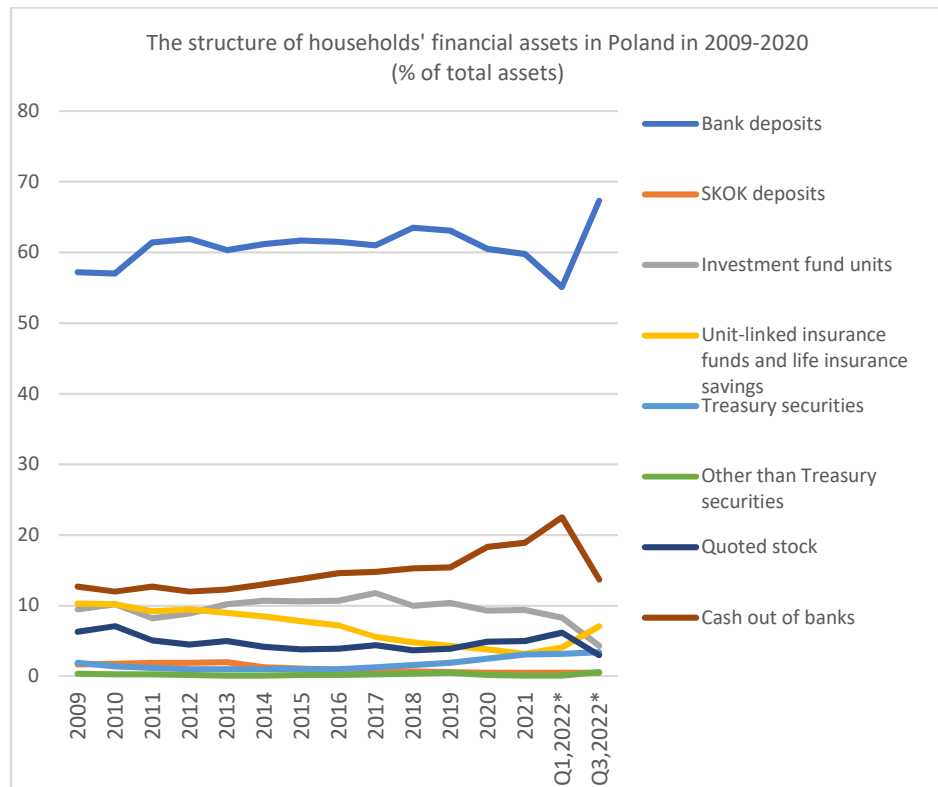Source: (NBP, *Raporty o rozwoju rynku finansowego*).

Figure 2. The structure of households' financial assets in Poland in 2009-2022
Source: (NBP, *Raporty o rozwoju rynku finansowego*).

Banks experienced a rising demand for mortgage loans, owing chiefly to the improved situation of the housing market in the beginning of that year and households' stated desire to use their savings to fund more profitable investments in real estate co-financed with crediting (NBP, Q2-2020, pp. 9-11, and NBP, Q-2022, pp. 9-12). In addition, they noted a falling demand for consumer loans between Q2 2020 and Q2 2022. That was caused mainly by a deteriorating financial position of households and the rising rates of loan interest. This explains the lower value of financial assets in relation to GDP coupled with their higher total value and the growth of the GDP itself (GUS, 2023, pp 1-2). They were partly replaced with material assets. This is commonly real estate in the case of Polish households.

Households assessed their financial standing as declining after the pandemic, since their income was dropping, they feared for their jobs, saw higher costs, and expected more price rises (NBP, 2021, p 26). These observations drove the demand for material assets, house repairs and building. The inclination to save dwindled, on the other hand.

Table 2. The real dynamics of gross domestic product without seasonal equalisation (average annual prices of the previous year) referred to the same period of the previous year = 100

Item	2018				2019				2020				2021			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Total consumption	104.3	104.4	104.3	104.2	104.7	104.4	104.8	104.0	101.9	93.2	101.0	100.0	100.3	110.6	104.2	106.7
including:																
- in the household sector	104.4	104.5	104.1	104.1	103.7	104.2	104.2	103.7	101.2	89.5	100.2	96.9	99.8	113.0	104.7	108.0
- public	102.9	103.1	104.0	103.9	108.9	105.7	107.1	104.8	103.4	104.4	103.3	107.8	102.4	104.2	102.8	104.0

Source: (GUS, *Informacja GUS w sprawie zaktualizowanego szacunku PKB wg kwartałów 2020-2021*)

The war in Ukraine caused some changes in the structure of household savings. Both the total value of financial assets and their relation to GDP fell considerably. The income of a statistical household grew at the same time. The demand for foreign currencies increased in Q1 2022. The share of Polish zloty deposits shrank compared to that of currency deposits. The volumes and dynamics of those changes are shown in Table 3 and Figure 3.

Table 3. Deposits and other liabilities of monetary financial institutions to households in Poland in 2009-2022, PLN m

Year	Total deposits	Polish zloty deposits	Currency deposits
2009	4405347.12	4042541.86	362805.27
2010	4848605.33	4484091.50	364513.83

Continued Table 3:

2011	5384606.06	4998321.66	386284.40
2012	5993885.25	5561113.67	432771.58
2013	6461065.49	5981823.47	479242.02
2014	5887175.99	5362040.64	525135.35
2015	8232037.55	7640717.20	591320.36
2016	8703905.92	8023311.97	680593.95
2017	8157819.40	7358536.22	799283.18
2018	8036310.28	7144986.20	891324.08
2019	8904653.24	7929899.13	974754.11
2020	11500775.94	10385294.21	1115481.73
2021	12372303.08	11085382.70	1286920.38
2022	12744504.15	11105735.72	1638768.44

Source: (NBP, 2023, *Należności i zobowiązania monetarnych instytucji finansowych i banków*).
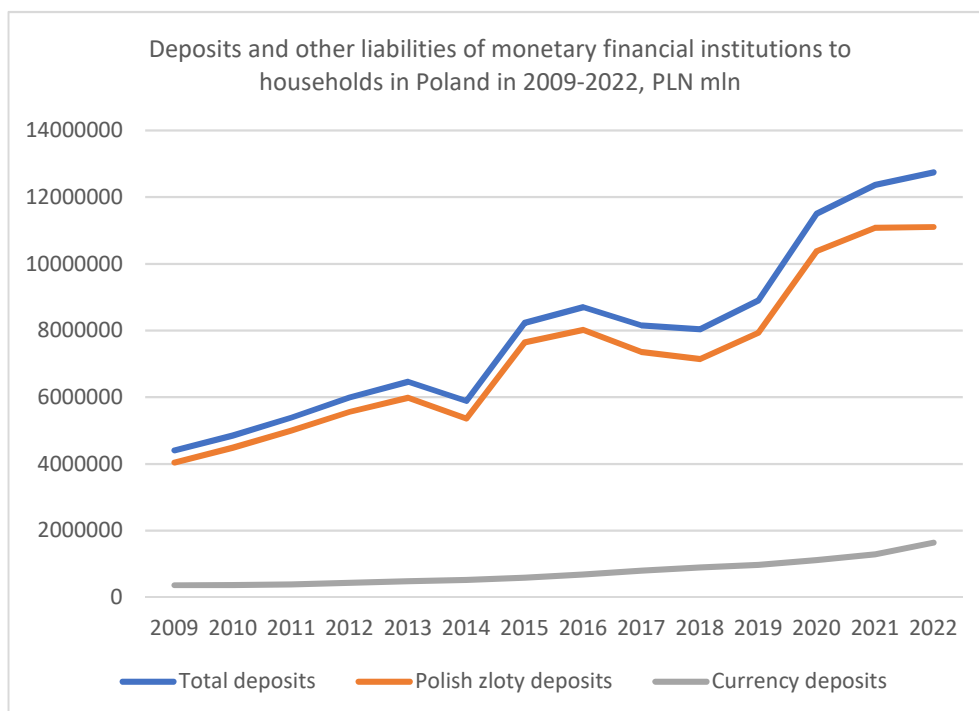
Source: (NBP, 2023, *Należności i zobowiązania monetarnych instytucji finansowych i banków*).

The declining total value of households' financial assets and their lower relation to GDP indicate some households have withdrawn some of their funds from the market and invested in currencies and gold (Mennica Polska, 2023). In the uncertain context of growing inflation and the risk of a spreading military conflict, households continued to prefer liquid forms of saving. There is a clear tendency to neutralise the main risk factors in the market. The lower purchasing power of the domestic currency, fears for the accessibility of funds in banks and other financial institutions which may experience infrastructure disruptions and cyberattacks became the key determinants of the structure of household savings in the first and second quarters of 2022.

Conclusion

Households in Poland prefer material assets as the central component of their long-term savings. The high inclination towards ownership is determined by historical experience. Confidence in financial institutions still tends to be quite low with the Polish society. The same is true of trust in the government. Inflationary expectations suggest it's low. The inclination to save has not been raised by interest rate hikes. The structure of savings has shifted towards material and liquid financial assets, including currencies, meanwhile. As the market interest grew due to the lockdown and the Russian aggression against Ukraine, Poles set aside more deposits denominated in foreign currencies. Households believe the purchase of material assets, currencies or precious metals are the safest means to protecting their property against depreciation. This is not positive from the macro-economic point of view, since the economy becomes less capable of stimulating the internal rate of investment.

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ARTICLES

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THE ROLE OF CONSUMER PRICE EXPECTATIONS IN SHAPING INFLATION

Abstract

The purpose of the study is to assess the role of consumer price expectations in shaping inflation, taking into account changes in the economic environment. The analysis will be carried out on the example of Poland for a period of relatively good economic prosperity and periods of its collapse due to the occurrence of the 2007+ financial crisis and the COVID-19 pandemic and the war in Ukraine. The adopted objective and the related main areas of analysis determined the layout and empirical nature of the article, which consists of three parts and a conclusion. The first reviews the literature on the impact of price expectations on the economy. Then, the subject and temporal scope of the study conducted are presented, and the research method used is discussed. The results of the empirical analysis of the role of price expectations in driving inflation on the example of Poland are included in the third part of the article. The conclusion of the paper formulates the most important conclusions resulting from the analysis. The obtained results of the conducted research are also discussed in the context of the challenges of developing artificial intelligence.

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1. Literature review on the analysis of the role of expectations in shaping inflation

Expectations of economic agents are one of the key factors in shaping the oscillation of economic activity, as they translate into such important decisions as those regarding the direction and scale of consumption, saving, or investment, as well as price setting and wage negotiations (Jankiewicz and Urbanowicz, 2023, p. 205; Albrizio and Bluedorn, 2023, p. 49). They also provide an estimator of future price dynamics and can be a source of valuable information useful for making forecasts used in monetary policy. Inflation expectations of various actors are also an indicator of the credibility of the central bank and determine the degree of confidence in its policies (Łyziak, 2011, p.114-115). For this reason, the inflation expectations of consumers, businesses and professional forecasters, are of keen interest to monetary authorities, including the National Bank of Poland, which uses a direct inflation targeting strategy in conducting its monetary policy. In the literature, many authors focus on the analysis of price expectations. Some publications focus on analyzing the mechanism of expectation formation (Szyszko, 2016; Angeletos et al., 2020), others on the methodology of their measurement (D'Acunto, 2023; Angelico et al., 2022). The study conducted for this article is part of the analyses whose authors attempt to explain the role of price expectations in influencing the economy according to its state. For example, Albrizio and Bluedorn (2023, p. 50) found that short-term price expectations are the most important driver of price increases, and then citing the findings of Coibion et al. (2020) and Reis (2021), they pointed out that the role of expectations in shaping inflation varies depending on the level of inflation in a given period. For example, in an environment of low and stable inflation, economic agents reduce their interest in the state and development of the economy, and thus, the informational value of the expectations they form decreases (Coibion et al., 2020). Such a state of affairs characterized the situation in many developed economies before the COVID-19 pandemic (Reis, 2021). In contrast, when inflation rises sharply or becomes volatile, economic agents become more attentive, and their expectations can become an important driver of actual inflation. A similar conclusion was reached by M. Weber et al. (2023), who also found that as inflation rises in developed economies, both households and firms pay more attention to the state of the economy and are better informed about, for example, the level of inflation. Binder and Kamdar (2022) concluded that a prolonged period of elevated inflation could first trigger an increase in short-term inflation expectations, which in turn could translate into an increase in the long-term expectations of firms and consumers, which in turn could translate into inflation remaining at elevated levels over the long term. Such a course of events can highly complicate the primary task of the monetary authorities.

2. The subject, time scope of the empirical analysis and the research method

The cited research results were the inspiration for the study and analysis of the role of consumers' price expectations in shaping inflation during periods of relative economic calm, during the 2007+ crisis and the COVID-19 pandemic and Russia's aggression against Ukraine, using Poland as an example. The analysis covers the period from January 2004 to September 2023. Due to the desire to capture the specificity of the relationship between the formation of inflation and the price expectations of Polish consumers during the above-mentioned periods of special conditions for the Polish economy, consumer expectations were analyzed in three „sub-periods":

- during the time of relative "peace and quiet" – from 01.2004 to 06.2007 and from 01.2011 to 02.2020,
- during the financial crisis 2007+ – from 07.2007 to 12.2010[3],
- during the COVID-19 pandemic and the war in Ukraine – from 03.2020 to 09.2023[4].

The basis for the empirical analysis of the relationship between inflation and consumer price expectations was a model in which:

- the response variable was: the CPI inflation rate,
- the explanatory variables were: inflation expectations of consumers analyzed separately by means of a zero-one variable for each of the distinguished „sub-periods".

CPI data were obtained from the Statistics Poland database. The source of information on inflation expectations formulated by consumers was the results of consumer surveys, which are also provided by the Statistics Poland[5]. Consumer expectations are analyzed through a survey and are reflected in the balance statistic. It represents the difference between the percentage of consumers expecting price increases and the percentage of consumers expecting no change or a decrease in prices. An increase in the balance statistic is interpreted as a shift in respondents' opinions toward stronger price increases (and vice versa).

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[3] It is difficult to clearly define the timeframe of the financial crisis 2007+. For the purposes of this analysis, it was assumed that the crisis lasted from mid-2007 to the end of 2010. However, the authors realize that there is no consensus among economists on its duration.

[4] Although the pandemic in Poland has ended up, the war in Ukraine continues. However, the study covers the period until 09.2023.

[5] Statistics Poland (2023): https://stat.gov.pl/obszary-tematyczne/inne-opracowania/informacje-o-sytuacji-spoleczno-gospodarczej/biuletyn-statystyczny-nr-112023,4,144.html (access: 05.09.2023).

In order to capture the specifics of the role of consumers' price expectations in shaping inflation in the highlighted „sub-periods," a zero-one variable, the so-called binary variable, was used. This variable shows whether a certain condition is met or not met. In the first case it is assigned the value „1", and in the second case the value „0", which explains the name of this variable (Maddala, 2000, p. 558). The study introduced three binary variables, each defined as follows:

- 1 , for months that reflect a given „sub-period",
- 0, for the other months.

The binary variables for each of the three highlighted time intervals were then multiplied by a variable reflecting consumer price expectations, and the explanatory variables thus constructed were entered into the model[6].

In modeling the relationship between inflation and price expectations, the assumption was made that the level of the response variable depends on the current value of the explanatory variables and their values from earlier periods. In addition, the level of the response variable in the current period depended on its value in previous periods[7]. Adding the lags of the response variable to the model makes it possible to capture significant inertia in many economic phenomena, as well as to obtain better measures of the fit of the estimated models. The basis of the econometric analysis was therefore an Autoregressive Distributed Lags Model (ARDL model):

$$y_t = \mu + \sum_{i=0} \alpha \, x(1)_{t-i} + \sum_{i=0} \gamma \, x(2)_{t-i} + \sum_{i=0} \varrho \, x(3)_{t-i} + \sum_{j=1} \beta \, y_{t-j} + \varepsilon_t$$

$$(1.1)$$

where:

y_t , y_{t-j} – the response variable and its lags: the inflation rate,

$x(1)_{t-i}$ – the first explanatory variable and its lags: „expectations during economic silence",

$x(2)_{t-i}$ – the second explanatory variable and its lags: „expectations during the 2007+ crisis",

$x(3)_{t-i}$ – the third explanatory variable and its lags: „expectations during the COVID-19 pandemic and the war in Ukraine",

μ –   intercept in the model,

$\alpha, \beta, \gamma, \varrho$ – regression parameters,

ε_t – residual component.

[6] For more on this subject, see.: Welfe (2009, p. 174-180), Osińska (2007, p. 176-178), Maddala (2008, p. 350-359), Aczel (2000, p. 558-570).

[7] Lags of up to 12 months for the response and explanatory variables were introduced into the model. The procedure is presented in detail in: Charemza i Deadman (1997, p. 75-80). In addition, it has been applied in the work: Kozłowska i Szczepkowska-Flis (2010).

The use of an ARDL model makes it possible to conduct a multiplier analysis, describing the short- and long-term relationship of a given exogenous variable with a given endogenous variable (Verbeek, 2004, p. 310-311 after Kozłowska i Szczepkowska-Flis, 2010, p. 212). The effect of a change in „x" for current changes in „y" is reflected by the short-run multiplier: $m_{xsr}= \alpha_0$. If the change in „x" persists in subsequent periods, its long-run effect on the „y" variable is described by the long-run multiplier: $m_{xlr}= \sum\alpha/(1-\sum\beta)$, which determines the strength and direction of the long-term relationship between the analyzed variables (Welfe, 2009, p. 203; Kozłowska and Szczepkowska-Flis, 2010, p. 212). Multipliers for the other explanatory variables are determined analogously, using the parameters estimated for them (Welfe, 2009, p. 174-176; p. 202-203).

The Classical Least Squares Method (KMNK) was used to estimate regression coefficients. The diagnostic usefulness of the estimated models was evaluated by analyzing the coefficient of determination R^2. The statistical significance of individual parameters was determined using the Student's t-test at a significance level of $p = 0.05$ (Wooldridge, 2001, pp. 116-134 after Kozłowska and Szczepkowska-Flis, 2010). The normality of the distribution of the residual component was tested using the Doornik-Hansen test (Maddala, 2006, p. 244-245, p. 292-293). The model was estimated using a method that was robust to standard errors, so it did not require checking for heteroskedasticity and autocorrelation of the residual component[8].

3. Results of the analysis of the role of consumer price expectations in shaping inflation in Poland

Estimation of the econometric model was preceded by decomposition of the source material. Seasonal and random fluctuations were removed from the output data series by applying the TRAMO/SEATS procedure, recommended by Eurostat. Stationarity tests were then performed on the series adopted for analysis. Stationarity was tested by applying the ADF test (ang. *Augmented Dickey-Fuller test*) at a significance level of 0,05. All of the series adopted for the analysis proved to be non-stationary and it was necessary to transform them (Table 1)[9].

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[8] On the procedure of verifying an econometric model, see: Kufel (2011, p. 57-67).

[9] In addition, outlier observations were removed from two series in order to obtain better measures of the goodness of fit of the statitstical model. One observation from 01.2013 was removed from the CPI series, while three observations from 11.2014 to 01. 2015 were removed from the x (1) series.

Table 1. The p-value for the ADF test for the analyzed variables

	CPI inflation rate	Consumer price expectations (without dividing into "sub-periods")	Consumer price expectations during economic silence	Consumer price expectations during the 2007+ crisis	Consumer price expectations during the COVID-19 pandemic and the war in Ukraine
Variable name	**y: CPI**	**OCZ_KONS**	**x(1): OCZ_C**	**x(2): OCZ_KRY**	**x(3): OCZ_COV_UKR**
Transformation method	logarithm increment	logarithm increment	= variable 0-1 * „OCZ_KONS" variable, where "1" is assigned for the intervals: from 01.2004 to 06.2007 and from 01.2011 to 02.2020, and "0" for the other months	= variable 0 - 1 * „OCZ_KONS" variable, where "1" is assigned for the interval: from 07.2007 to 12.2010, and "0" for the remaining months	= variable 0 - 1 * „OCZ_KONS" variable, where "1" is assigned for the interval: from 03.2020 to 09.2023, and "0" for the other months
ADF without intercept	6,031e-007	7,294e-011	1,243e-017	2,009e-008	0,00225
ADF with intercept	1,301e-005	1,476e-009	4,987e-017	4,54e-007	0,02226
ADF with intercept and trend	0,0002442	1,038e-008	3,9e-017	3,853e-006	0,04519
Conclusion	**Stationary series**	**Stationary series**	**Stationary series**	**Stationary series**	**Stationary series**

Source: own study.

The results of estimating the regression equation (1.1) indicated the existence of a relationship between inflation and consumer expectations in the analyzed research period (Table 2).

Table 2. Estimation results of the ARDL model for inflation in Poland based on equation 1.1.

Explanatory variables	Regression parameters	t - Statistics	p value
OCZ_COV_UKR	0,0191395	3,735	0,0002
OCZ_COV_UKR_1	−0,0264970	−3,309	0,0011
OCZ_COV_UKR_2	0,0280780	4,583	8,07e-06
OCZ_COV_UKR_3	−0,0102841	−2,844	0,0049
OCZ_COV_UKR_8	−0,00802329	−3,620	0,0004
OCZ_KRY_3	0,00526045	3,118	0,0021
OCZ_KRY_11	−0,00726841	−2,758	0,0064
CPI_1	1,90925	28,99	1,51e-073
CPI_2	−2,48610	−19,47	4,80e-048
CPI_3	2,78610	15,59	2,10e-036
CPI_4	−2,72972	−12,75	1,19e-027
CPI_5	2,51047	10,54	5,90e-021
CPI_6	−2,07468	−9,155	6,45e-017
CPI_7	1,77459	8,684	1,36e-015
CPI_8	−1,32109	−7,862	2,30e-013
CPI_9	0,904739	7,372	4,34e-012
CPI_10	−0,402204	-6,779	1,33e-010
Intercept	2,23024e-05	1,499	0,1354
R^2=0,918786, ^ R^2=0,911882; F=262,9897, p=1,0e-126; Doornik-Hansen test: statistics=2,74819, p=0,253068.			

Source: own study.

The reduced form of the model was the basis for determining the short-term (m_{sr}) and long-term (m_{lr}) multipliers for consumer price expectations in the sub-periods highlighted. Their summary is shown in the Table 3.

Table 3. Summary of values of short- and long-term multipliers for consumer price
      expectations

Response variable: CPI		
Multipliers for explanatory variables:	**m_{sr}**	**m_{lr}**
OCZ_C	**Variable not statistically significant**	
OCZ_KRY	**0**	**-0,00059**
OCZ_COV_UKR	**0,0191395**	**-0,00531**

Source: own study.

The obtained values of multipliers revealed that consumers' price expectations can play a differentiated role in influencing inflation depending on whether or not there is accompanying economic turmoil. Indeed, the obtained values of multipliers indicated that:

- consumers' price expectations did not translate in a statistically significant way into inflation during periods of relatively good economic conditions,
- consumer price expectations, on the other hand, were statistically significant for the formation of inflation in periods of economic collapse due to the consequences of the 2007+ crisis or the COVID-19 pandemic and the war in Ukraine.

An explanation for this may be the increased interest of economic agents in the state of the economy under conditions of its threat. This increased interest may cause some deviation (up or down) from a certain "normal" level in terms of formulated expectations. These deviations may, in turn, have important implications for current inflation.

The results obtained suggest that in the short term, the relationship between consumers' price expectations during the 2007+ financial crisis and during the pandemic and war in Ukraine was not equal. Well, during the crisis, a change in consumers' price expectations was not accompanied by a change in the inflation rate during the same period. In contrast, during the pandemic and war in Ukraine, rising consumer price expectations were accompanied by an increase in inflation in a given month (and vice versa). An explanation for this differential nature of the short-term relationship between consumers' price expectations during the crisis and the pandemic and war across Polish eastern border, perhaps, was the great unknown about the further course of the pandemic and its possible end, as well as concerns about the not entirely expected outbreak of war in Ukraine. These "exceptional" events having their economic and political effects of unprecedented magnitude, among others, may therefore have translated into an increased role of expectations in shaping inflation in the short term. In addition, the 2007+ crisis period and the period of the pandemic and war in Ukraine are distinguished by the accompanying inflation levels. In Poland, during the pandemic and war

in Ukraine, the CPI inflation rate (y/y) reached, a record level in years, namely 18,4% (!). Contributing to this, among other things, was the erroneous monetary and information policy of the National Bank of Poland, whose actions and their explanation failed to convince the public that inflation was „under control". Arguably, the result was growing fears and expected price increases, which certainly did not help stabilize inflation in the short term. In a different way, during the 2007+ crisis, the CPI inflation rate (y/y) recorded also an increase, but a moderate one, reaching a peak of 4,8%, and the NBP's monetary policy pursued at that time did not receive a wave of criticism, as it did during the pandemic and the war in Ukraine. Perhaps this inflationary environment and the monetary policy actions carried out provide explanations for the different nature of the relationship between consumers' price expectations during the 2007+ crisis and during the COVID-19 pandemic and the war in Ukraine.

In the longer term, the relationship between Polish consumers' price expectations during the 2007+ financial crisis and during the pandemic and war in Ukraine was the same. The results noted suggest that:
- the relationship between expectations and inflation emerged over time during the 2007+ crisis,
- the relationship between expectations and inflation did not disappear with the passage of time during the pandemic and war in Ukraine. However, its direction changed from positive to negative.

In the case of the two "sub-periods" analyzed, a negative value of the long-run multiplier means that the result of an increase in consumer price expectations was a postponed reduction in inflation, and vice versa. Such a result, perhaps, explains the behavior of economic agents who, expecting price increases, did not increase consumer demand for fear of, as a consequence, possible even higher price increases. In this way, it was actually possible to prevent even higher inflation increases in the long term during the 2007+ crisis and during pandemics and war.

Conclusion

The results of the study indicated that the role of consumer price expectations in shaping inflation can vary depending on the state of the economy. In times of prosperity, it was found that consumers' price expectations do not translate into inflation in a statistically significant way. In contrast, during periods of dangerous economic turmoil, it appears that the role of price expectations in shaping inflation increases and can impede the stabilization of inflation. Thus, it seems that during a downturn the monetary authorities should try to influence the process of their formulation with extreme accuracy and caution. However, one should be aware that economic agents form their expectations not only on the basis of the central bank's announcement. To a large extent, they search

for information „on their own” on the Internet, and this is often the basis on which they form their expectations. What sources do they come across? For example, on financial and business websites or economic blogs. It is important to consider to what extent the information obtained from such sources is reliable and what consequences they carry. This question is particularly relevant in a reality in which artificial intelligence is gaining importance, which can be, and even already is, used to create „information content". Using a tool like artificial intelligence, for example, it is possible to amplify the public's fears and even create panic that can raise inflation for a longer time. This is because tools like Chat GTP „derive their knowledge" from information from the network, and if „fed" with the right amount of fake news, this can cause a spike in price expectations. Thus, the world has gained a tool that, if maligned, can strongly destabilize the economy. In the ongoing discussion on this topic, there is also the question of who is responsible for any destabilization caused by false information getting into the public domain. Such a situation occurred on January 1, 2024: the quotation of the Polish zloty (PLN) for 1 euro (EUR), according to charts published by Google, broke through the 5 PLN barrier. Visible on the Google chart, the exchange rate was rising from about 5:40 pm, and a few minutes after 8 pm the service showed a price of 5,06 PLN (!) per euro. (Money.pl). This confusion about the Polish zloty exchange rate turned out to be a consequence of a „data source error". This „error" certainly proved costly for many business entities. Who bears responsibility for it? This question remains unanswered to this day. In view of the research results obtained, being aware of the role of consumers' price expectations in influencing the state of the economy, it can therefore be assumed that, with the help of artificial intelligence, it is relatively easy to bring about a collapse of the economy or a deepening of its collapse, without any responsibility. The task of conducting monetary policy in bad economic times becomes even more difficult in this context. This is therefore a further argument in favor of absolutely preventing inflation from fluctuating outside the band established by the adopted inflation target.

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ARTICLES

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THE INFLUENCE OF CAPITAL MARKETS ON AUSTRIA'S ECONOMIC GROWTH

Abstract:

This research undertook a comprehensive assessment of how capital market have affected Austria's economic development, scrutinizing data spanning from 1975 to 2020. In pursuit of this objective, the study meticulously constructed an econometric model utilizing the GRETL software, a tool known for its robust analytical capabilities in economic modeling. This model was specifically designed to probe the extent to which the capital market have been a driving force behind Austria's economic progress. Once the model was in place, it was applied to the aforementioned dataset using the GRETL program, allowing for a detailed and nuanced analysis. The results derived from this process were pivotal in establishing a clear and quantifiable understanding of the capital markets' impact on Austria's economic growth trajectory over this extensive period. This comprehensive approach, integrating long-term data analysis with sophisticated econometric modeling, provided valuable insights into the dynamic interplay between capital market fluctuations and national economic performance.

Keywords: OLS, GARCH, GRETL, capital market, economic growth

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1. Introduction

The capital market plays an indispensable role as a primary channel for gathering financial assets. During this intricate process, issuers of financial instruments secure capital, which is subsequently directed towards fostering corporate expansion. Meanwhile, purchasers of these securities are presented with the prospect of investing their excess funds into ventures that offer the potential for future financial gains (Demertzis, Domínguez-Jiménez and Guetta-Jeanrenaud, 2021, 2-5). This arrangement is particularly beneficial for issuers as it opens up access to a diverse array of prospective investors. On the flip side, investors typically bring a profound comprehension of the issuer's standing and the broader market context, empowering them to make judicious investment decisions. This includes a careful assessment of potential yields and an understanding of the prevailing trends in specific market segments (Bogle, Coyle and Turner, 2022, 370-372; Bajaher, Habbash and Alborr, 2022, 261-278).

Capital markets are primarily engaged with financial instruments that have medium to long-term maturities, signifying that the period for realizing investment returns generally surpasses the initial phase of capital infusion, often extending beyond one year. This trait is instrumental in consolidating considerable capital within these markets, thereby exerting a substantial influence on broader economic activities (Wang, Zhang, Yang and Guo 2021, 2-3; Cunha, de Oliveira, Orsato, Klotzle, Cyrino, Oliveira and Caiado, 2020, 682-695).

Economic expansion is multifaceted, encompassing tangible economic outputs, the quantitative progression of inputs and outputs, and the fundamental mechanisms that propel growth. These mechanisms include social interactions that ensure the maintenance of systemic equilibrium. Hence, the process of growth is not only about the functional and social structure of the economy but also about the institutional framework that governs it. Additionally, shifts in production over time are critical elements that demand attention (Žarković, Ćetković, Redzepagic, Đurović, Vujadinović and Živković, 2022, 1622-1648; Batrancea, Rathnaswamy and Batrancea, 2022, 1651-1665; Chirwa, and Odhiambo, 2016, 33-37).

This article ventures into the complex interaction between the capital market and economic growth, a topic that has sparked extensive public discourse. Perspectives on this issue are diverse, with some viewpoints highlighting the adverse consequences of financial development on economic stability, while others underscore its constructive role in the efficient allocation of capital and the enhancement of productivity. Particularly in the aftermath of the 2007-2011 financial crisis, which significantly altered the perception of the capital market's advantages, this research takes on added significance.

The primary goal of this study is to evaluate the degree to which the maturation of the capital market impacts the long-term economic growth of Austria, with a focus on the period from 1975 to 2020. The research methodology began with an exhaustive review of relevant literature, drawing from a wide spectrum of sources and empirical evidence. The subsequent phase involved the meticulous gathering and selection of critical statistical data. The culmination of this study involves an econometric analysis, leveraging a specially designed econometric model for precise estimation. This comprehensive approach is designed to provide a deep insight into the role of the capital market in molding Austria's economic terrain over this extended timeframe.

2. The Impact of capital markets on economic growth as explored in scholarly studies.

The exploration of how capital markets affect economic growth, as revealed through various scientific studies, offers an in-depth analysis of the intricate relationship between these two domains. Theoretical investigations have consistently established a significant connection between the dynamics of capital markets and the trajectory of economic growth, a link further reinforced by empirical research examining the impact of financial markets on economic progress (Nordin and Nordin, 2016, 259-265; Bekaert, Harvey, 1998, 33-53; Nazir, Nawaz and Gilani, 2010, 3473-3476. Diverse theoretical perspectives bolster the notion of a symbiotic relationship between capital markets and economic expansion. Under W. Brainard's extended Q-Tobin theory, favorable conditions in the stock market play a crucial role in elevating investment levels, with this theory drawing support from the causality attributed to rising stock prices (Brainard, Tobin, 1968). B. Malkiel's hypothesis suggests that stock exchanges influence economic growth primarily through the wealth effect, which, in turn, stimulates an uptick in consumer spending (Malkiel, 1999). Further, contemporary literature indicates that robust economic conditions favorably interact with stock markets, thereby boosting the perceived reliability of corporations in capital markets and consequently driving up the prices of their individual stocks.

To probe deeper into this theme, the researchers developed an intricate econometric model, later refined and estimated through selected research methods. This study recurrently focuses on the dynamics within distinct national groupings, considering factors like the maturity of their capital markets, the degree of economic development, integration into the global community, and the characteristics of their existing financial systems.

A pivotal econometric model, introduced by R. Levin and R.G. King, serves as a fundamental tool for analyzing the interaction between the progression of financial markets and the economic growth across nations

(King, Levine, 1993, p. 717-736). This model, encapsulated in Equation 1, functions as a regression model aimed at deciphering economic growth patterns:

Equation 1: Economic Growth Regression Model Formula

$$Y_{it} = \alpha_0 + \alpha F_{it} + \beta X_{it} + u_{it}$$

Where:
- Y_{it}- symbolizes the real GDP growth rate per capita for country i in period t;
- F_{it}- denotes an indicator of financial development for country i in period t, including metrics like the ratio of private sector non-financial loans to total domestic loans, the financial sector's current liabilities as a proportion of GDP, and the domestic deposit to bank asset ratio;
- X_{it}- encapsulates specific explanatory variables impacting the economic growth of country i in period t, such as the ratio of foreign trade turnover to GDP, the ratio of the budget deficit to GDP, and the ratio of government consumption to GDP.

Employing the double least squares method for estimation, this model allowed for the substitution of GDP per capita with other indicators like the investment rate in GDP or the rate of per capita capital growth to assess the effect of individual financial development indicators on other variables. Analysis of data from 80 countries between 1960-1989 using panel data illustrated a substantial correlation between financial development and economic growth at the national level (Caporale, Howells and Soliman, 2005, p. 166-175).

Nonetheless, the role of capital markets in fostering economic growth is not unequivocally positive. Some studies indicate that the liquidity involved in the buying and selling of shares within capital markets could adversely impact corporate governance, potentially decelerating economic growth. Despite these contrasting views, the preponderance of scholarly work endorses a positive relationship between capital markets and economic growth.

Over the years, a variety of models have been utilized to decipher the influence of financial and capital markets on the economies of different nations (Jin and Boubakari, 2010, p. 14-19). These studies have culminated in a series of key observations, leading to several overarching conclusions regarding the tested model:

- Stock market capitalization exhibits a substantial and statistically significant positive effect on the growth of real GDP and physical capital, highlighting the necessity for companies to invest in long-term projects within the real sector.
- A statistically significant relationship between the development of financial markets and economic growth was observed during the study period.
- The correlation between total bank assets and the exchange rate demonstrated a notable and statistically significant positive impact on real GDP growth.

3. A comprehensive empirical examination of the link between capital market and economic growth.

This comprehensive study utilized data from two key sources to assess the impact of capital market dynamics on Austria's economic growth: The World Bank and Statistics Austria. The period of investigation spanned from 1975 to 2020, with annual data being systematically collected for empirical analysis. Notably, the dataset commences from 1975, as this was the earliest year for which suitable data for econometric evaluation was available. Additionally, the analysis did not extend beyond 2020 due to the non-availability of certain critical statistics in the recent years, which would have necessitated the omission of other significant variables.

The study's scope was deliberately confined to data up until 2020, partly due to the advent of the COVID-19 pandemic and the subsequent military conflict in Ukraine initiated by the Russian Federation. These global events ushered in a period of exceptional economic turmoil and unpredictability, making any data post-2020 potentially unrepresentative of standard economic conditions due to the extraordinary nature of these events.

The study did not factor in the economic impact of these global events and instead focused on an annual analysis of various economic indicators. These indicators included GDP (Gross Domestic Product), CAPINV (capital investments), HOUCON (household consumption), EX (exports of goods and services), IM (imports of goods and services), GOV (government expenditure), KAP (stock market capitalization), NUMCOM (number of listed companies), and POP (population size). The financial data was meticulously collected and harmonized into a consistent unit of account. The values were adjusted using the 2015 deflator to ensure accurate valuation over time and converted into a logarithmic form for easier computation.

The research utilized a modified version of the Economic Growth Regression Model developed by R. Levin and R.G. Barro to examine the relationship between financial development and economic growth. This model was particularly adept at exploring the nexus between capital market activities and economic expansion, employing the GRETL software

for computational purposes (Filipowicz, 2019, p. 19-36). The model specifically focused on the natural logarithm of real GDP and included variables like real stock market capitalization, capital investments, and government expenditure.

Equation 2: Author's econometric model examining the influence of the capital market on economic growth in Austria

$$lnGDP_t = a_0 + a_1 lnKAP_t + a_2 lnCAPINV_t + a_3 lnGOV_t + u_t$$

Where:
- $lnGDP_t$- represents the natural logarithm of real Gross Domestic Product;
- $lnKAP_t$- denotes the natural logarithm of real stock market capitalization;
- $lnCAPINV_t$- indicates the natural logarithm of capital investments;
- $lnGOV_t$- signifies the natural logarithm of government expenditure.

The model was developed using the stepwise backward regression method. The structural parameters' estimation hinged on the advantageous properties of the estimators obtained from the Classical Linear Regression Model (CLRM). However, the study revealed that the residuals of the model were incorrectly distributed, presenting as long tails. Conventional methods such as the Prais, Cochran-Orcutt, and GLS approaches were inadequate, as models estimated using these methods failed to comply with the assumptions of classical regression.

In the realm of financial modeling, the assumption that a random component adheres to a normal distribution often does not hold. This study confirmed that the least squares estimator is imprecise for financial series, impacting the efficacy of commonly used tests due to inaccurate variance estimations. Hence, alternative methods are necessary for accurate variance estimation and to conduct a proper analysis (Maciejewska, 2008, 534-537).

The research also incorporated a GARCH (Generalized Autoregressive Conditional Heteroskedasticity) model, which is adept at predicting financial time series characterized by fat tails or high variance aggregation. This model particularly emphasizes one-shot phenomena, where a single deviation in a time series differs markedly from the predicted value, impacting the series without affecting other time periods (Domańska, 2020, 122-128). The outcomes of the GARCH model estimations are presented in Table 1, offering insightful conclusions about the influence of capital markets on Austria's economic landscape.

Table 1. Model: GARCH estimation, observations used 1975-2020 (T = 46). Dependent variable (Y): lnGDP. Standard errors of Quasi-Maximum Likelihood

GARCH, using observations 1975-2020 (T = 46) Dependent variable: l_GDP QML standard errors					
name	coefficient	std. error	z	p-value	significance level
const	1,69860	0,0202707	83,80	0,0000	***
l_KAP	0,00891460	0,00318102	2,802	0,0051	***
l_CAPINV	0,216470	0,0306507	7,062	1,64e-012	***
l_GOV	0,745289	0,0287029	25,97	1,21e-148	***
alpha (0)	0,000323960	8,34547e-05	3,882	0,0001	***
Mean dependent var	4,843130		S.D. dependent var		1,100614
Log-likelihood	119,5313		Akaike criterion		−227,0627
Schwarz criterion	−216,0908		Hannan-Quinn		−222,9525
Unconditional error variance = 0,00032396 Test for normality of residual - Null hypothesis: error is normally distributed Test statistic: Chi-square (2) = 8,8385 with p-value = 0,0120432					

*** - the variable is significant at the significance level of 0.01,
** - the variable is significant at the significance level of 0.05,
* - the variable is significant at the significance level of 0.1.
Source: Own study based on the GRETL program.

To accurately estimate the parameters of a model using the maximum likelihood method, it is imperative to make certain presumptions about the model's probability distribution. When these assumptions are appropriately adhered to, it becomes possible to achieve parameter estimations that are asymptotically efficient. In the realm of GARCH (Generalized Autoregressive Conditional Heteroskedasticity) model estimation, Quasi-maximum-likelihood methods are routinely employed due to their effectiveness. A distinctive characteristic of GARCH models, particularly when applied

to financial data, is their ability to account for the 'fat tail' phenomenon. This aspect of the GARCH models is crucial as it enables researchers to arrive at consistent parameter estimations even in scenarios where the distribution deviates from normality. This feature stands in contrast to the outcomes typically observed when employing Ordinary Least Squares (OLS) model estimation with normal distributions (Fiszeder, 2009, 21- 24).

A detailed examination of the data presented in Table 1 reveals that every explanatory variable within the model holds statistical significance. Notably, variations in capital investment exert a considerably significant positive influence on the fluctuations of the economic growth rate. This finding indicates that capital investment is a key driver in modulating the pace of economic growth. Moreover, alterations in market capitalization, though having a relatively modest effect, positively influence the volatility of economic growth rates. These observations suggest that the necessary conditions to affirm the capital market's positive impact on Austria's economic growth have been established.

The study's findings, therefore, underscore the integral role of capital markets in shaping Austria's economic landscape. The positive correlation between capital investment and economic growth rate fluctuations suggests that strategic investments in the capital market can act as catalysts for economic expansion. Additionally, the influence of market capitalization, albeit smaller, points to the broader effects of financial market dynamics on the economy. This comprehensive analysis, grounded in robust statistical methods, provides compelling evidence of the capital market's instrumental role in fostering economic growth, highlighting its importance as a key factor in Austria's economic development strategy.

4. Conclusion

The empirical research conducted robustly establishes the significant link between the evolution of capital markets and the economic growth of Austria. The study employed a detailed model which, under the assumption of other variables remaining constant, elucidates the direct impact of changes within the capital market on the nation's Gross Domestic Product (GDP). This assumption is key to isolating the specific effects of capital market dynamics from other economic factors.

According to the model's findings, every one percent increment in capital investment correlates with an approximate 0.22 percent increase in the GDP. This substantial relationship highlights the potent influence of capital investment in driving the country's economic output, underscoring its vital role in economic stimulation and growth.

Furthermore, the model indicates that a one percent rise in market capitalization is associated with an about 0.01 percent uplift in the GDP. Although this effect might seem modest compared to that of capital

investments, it is still noteworthy. It reflects the broader impact of the stock market's health on the economy, influencing investor confidence and the effectiveness of capital allocation within the market.

Additionally, the analysis reveals that a one percent increase in government expenditure could potentially elevate the GDP by approximately 0.75 percent. This significant impact suggests that government spending is a crucial driver of economic activity, likely fueling public investments, stimulating demand, and thus, contributing to overall economic expansion.

Under the premise that other economic variables maintain their stability, these findings offer a nuanced understanding of the interconnectedness between capital market developments, government spending, and Austria's economic growth. By meticulously separating the influence of these specific variables, the research provides a clearer insight into their respective roles and the extent of their impact on the nation's economic trajectory. This analytical clarity is of immense value, particularly for policymakers and economic strategists, in formulating policies and investment strategies that capitalize on these dynamics for enhanced economic prosperity.

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ARTICLES

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AN EMPIRICAL ANALYSIS OF THE GRANGER CAUSALITY BETWEEN THE PUBLIC DEBT AND THE LEVEL OF INFLATION IN SELECTED EUROPEAN COUNTRIES IN THE PERIOD 1990-2022

Abstract

   While growing debt is not a problem for governments in the environment of low interest rates, such a high level of inflation, which makes debt servicing easier, may have a number of unfavorable consequences. The aim of this article is to verify the existence of causal relationships between the amount of public debt and the inflation level of selected countries. The conducted empirical study is based on the concept of Granger causality, which is one of the possible methods for examining interdependencies. The results of the study proved the occurrence of statistically significant granger causality in both groups of countries, i.e. those characterized by both high and low levels of debt.

Keywords: public debt, inflation, Granger causality

JEL Classification: C1, G28, H63.

Introduction

   Throughout the last fifty years, cycles of accumulating debt have consistently surfaced in the global economy, affecting both advanced economies and emerging markets. In the aftermath of the global financial

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crisis, a fresh wave of debt has emerged, culminating in a historic pinnacle where global debt has soared to around two hundred thirty eight percent of the global Gross Domestic Product by the year 2022.

When explaining the essence of the budget deficit, considerations can be based on three basic theories or paradigms: neoclassical, keynesian and ricardian (see e.g.: Barro, 1989; Bernheim, 1989; Eisner, 1989; Gramlich, 1989; Santos, 1991). It is emphasized that accumulating debt involves both advantages and disadvantages. The benefits depend on how effectively debt is used, the economic cycle, and the level of financial market development. Budget deficits play a role in energizing the economy when the output falls short of full employment levels. Conversely, the downsides include interest payments, the risk of debt distress, constraints on policy flexibility and effectiveness, the potential crowding out of private sector investment and an excessive increase in inflation beyond the level that brings benefits to the economy. The optimal levels of debt depend on specific country characteristics, financial market conditions, government and private entity behavior, and the multifaceted roles that debt plays.

Public debt and the consumer price level are intertwined through various transmission channels, forming a two-way relationship. The influence of the public debt on inflation involves several transmission mechanisms, taking into account effects on money supply, overall demand, and the central bank's role.

Debt-financed government spending stimulates immediate overall demand, potentially leading to long-term inflation. This can occur directly e.g. through the central bank's purchase of public bonds or indirectly through private sector demand for public bonds, accompanied by a concurrent expansive monetary policy aimed at stabilizing rising interest rates. Another indirect channel concerns the banking sector's demand for public bonds.

The potential risk of insolvency of the public finance sector, that come with this, may consequently lead to an increase in market interest rates and tax burdens. In the face of this risk materializing, the rising costs of obtaining funds to cover the budget deficit may lead to price increases, especially if these circumstances are accompanied by a decline in trust in the state.

It is needed to mention the crowding effect, i.e. competition for financial resources on the bank loan market between the public sector and enterprises, which may also affect the level of inflation. Restricted access to credit stimulated by a high level of debt may lead to a decline in economic activity, which, on the one hand, may reduce inflationary pressure, on the other hand, may encourage enterprises to transfer financing costs to product prices, thus leading to an increase in inflation.

Moreover, debt monetization, i.e. the conversion of assets into money by financing it on the primary or secondary market, should be indicated as a source of the impact of public debt on inflation too. Such actions lead

to an increase in the money supply, which in turn may generate inflationary pressure.

It is crucial for the stability of public finances to maintain a balance between the benefits of inflation and the possible threats resulting from it, such as increases in interest rates or exchange rate fluctuations.

This paper presents an empirical framework for examining the causality between public debt and inflation and is motivated by global inflation trends and domestic economic indicators. The study aims to explore whether changes in public debt levels precede and provide information about subsequent variations in inflation. Through empirical analysis and employing Granger causality tests, the article seeks to contribute to the understanding of the dynamic interplay between public debt and inflation, shedding light on the potential causal links between these two economic variables. The empirical analysis is subordinated to the research hypothesis according to which a high level of debt is a factor stimulating a causal relationship in the Granger sense.

The dataset encompasses a total of forty European countries, with the observation period spanning from 1990 to 2022. The choice of countries was dictated by the desire to include in the sample economies with a moderate level of public debt and inflation as well as those with high levels of those variables. Classification into developed and developing and emerging countries was extracted from the IMF.

The variables utilized in the estimations are historical series for public debt presented as a percentage of GDP, converted into real terms by multiplying with the respective real GDP and inflation which is derived from the logarithmic difference of the Consumer Price Index. Data for the study was sourced from two primary databases: the World Bank database and the IMF's International Financial Statistics database.

The paper's organization is as follows: Section 2 delves into relevant literature, providing a background context. Section 3 outlines the empirical methodology and the next one concenrs prelimary data analysis. The primary focus of the paper is Section 5, where the dynamics of public debt of a choosen countries and its relation with the inflation rate are comprehensively analyzed. Finally, Section 6 offers concluding remarks.

1. Analyzing the Nexus between Government Debt and Inflation: A Comprehensive Literature Review

The dimensions and endurance of fiscal deficits, coupled with their fluctuations across time and nations, have become a focal point in both theoretical and empirical realms. Primarily, the focus lies on the origins of these enduring deficits and their consequential effects on public debt. These deficits are identified as instigators of money supply expansion, prolonged inflation and macroeconomic instability. Analyzes presented

in the literature suggest that the impact of public debt on the level of inflation is noticeable, but it is usually associated with specific conditions. And the question of whether the budget deficit contributes to inflationary pressures or no has been discussed by many researchers.

In accordance with Sargent & Wallace (1984), heightened public debt levels are commonly associated with inflation, especially in countries with substantial existing indebtedness. They claimed that the connection between inflation and budget deficits hinges on how these deficits are funded – specifically, the degree of monetization involved. Understanding whether fiscal deficits result in elevated inflation rates depends on the interplay between the independence of monetary policy and the dependence of budget policy.

Ghura & Hadjimichael (1996), in their analysis of a substantial sample of sub-Saharan African countries spanning 1981-1992, illustrate an inverse correlation between economic growth and macroeconomic stability. This stability is gauged by the inflation rate and the fiscal deficit as a percentage of gross domestic product.

The macroeconomic consequences of government debt in the United States during the 1980s and 1990s using variance decompositions and impulse response functions were explored by Wheeler (1999). The study assesses the Ricardian Equivalence hypothesis by investigating the influence of government debt on interest rates, the price level, and output. The findings indicate that government debt exerts a statistically significant negative impact on interest rates, the price level, and output.

The main finding from Reinhart et al. (2003) revolves around the concept of debt intolerance. The authors argue that certain countries, especially those with a history of high inflation, tend to be more susceptible to negative consequences when their debt levels surpass a certain threshold. They identify a critical threshold level of government debt relative to GDP, beyond which countries with a history of high inflation are likely to face significant economic challenges. The study suggests that when a country's government debt exceeds around 90% of its GDP, the negative impact on economic growth becomes particularly pronounced. Countries with a history of high inflation are deemed "debt intolerant" because, once they breach this threshold, they experience a substantial decline in economic growth. The findings underscore the importance of considering a nation's historical context, especially regarding inflation, when evaluating the consequences of high levels of public debt.

Kannan & Singh (2009) investigate the policy conduct and stability of public debt in India by examining the dynamic interplay of deficits and debt with macroeconomic variables like inflation, interest rate, trade gap, and output. They employ a 2SLS simulation technique for the period spanning 1971 to 2006. The results of the study reveal that fiscal deficits

and debt exert a detrimental influence on all the macroeconomic variables considered, particularly in the medium to long run.

The study of Reinhart et al. (2010) suggests that countries with elevated levels of government debt may face a higher risk of experiencing inflationary pressures. While the primary emphasis of the study is on the negative impact of high debt on economic growth, Reinhart and Rogoff also highlight that inflation is one of the challenges associated with excessive government debt. The study indicates that countries with high debt levels may resort to inflationary policies as a means of managing and reducing their debt burden. It's important to note that the findings of the study have been subject to scrutiny and criticism, particularly regarding data errors and methodological issues. The debate surrounding the accuracy and robustness of the results has led to a reevaluation of the study's conclusions. Subsequent research has provided alternative perspectives on the relationship between government debt and inflation.

The influence of government debt maturity on inflation using a dynamic stochastic general equilibrium model was investigated by Faraglia et al. (2012). The variables considered in their analysis included Fiscal Insurance, Fiscal Sustainability, Government Debt, Inflation, Interest Rates, and Maturity. The findings indicated that the persistence and volatility of inflation are contingent on the sign, size, and maturity structure of government debt. Even with long bonds, inflation's role in achieving debt sustainability remains notably incomplete. The study concluded that while issuing long-term debt allows governments to utilize inflation for fiscal sustainability, the length of debt maturity directly correlates with the volatility and persistence of inflation. Despite this relationship, the impact of inflation on fiscal sustainability is relatively modest, regardless of maturity length. The study emphasizes that a more substantial contribution to debt stabilization comes from adjusting interest rates.

Essien et al. (2016) found that over the period 1970-2014, the level of domestic debt had no significant impact on the overall price level and production in Nigeria. The results of the impulse response analysis indicated that the prime lending rate and the consumer price index (CPI) responded positively to shocks from foreign debt innovations, but exhibited a negative reaction over time to shocks from innovations in domestic debt. This observation confirmed the inflationary tendencies associated with heightened public borrowing, leading to increased government expenditure and consequential changes in interest rates due to the expansion of credit to the government, which, in turn, crowds out private borrowing.

Several authors employ Granger causality tests to examine the impact of budget deficits on inflation. The study of Dwyer (1982) proved the well-established positive correlation between inflation and government deficits in the United States since World War II. The author tested three prominent

explanations for this correlation: a deficit induces price increases through a wealth effect; a deficit leads to the Federal Reserve purchasing debt, thereby elevating the money supply and prices and anticipated inflation causes an increase in the deficit defined as the change in the nominal value of bonds. The findings do not support the first two hypotheses, indicating that expected government deficits do not hold significance for future inflation.

The dynamic relationship between inflation, external debt, domestic debt and exchange rates in Malaysia from 1960 to 2014 were examined by Yien et al. (2017). Key findings include a strong positive association between inflation and both domestic and external debt, a weak positive association between exchange rates and inflation and the identification of one long-run relationship through cointegration tests. Granger causality tests reveal a unidirectional relationship, with domestic debt causing inflation, exchange rates causing inflation and domestic debt causing exchange rates, in the Granger sense. The heightened external debt, causing exchange rate changes, is identified as a factor leading to inflation. In the long run, exchange rates significantly influence inflation. The study underscores the need for policymakers to formulate prudent policies, particularly during periods of high inflation.

Despite extensive research on the connection between debt and inflation, there is a lack of consensus, both theoretically and empirically, about the general essence of the relationship between public debt or budget deficits on the inflation. The question about the precise economic implications of this phenomenon is still open so there is the constant need of new research regarding this area.

3. Theoretical Frameworks for Granger Causality

The concept of causality formulated in 1969 by Clive Granger, based on theoretical foundations previously developed by Wiener (1956), is a popular direction of considerations in the field of relationships between economic processes.

Finding a relationship between variables via the regression analysis doesn't confirm the direction of influence or causality. However, in time series regression, the sequence of events matters: if event A precedes event B, A might cause B, although B causing A is also plausible. Past events can influence present occurrences, but future events cannot.

The Granger Causality test embodies this notion, though the concept of causality is philosophically complex and contentious. Some argue that "everything causes everything," while others reject the notion of causality entirely. Edward Learner prefers the term "precedence" over causality, and Francis Diebold suggests "predictive causality" as an alternative.

The linear version of the Granger test is used for detection causality in the mean. The use of econometric models to modelling conditional mean

of the endogenous variable essentially boils down to searching for a systematic, repeatable relationship between processes that could be used, among others. in the process of forecasting. The Granger causality concept extends beyond the quest for a variable that enhances forecast accuracy in a model.

Let X_t and Y_t be a representation of stochastic processes and let $\Omega_t = \{X_{t-j}, Y_{t-j}; j > 0\}$ be the set of all information from the past available at time t, while $\Omega_t \backslash Y_t$ is the same set of information minus the information regarding the Y_t process. The occurrence of Granger causality in the mean, called systematic causality, will be said to occur when the following inequality will be true:

$$E\{X_t | \Omega_t \backslash Y_t\} \neq E\{X_t | \Omega_t\}. \tag{1}$$

The basis of the procedure for testing causality in the mean is the Pierce and Haugh test, which boils down to the analysis of the cross-correlation coefficient of two processes x_t and y_t:

$$\rho_{xy}(k) = \frac{E(x_{t-k} y_t)}{\left(E(x_t^2) E(y_t^2)\right)^{0,5}}. \tag{2}$$

The null hypothesis assumes the independence of both processes, i.e. $\rho_{xy}(k) = 0$, and the test statistic takes the following form:

$$T^{PH} = n \sum_{k=1}^{m} \widehat{r_k^2} \sim \chi_m^2, \tag{3}$$

where: $\widehat{r_k^2}$ is the estimated cross-correlation coefficient.

4. Preliminary Data Analysis

In the current era of low interest rates and sluggish global growth, there's a heated discussion surrounding the advantages and drawbacks of increasing government debt to support elevated spending. Borrowing can offer benefits, especially in economies facing significant developmental hurdles, if the funds are allocated towards growth-boosting investments like infrastructure, healthcare, and education. Additionally, accumulating government debt can serve as a temporary measure in counter-cyclical fiscal policies aimed at stimulating demand and economic activity during downturns.

However, the accumulation of high levels of debt poses considerable risks as it renders economies more susceptible to external shocks. During periods of financial strain, servicing debt obligations and refinancing can become increasingly challenging, potentially leading to crises. Moreover, elevated government debt levels may restrict the capacity and efficacy of fiscal stimulus measures during economic contractions and could impede long-

term growth by placing a burden on productivity-enhancing private investments.

In 2022, global public debt witnessed a reduction of 3.6 percentage points, settling at 92 percent of GDP, slightly surpassing USD 91 trillion according to Table 1. Despite this decrease, the overall decline of 8 percentage points over the past two years only mitigated approximately half of the surge in public debt attributed to the pandemic. Notably, the global public debt level remained 7.5 percentage points higher than its pre-pandemic level in 2019.

Table 1. Global Public Debt in the period 1980–2022 (percent of GDP, weighted averages)

	1980s	1986s	1990s	2000s	2004	2010s	2019	2020	2021	2022
World	47.6	54.3	62.0	66.5	69.8	81.0	84.9	100.4	96.0	92.4
Advanced Economies	50.7	57.5	66.4	75.3	76.8	104.6	105.4	124.4	118.7	113.5
Euro Area	47.0	52.1	67.0	69.9	69.7	90.9	85.9	99.2	97.3	93.2
Japan	64.3	74.0	89.0	166.6	169.5	227.5	236.4	258.7	255.4	261.3
United Kingdom	40.3	41.0	38.1	42.6	39.8	84.7	85.5	105.6	105.9	101.4
United States	51.6	57.7	66.3	64.1	66.1	104.1	108.7	133.5	126.4	121.4
Emerging Market Economies	35.6	40.2	41.5	40.9	44.1	44.3	55.7	65.8	64.8	65.2
China			21.2	26.9	26.4	44.3	60.4	70.1	71.8	77.1
Others	38.6	45.8	46.3	44.7	49.0	44.0	52.0	61.9	58.4	55.3
Low-income Developing Countries	36.2	43.2	64.8	45.8	51.2	34.8	42.9	48.5	48.5	48.4

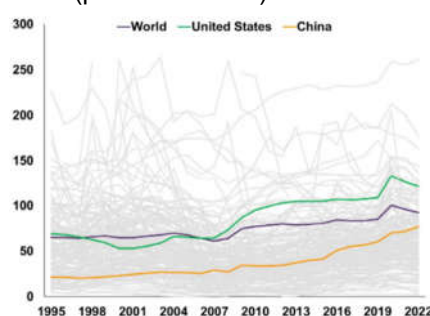*Source:* IMF Global Debt Database, 2023; World Economic Outlook, April 2023.

Global debt dynamics revealed distinctive trends among various country groups. In 2022, Advanced Economies saw a substantial debt reduction, down by 5 percentage points to 113,5% of GDP. This was driven by a slowdown in public debt influenced by tighter monetary policy. Despite a 3 percentage point decrease in public debt, it still stood 3.3 percentage points higher than the pre-pandemic level in 2019 at 55 percent of GDP. In contrast, China witnessed a notable 7.3 percentage point increase in debt to 272 percent of GDP, marked by significant rises in both public and private debt.

Figure 1. Global Public and Private debt, 1950-2022 (Percent of GDP)
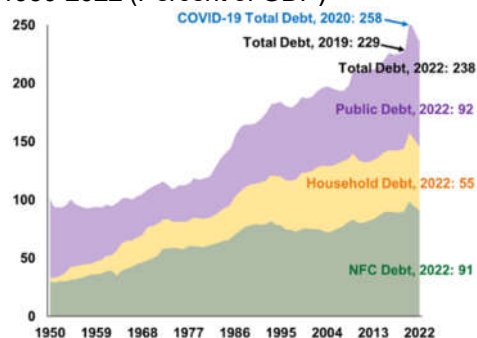
Source: IMF Global Debt Database, 2023; World Economic Outlook, April 2023.

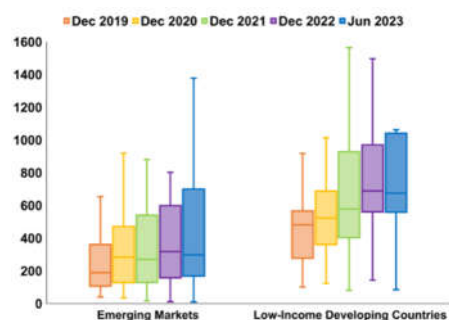Figure 2. Global Public Debt, 1995-2022 (percent of GDP)*

*Debt-to-GDP ratios above 300 percent are not shown.
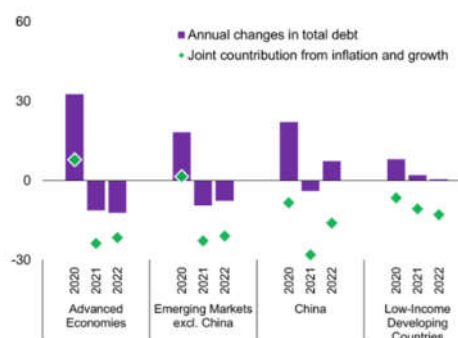*Source:* IMF Global Debt Database, 2023; World Economic Outlook, April 2023.

Global total debt experienced a decrease of 10 percentage points as a share of GDP in 2022, reaching 92 percent of GDP, as illustrated in Figure 1. This decline equated to a total of USD 235 trillion in dollar terms. However, the public debt declined by 4 percentage points as a share of GDP. Over the past two years, the reduction in global debt amounted to 20 percentage points of GDP, driven by a resurgence in economic activity following the initial pandemic-induced contraction and higher-than-anticipated inflation. Notably, this reduction accounted for approximately two-thirds of the substantial surge in global debt witnessed in 2020 during the peak of the pandemic.

Figure 3. Sovereign Spreads, 2019-2023 (basis points)

Source: IMF Global Debt Database, 2023; World Economic Outlook, April 2023.

Figure 4. Contribution of real GDP growth and inflation to annual changes in debt, 2020–2022 (percentage points of GDP)

Source: IMF Global Debt Database, 2023; World Economic Outlook, April 2023.

The global debt-to-GDP ratios had been consistently increasing for several decades, as illustrated in Figure 2. Despite fluctuations, the overarching trend reveals a continuous rise. Since the early 1980s, global public debt has tripled, escalating from approximately 30 percent of GDP to surpass 90 percent of GDP by 2022.

Public debt in low-income developing countries remained steady at 48 percent of GDP. In the case of many countries heavily reliant on foreign borrowing, the depreciation of exchange rates exacerbated their debt burdens. Confronted with heightened financing requirements in the post-pandemic aftermath and compelled to address the cost-of-living crisis, the task of debt reduction has grown more formidable for those countries. These challenges have negatively impacted risk perceptions, influencing market access and contributing to more stringent financing terms in markets (see Figure 3).

A pivotal role in shaping global debt dynamics in recent decades played China. While the impact of COVID-19 on China's debt is less conspicuous in comparison to other countries, what stands out is its prolonged and rapid accumulation of debt over several decades. The total debt-to-GDP ratio in China surged nearly fourfold, starting from approximately 21,2 percent in the mid-1990s. The unparalleled ascent of China's debt-to-GDP ratio became markedly steeper from 2009 onwards (see Figure 2). When comparing historical data it becomes evident that a substantial portion of the global debt increase from 2008 to 2022 is attributed to China's exceptional rise above the rest of the world. In fact, over half of the global debt-to-GDP ratio increase

during the period can be linked to the rapid escalation in China's debt-to-GDP ratio.

The investigation into the Granger causality between the public debt level and inflation commenced with an assessment of the integration status of the examined processes. The utilization of stationary time series was imperative given the adopted methodology. The implications of appraising causality in non-stationary time series were deliberated by notable researchers such as Granger (1981) or Phillips (1986).

5. Empirical Findings on Granger Causality Links Between Public Debt and Inflation

The examination of the causal relationship on average in Granger sense, between the levels of public debt and inflation in the analyzed countries initiated with checking stationarity of the analyzed variables and the Augmented Dickey-Fuller test was adopted into it. The findings indicate that both consumer price index and public debt were non-stationary at the initial level. However, they exhibited stationarity after undergoing the first difference, signifying integration of order one at a significance level of five percent. This suggests the potential existence of a significant cointegration relationship among the variables. Notably, all variables are expressed in logarithmic form.

Initially, the investigation sought to determine whether public debt serves as a Granger causal factor for the inflation levels in the analyzed countries. The outcomes of the tests are detailed in Table 2.

Table 2. Results of testing the null hypothesis indicating that the public debt does not serve as a Granger causality factor for the inflation*

Group	Country	Statistics		Statistics
Advanced Economies	Finland	11.057 (0.621)	Portugal	32.029 (0.032)
	Great Britain	23.043 (0.233)	Germany	25.054 (0.001)
	France	15.092 (0.621)	Spain	27.291 (0.037)
	Sweden	33.402 (0.021)	Greece	41.092 (0.002)
	Italy	27.021 (0.027)	Ireland	38.271 (0.041)
Emerging and Developing Economies	Romania	10.038 (0.754)	Poland	17.921 (0.047)
	Hungary	12.021 (0.429)	Bulgaria	11.013 (0.422)

*p-value is given in brackets.
Source: author's own elaboration.

Concerning the economies under examination, the analysis reveals a Granger causality relationship between public debt-to-GDP ratios and inflation in the case of Sweden, Italy, Portugal, Germany, Spain, Greece, Ireland, and Poland. Notably, this relationship is observed in also "fiscally conservative" nations with notably low levels of public debt, exemplified by

Sweden, where the public debt-to-GDP ratio stood at 33 percent in 2022. Conversely, among countries characterized by substantially higher debt levels, the Granger causality relationship was confirmed especially in Greece representing the highest ratio of public debt to GDP among all considered countries equals to 172,6 percent and in Italy with the level of debt equals to 141,7. These countries are under scrutiny by the European Commission.

Public deficits may contribute to higher inflation, particularly when accompanied by expansive monetary policies that increase the money supply. The relationship between national debt and inflation is influenced by various factors, including the liquidity conditions of the banking sector and the independence of the central bank. A lower level of central bank independence may heighten the risk of debt-induced inflationary pressures.

The source and nature of government borrowing, whether domestic or foreign and from private or institutional investors play a significant role in shaping inflation dynamics and could be one from possible explanations of the observed regularities. Evaluations of public bonds by investors hinge on factors such as government solvency, including its ability and willingness to repay debt. Recent examples, such as Greece, underscore the importance of sustainable public debt levels, as unsustainable levels can undermine financial credibility and access to credit markets.

Table 3. Results of testing the null hypothesis indicating that the inflation does not serve as a Granger causality factor for the public debt*

Group	Country	Statistics		Statistics
Advanced Economies	Finland	23.902 (0.044)	Portugal	9.201 (0.301)
	Great Britain	18.021 (0.710)	Germany	12.091 (0.239)
	France	28.329 (0.003)	Spain	16.032 (0.117)
	Sweden	24.007 (0.121)	Greece	25.921 (0.011)
	Italy	27.831 (0.238)	Ireland	22.019 (0.172)
Emerging and Developing Economies	Romania	13.092 (0.745)	Poland	10.038 (0.826)
	Hungary	17.023 (0.439)	Bulgaria	12.023 (0.428)

*p-value is given in brackets.
Source: author's own elaboration.

The empirical validation of whether inflation serves as a Granger cause of public debt indicates a statistically significant causality only in few cases as France, Greece and Finland. This observation aligns with the notion that elevated inflation which tend to exert a substantial influence on the growth of the money supply. In periods of high inflation, the government seeks to acquire resources from the private sector by accelerating the printing of money and spending it at a rate surpassing the inflation rate, thereby compensating for the rapid decline in real revenues. This establishes a robust bidirectional correlation between the growth of money supply and

inflation. This, in turn, can impact the level of nominal public debt. Conversely, when inflation is low, its impact on fiscal deficits is less pronounced, potentially resulting in a weaker causal relationship from inflation to money supply growth that may not be discernible through statistical testing.

In summary, the examination of time series data for the countries included in the analysis indicates that, in general, the public debt-to-GDP ratio serves as an indicator for the price level only in select cases. The group of countries exhibiting statistical significance in this relationship encompasses nations characterized by both low and high public debt-to-GDP ratios.

6. Conclusions

The study delved into the causal relationship between public debt and inflation. The literature review underscored that the impact of public debt on the level of inflation is noticeable, but it is usually associated with specific conditions. The main findings of the empirical analysis pointed to a causal relationship between public debt and GDP. This insight allows us to conclude that, based on the amount of public debt, conclusions can be made about the level of inflation in countries such as Greece, Italy and Portugal, for example, countries with different levels of debt. Thus, no confirmation was found for the research hypothesis adopted in the paper.

Achieving sustained long-term economic growth through the use of budget deficit as a fiscal policy instrument necessitates strengthening monetary, industrial, and commercial policies to keep the economies in balance. Enhanced policy coordination across government branches is crucial, emphasizing the complementary nature of monetary and fiscal measures. Maintaining stringent fiscal discipline at all government levels is imperative. Recognizing inflation as a monetary phenomenon in some of the analyzed countries the effective utilization of budget deficits requires fundamental changes in the productive base of the economy.

The effective use of debt to yield positive outcomes hinges on its judicious allocation towards initiatives that genuinely enhance output, coupled with resilience to factors like maturity, currency, and creditor composition, especially in the face of economic and financial market disruptions. Achieving this requires not only prudent government debt management but also the implementation of robust regulations and supervision in the financial system, alongside a commitment to sound corporate governance principles. A prompt and effective response to external shocks, particularly in the presence of domestic vulnerabilities, is crucial, as private debt can rapidly evolve into public debt during periods of financial stress. Timely resolution of debt distress is imperative to prevent prolonged periods of economic weakness.

Regarding the relationship between debt and inflation, addressing this aspect involves considering four overarching strategies. Firstly, governments

should establish mechanisms and institutions enabling them to strike an appropriate balance between the benefits and costs of additional debt, incorporating sound debt management practices and maintaining high debt transparency. International creditors can contribute by implementing prudent lending standards, ensuring risk is appropriately distributed, and verifying the productive use of debt.

Secondly, the importance of stability-oriented and resilient fiscal and monetary policy frameworks cannot be overstated, particularly in the context of managing inflationary pressures associated with debt. Thirdly, policies related to the financial sector should be tailored to encourage responsible private sector borrowing, necessitating robust supervisory and regulatory frameworks, along with corporate and bank bankruptcy frameworks that facilitate prompt debt resolution to minimize the impact of debt distress. Lastly, the implementation of strong corporate governance practices and effective bankruptcy and insolvency regimes is essential, considering their role in influencing the relationship between debt and inflation.

As a direction for further research, it would be worth considering verification of the impact of the public debt structure on inflation processes, taking into account the state of the country's economic situation, as it is one of the determinants of the impact of public debt on inflation.

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ARTICLES

Anna Wolak-Tuzimek[1]

NON-ECONOMIC DETERMINANTS OF CONSUMER PURCHASING BEHAVIOR

Abstract
The aim of the article is to examine the impact of non-economic factors on consumer purchasing decisions depending on their place of residence. The article discusses non-economic factors influencing consumer purchasing decisions. To verify the research hypothesis regarding the relationship between place of residence and consumer buying behavior, the Mann-Whitney U test was used. The results obtained from the study conducted on a group of 250 consumers residing in the Mazowieckie Voivodeship do not unequivocally confirm that the place of residence influences consumer purchasing decisions.

Key words: consumer, purchasing decisions, market

JEL Classification: D11, D12

Paper type: Research paper

1. Introduction
Consumer behaviors are one of the most important sources of knowledge about the market. Understanding them can turn into market success for a company. Therefore, the process of consumer purchasing decisions is important, influenced by both economic issues and a variety of non-economic factors. Purchasing decisions can be shaped by social influences, psychological motivations, cultural norms, individual preferences, and environmental elements.

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The aim of the article is to examine the influence of non-economic factors on consumer purchasing decisions depending on their place of residence.

Consumer behavior and needs in the market are dynamic and undergo evolution due to a variety of social, economic, and environmental factors. Changing conditions in economic development can cause changes in human needs and the factors shaping them. Moreover, place of residence can serve as an important context shaping consumer purchasing decisions through the availability of products and services, demographic characteristics of the community, infrastructure, local culture, and consumer trends

The article conducted a review of the literature on the subject, as well as used the Mann-Whitney U test.

The analysis of the obtained results was conducted based on surveys carried out on a group of 250 consumers from the Mazowieckie Voivodeship (pilot studies) using STATISTICA 13 software. The survey questionnaire aimed to assess the importance of selected factors influencing consumer purchasing behavior.

The results obtained from the research can provide crucial information that will be utilized in the marketing strategy of businesses operating in the specific local or regional market.

2. Theoretical background

In the subject literature, there is a broad and interdisciplinary approach to the concept of consumer behavior. Available studies emphasize various aspects and dimensions of behavior. This concept is understood as: "the totality of actions and perceptions of a person comprising the preparation of product choice decisions, making that choice, and consumption" (Hansen, 1972, p. 15), "the dynamic interaction of affect (emotions) and cognition (thought processes), behavior, and environment, through which people carry out aspects of exchange in their lives" (Bennett, 1995, p. 58), "actions and processes whereby people decide to acquire or dispose of products or services based on their experiences and ideas" (Blackwell et al. 2006), "a coherent set of actions and ways of acting related to choices made in the process of satisfying consumer needs under specific cultural, social, and economic conditions" (Kieżel, 2010). According to Nguyen Hoang Tien et al. (2021, p. 54), consumer behavior is the act of a person buying and using a product or service, including both psychological and social processes occurring before and after the act. The study of consumer behavior includes the study of individual consumers, how they choose products and services, and the impact of this process on consumers themselves and society. From the presented definitions, it follows that consumer behavior can be understood as the totality of actions and ways of acting related to making choices occurring in the process of satisfying consumer needs.

It encompasses everything that happens before, during, and after the acquisition of specific goods and services.

The role of consumers and their behaviors in shaping the market and the functioning of businesses is very important. Through a better understanding of consumer needs and preferences, companies can optimize their product offerings, improve operational efficiency, and build stronger customer relationships (Dash et al., 2019). As a result of these actions, they can gain a competitive advantage in the market (Wolak-Tuzimek, 2023).

The fundamental and comprehensive division of determinants of consumer purchasing behavior is into economic and non-economic factors. Within the first group, economic factors consist of elements from the broader economic environment (over which consumers have no control – macroeconomic factors) and microeconomic factors, such as consumer incomes. Economic factors are the cornerstone of consumer purchasing behavior as they determine the financial capabilities necessary to fulfill needs.

The main non-economic factors influencing consumer behavior are divided into four primary groups: cultural, social, psychological, and personal (Tien et al., 2021, p. 54).

Culture is a powerful force influencing consumers' daily lives, making it a significant factor shaping consumer behavior in different parts of the world (Akdogan et al., 2021). It is a complex network of shared beliefs, customs, values, traditions, religions, and symbols that serve to identify a group or society (Zimmu, 2023). Cultural factors are the reason why consumer behaviors in different markets can be entirely different.

Social factors, largely associated with the influence of groups (such as family, reference groups), play a significant role in consumer purchasing behavior (Almeshal, Almawash, 2023). A person's reference groups are individuals or groups of people who may directly or indirectly influence the attitude or behavior of that person. Reference groups can include friends, coworkers, classmates, the same team, an organization, or simply people with similar interests (Tien et al., 2021).

Psychological determinants, constituting a separate group of determinants, are interconnected with other factors (Lichev, 2017, p. 15). The environment, education level, social status, ownership status (among others) have significant connections with the psychological aspects of an individual. These primarily include perception, motivations and emotions, attitudes and preferences, as well as acquired knowledge. Perception allows consumers to become aware of the existence of certain products, notice differences between brands and places of purchase, thus it can be inferred that it is a condition and a prelude to any purchasing behavior (Kieżel, 2010, p.135). Motives, as factors related to the occurrence of consumer needs and

perception, are forces arising from unfulfilled needs that stimulate and direct consumer behavior to satisfy those needs (Rudnicki, 2000, p. 91).

Personal factors include, among others, age, gender, education, life stage, occupation, lifestyle, and personality. The structure and preferences for purchasing many products change with age. Perception of risk, economic conditions, tastes, and preferences also change. Gender influences orientation towards specific products, perception of their shape, color, packaging, functionality, and usefulness. Consumer behavior also depends on the phase in the family life cycle. Depending on the phase, changing needs can be observed, initially focused on oneself, leisure, free time, entertainment, and later, as a result of changes, on family needs (Rosa, 2012, p.126). Individuals with higher education have more information about the environment in which they operate and can better process the accumulated information, turning it into knowledge. This knowledge serves to make more conscious and thoughtful purchasing decisions than in the case of individuals with lower levels of education. It should be added that with an increase in the level of education, the level of rationality in market behaviors increases (striving for maximizing benefits), as well as the desire to purchase a product for pleasure (Zalega, 2007). On the other hand, occupational activity is directly related to the level of education, the amount of income earned, and social position, which undoubtedly translates into consumer behavior and the structure of purchases (Janoś-Kresło, Mróz, 2006).

The consumer's place of residence can have a significant impact on their purchasing behavior because many factors, including culture, the availability of products and services, and the standard of living, vary depending on the region or locality. The availability of products and services can vary significantly depending on the location. A consumer in a large city may have easier access to a wider range of products than someone living in a rural area.

Market research indicates that the local availability of products can influence consumer brand loyalty (Rust, 2010). The income level of the population residing in a particular area can shape shopping profiles (Chetty, Hendren, 2018), and the brand of a product should align with local social values (Bhattacharya, Sen, 2003).

The literature review enabled the identification of both direct and indirect factors influencing consumer purchasing behavior. The article formulated a research hypothesis H: place of residence affects consumer purchasing behavior.

3. Research methodology
The verification of the research hypothesis was conducted based on the results of survey research carried out on a group of 250 consumers residing in the Mazowieckie Voivodeship, using the Mann-Whitney U test.

The study was conducted in June and July 2023 and had a pilot nature. Data included in the survey were obtained using a diagnostic survey method, in which an author-designed questionnaire was used to collect the necessary data. It consisted of two parts: a metric part and a substantive part. In the metric part, objective criteria such as gender, age, education, and place of residence were used to characterize the sample, as presented in Table 1.

Table 1 Research Sample Characteristics

Cryteria	Number	Structure (%)
Sex		
female	136	54.4
male	114	45.6
Location		
town with over 100,000 inhabitants	161	64.4
town with below 100,000 inhabitants	89	35.6
Age		
18-24	60	24.0
25-34	109	43.6
35-44	39	15.6
more than 45	42	16.8
Education		
high	95	38,0
medium	110	44,0
basic	45	18,0

Source: own study

Upon analyzing the structure of the surveyed respondents, the following observations can be made:

1. Women predominated in the study, constituting 54.4% of the total respondents.
2. In cities with over 100,000 inhabitants, 161 respondents resided (approximately 64%).
3. The highest number of surveys were completed by respondents in the age group of 25-34 years, with 109 individuals, while the smallest share, accounting for 15.6%, was represented by consumers aged 35 to 44 years (39 individuals).
4. The study included the highest number of individuals with a secondary education (110 individuals, accounting for 44% of the total).

In the second part of the survey, respondents were asked to evaluate the importance of variables in consumer purchasing decision-making. Nineteen variables were identified, namely: product brand, advertising,

public relations, company image, product price, promotion, product/service quality, service quality, customer loyalty, customer trust, customer satisfaction, product innovation, product availability, company involvement in the local community, company environmental protection activities, consumer consultations, company charity activities, eco-labeling, and promotion of a healthy lifestyle. Respondents' answers were recorded on a 10-point ordinal scale, where 1 indicated low importance, while 10 indicated high importance.

To verify the research hypothesis, the Mann-Whitney U test was utilized. This is a non-parametric test used to test hypotheses about the insignificance of differences between the medians of the variable under study in two populations (with distributions of the variable being close to each other) (Mroczek, Stachyra, 2022, p. 110). The conditions for applying this test include measuring variables on an ordinal scale and the independence of the model.

The hypotheses regarding the equality of mean ranks for the compared populations have been simplified to medians:

H0: $\theta_1 = \theta_2$,

H1: $\theta_1 \neq \theta_2$,

where:

θ_1, θ_2 – distributions of the variable under study in the first and second populations.

The null hypothesis assumes equality of the mean ranks for both groups, while the alternative hypothesis suggests that the means differ. The calculated p-value based on the test statistic is compared to the significance α level:

if $p \leq \alpha \Rightarrow$ reject H0 accepting H1,

if $p > \alpha \Rightarrow$ there is no reason to reject H0.

The verification of the Mann-Whitney U Test for each variable was conducted at a significance level (p-value) of 0.05.

4. Results and discussion

In the study, it was assumed that the p-value should be greater than the specified significance level $\alpha = 0.05$.

In the study, two hypotheses were formulated:

H0: The distributions of variables influencing consumer purchasing behavior are the same for the categories of the variable "place of residence".

H1: The distributions of variables influencing consumer purchasing behavior are not the same for the categories of the variable "place of residence".

The null hypothesis H0 should be rejected in favor of the alternative hypothesis H1 if the p-value $\leq \alpha$. If the p-value $> \alpha$, there is no basis for rejecting H0. The results of the Mann-Whitney U test are presented in Table 2.

Table 2. The results of the test for the values of variables influencing consumer purchasing behavior based on the place of residence are as follows

Number	Null hypothesis	Test	Significance (p)	Decision
1	The distribution of the product brand variable is the same across the variable category of place of residence		0.037	reject H0
2	The distribution of the advertisement variable is the same across the variable category of place of residence		0.069	accept H0
3	The distribution of the public relations variable is the same across the variable category of place of residence		0.015	reject H0
4.	The distribution of the company image variable is the same across the variable category of place of residence		0.007	reject H0
5.	The distribution of the product price variable is the same across the variable category of place of residence	Mann-Whitney U Test	0.088	accept H0
6.	The distribution of the promotion variable is the same across the variable category of place of residence		0.492	accept H0
7.	The distribution of the product/service quality variable is the same across the variable category of place of residence		0.789	accept H0
8.	The distribution of the customer service quality variable is the same across the variable category of place of residence.		0.199	accept H0

Continued Table 2

9.	The distribution of customer loyalty variable is the same across the variable category of place of residence		0.002	reject H0
10	The distribution of customer trust variable is the same across the variable category of place of residence		0.008	reject H0
11	The distribution of customer satisfaction variable is the same across the variable category of place of residence		0.003	reject H0
12	The distribution of product innovativeness variable is the same across the variable category of place of residence		0.368	accept H0
13	The distribution of product availability variable is the same across the variable category of place of residence		0.097	accept H0
14	The distribution of the company's engagement in local community efforts is the same across the variable category of place of residence		0.008	reject H0
15	The distribution of the company's actions for environmental protection is the same across the variable category of place of residence		0.008	reject H0
16	The distribution of consumer consultations variable is the same across the variable category of place of residence		0.020	reject H0

Continued Table 2.

`17	The distribution of the company's charitable activities is the same across the variable category of place of residence		0.004	reject H0
18	The distribution of eco-labeling variable is the same across the variable category of place of residence		0.007	reject H0
19	The distribution of promotion of a healthy lifestyle variable is the same across the variable category of place of residence		0.004	reject H0

Source: own study

Based on the analysis of probabilities obtained for the respective threshold values presented in Table 2, it appears that not all examined variables influence consumer purchasing behaviors based on their place of residence. The obtained results indicate that for the variables: product brand, public relations, company image, customer loyalty, customer trust, customer satisfaction, company engagement in the local community, company environmental protection activities, consumer consultations, company charitable activities, eco-labeling, and promotion of a healthy lifestyle, the null hypothesis should be rejected. This means that for the mentioned variables, place of residence is a differentiating factor in consumer purchasing behaviors, thus confirming the validity of the research hypothesis H.

However, it should be noted that for 7 variables: advertisement, product price, promotion, product/service quality, customer service quality, product innovativeness, and product availability, the null hypothesis should be accepted. This means that for these variables, place of residence does not differentiate consumer purchasing behaviors. In summary, it cannot be conclusively confirmed that the research hypothesis H: place of residence influences consumer purchasing behaviors, is correct.

The obtained research results align with previously published studies. According to M.J.L. Costales (2023), non-economic factors influence consumer purchasing behaviors. In line with research conducted among 100 residents of Muntinlupa, ecological awareness, ecological product characteristics, ecological promotional activities, and ecological pricing notably influence consumers' ecological purchasing behaviors. Meanwhile, demographic characteristics have a moderate impact on the assertion that

brand, product, price, and promotional strategies significantly influence the purchasing behaviors of the surveyed consumers.

Research conducted by Q. Liu and X. Wang (2023) among a group of 544 consumers confirms that regional product branding positively influences consumers' attitudes, purchase intention, and purchasing behavior. Each regional brand, with its unique characteristics, combines certification factors and geographical indication, facilitating the transformation of purchase intention into actual purchasing behavior.

According to research by H. Nahi and E.I. Develi (2023), consumers rely on information from social media when making purchasing decisions. The results of the study conducted on a group of 300 Moroccan consumers confirm that the content of posts, their emotional appeal, and the frequency of social media usage influence consumer behaviors.

To summarize, it can be said that many authors confirm in their research that consumers take into account non-economic factors when making purchasing decisions.

Conclusions

In the literature, there are many definitions of consumer behavior. They usually differ in their emphasis or level of detail. Consumer behavior can be defined as any actions taken by individuals during the acquisition, consumption, and disposal of products and services.

The literature analysis has enabled the identification of non-economic factors influencing consumer purchasing behaviors, which encompass a wide range of factors including social, psychological, cultural, and environmental factors.

Based on the conducted research, it can be concluded that consumers are influenced by non-economic factors when making purchasing decisions. Furthermore, 12 variables examined—product brand, public relations, company image, customer loyalty, customer trust, customer satisfaction, company engagement in the local community, company environmental protection activities, consumer consultations, company charitable activities, eco-labeling, and promotion of a healthy lifestyle—are diversified depending on the place of residence. However, for 7 variables—advertisement, product price, promotion, product/service quality, customer service quality, product innovativeness, and product availability—place of residence does not differentiate consumer behaviors. This suggests that the correctness of the research hypothesis, that place of residence influences consumer purchasing behaviors, cannot be conclusively confirmed.

The extensive variety of products available makes the knowledge about customer behaviors possessed by the entrepreneur a significant source of competitive advantage and business success. This knowledge forms the basis for characterizing buyers, which in turn is useful in formulating

responses regarding the reasons behind certain customer behaviors and enables thinking in their terms. Therefore, it is important to conduct research encompassing customers' views, opinions, and assessments regarding their behaviors in the market.

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