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Gender equality and social innovation

The cohesion policy of the EU

Research, education and development

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Równość płci i innowacje społeczne

Polityka spójności UE

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THEORIES AND METHODS IN EUROPEAN STUDIES

Gender equality and innovation – towards sustainable development and social innovation using the example of activities undertaken by the European Union

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Abstract

The main aim of the article is to analyse the importance of gender equality in the context of implementing social innovations and the principles of sustainable development. These processes will be shown in the context of activities undertaken at the European level and by European institutions. The main research problem of the article is to present arguments relating to the growing importance of the concept of sustainable development and social innovation, for which social order and gender equality are of key importance. Such identification of the concept of sustainable socio-economic development with social order and gender equality in the creation of contemporary innovations can be analysed in a scientific perspective with the functional theory of social change by A.R. Redcliffe-Brown and B. Malinowski. On the other hand, in practical terms it is entwined with all types of activities, strategies or programmes undertaken and implemented in the pragmatics of European Union activities (eg. *Commission Work Programme 2020: A Union that strives for more*, the Ljubljana Declaration, the Programme *Horizon Europe*, including *Women TechEU*). The author uses both traditional research methods as a middle-order system analysis and institutional-legal method, as well as new methods, including sociological neoinstitutionalism and network analysis. The research techniques used in the analysis are mainly quantitative techniques, i.e. desk research or analysis of existing data from databases *She Figures*, GEM, Statista.com.

Keywords: sustainable development, social innovation, European Union, gender equality

Równość płci a innowacyjność – w kierunku zrównoważonego rozwoju i innowacji społecznych na przykładzie działań podejmowanych przez Unię Europejską

Streszczenie

Głównym celem artykułu jest analiza znaczenia równości płci w kontekście wdrażania innowacji społecznych i zasad zrównoważonego rozwoju. Owe procesy zostaną ukazane w kontekście działań podejmowanych na poziomie europejskim oraz przez instytucje europejskie. Głównym problemem badawczym artykułu jest przedstawienie argumentów odnoszących się do wzrastającego znaczenia koncepcji zrównoważonego rozwoju i innowacji społecznych, dla których to ład społeczny i równość płci mają kluczowe znaczenie. Takie utożsamienie koncepcji zrównoważonego rozwoju społeczno-gospodarczego z ładem społecznym i równością płci w kreowaniu współczesnych innowacji można zbadać w ujęciu naukowym na podstawie funkcjonalnej teorii zmiany społecznej A.R. Redcliffe-Browna i B. Malinowskiego. Natomiast w ujęciu praktycznym – z wszelkiego typu działaniami, strategiami czy programami podejmowanymi i realizowanymi w pragmatyce działań Unii Europejskiej (np. Program roboczy KE pt. *Unia, która mierzy wyżej*, Deklaracja z Lublany, Program *Horyzont Europa*, w tym *Women TechEU*). W odniesieniu do metod badawczych, w artykule wykorzystano tradycyjne metody badawcze (jak analiza systemowa średniego rzędu oraz metoda instytucjonalno-prawna), a także nowe metody, w tym neoinstytucjonalizm socjologiczny oraz analiza sieci. Technikami badawczymi, jakimi posłużono się w analizie, są głównie techniki ilościowe, tj. analiza typu *desk research* czy analiza danych zastanych, zawartych w bazach *She Figures*, GEM, Statista.com.

Słowa kluczowe: zrównoważony rozwój, innowacje społeczne, Unia Europejska, równość płci

A review of the innovation literature suggests that research on gender issues has increased significantly over the past few years. These studies address issues such as women on corporate boards, which can affect a company's financial performance and social impact (Campbell, Mínguez-Vera 2008; Carter et al. 2010; Boulouta 2013; Solakoglu 2013), gender and corporate governance (Carter et al. 2003; Francoeur et al. 2008; Adams, Ferreira 2009), gender identification as a company asset (Hillman et al. 2000), networking (Westphal, Milton 2000; Arfken et al. 2004; Hillman et al. 2007), types and dimensions of innovation (Turner 2009; Díaz-García et al. 2013). In many articles, authors argue that gender as the new determinant of the modern description of innovation has not been sufficiently studied (Blake, Hanson 2005; Fagerberg 2005; Alsos et al. 2016; Smith 2020; Trauth 2023).

Three perspectives of innovation concerning gender can be distinguished in the analysed literature. The first is the so-called "person-centred" or "gender-centred" (Horner 1972; Terborg 1977; Riger, Galligan 1980; Adler, Israeli 1988). This perspective has been used since the 1970s, when women gained access to master's degrees, meaning they were involved in organisational management of companies focusing on innovation. This approach attributes the limited representation of women in senior positions to factors that are internal to women (behavioural aspects), e.g., their ill-suited characteristics, beliefs, attitudes and behaviours (Fagenson 1990).

The second perspective, called the "situational or structural approach" (Kanter 1988; Freeman 1990), asserts that the behaviour of people is strongly related to the positions they hold in organisational hierarchies and the structures of the studied organisations. In other words, instead of behavioural (gender-related) factors, organisational structure shapes and determines women's behaviour in the workplace as well as in career progression (Fagenson 1990). Taking this fact into account, the limited percentage of women in innovative organisations is not only due to gender, but, above all, to organisational structures. Moreover, both of these factors interact with culture and shape women's behaviour in the workplace.

The third approach, the "Gender–Organisation–System" (GOS), argues that women's behaviour and the difficulties they encounter in innovation processes cannot be attributed solely to gender, because individuals differ from each other not only in terms of gender (Fagenson 1990, 1993), but also in terms of their national, social and institutional system locations, and the cultural context as a whole (Biscione et al. 2022). Moreover, it is noted that specific classifications and concepts relating to innovation, such as the knowledge-based economy, the *Oslo Manual* (see: OECD/Eurostat 2018), and the STEM approach, are widely accepted as the standard for innovation and are implemented in industries and sectors led mainly by men. Therefore, gender in relation to innovation processes has been and continues to be relevant (Blake, Hanson 2005; Beede et al. 2011; Belghiti-Mahut et al. 2016). It is assumed that the GOS approach is systemic, in the sense that it accounts for the interactions between individuals, organisations and society.

This article fits into the latter area of analysis related to the GOS approach. The author intends to present innovation and gender in the context of sustainable socio-economic development paradigm. The main aim of the article is to analyse the importance of gender in the context of implementing social innovations and the principles of sustainable development. These processes will be shown in the context of activities undertaken at the European level and by European institutions.

The essence of sustainable development is anthropocentrism, which is centred on values, and can be considered in relation to the categories of justice, or equality, of access to diverse environmental, social, and economic resources, etc. Such understanding of sustainable development is carried out through the integrity and implementation of five orders (arenas): social, institutional-political, environmental, spatial and economic. In this article, the scope of social order and the inherent gender equality associated with it will be analysed in detail.

Such identification of sustainable socio-economic development concept with social order and gender equality in creating contemporary innovations can be scientifically analysed by the application of Radcliffe-Brown's and Malinowski's theory of structural functionalism (see: Radcliffe-Brown 1940; Malinowski 1945). However, in practical terms it is entwined with all types of activities, strategies or programmes undertaken and implemented pragmatically by the European Union's activities, for example: *Commission Work Programme 2020: A Union that strives for more* (see: European Commission 2020a), *Ljubljana Declaration on Gender Equality in Research and Innovation* (see: Ljubljana Dec-

laration 2021), the *Framework Programme for Research and Innovation "Horizon Europe"* (see: Regulation (EU) 2021/695), including *Women TechEU* – the EU's scheme supporting deep-tech start-ups led by women. This is practical dimension, and the analysis of actions undertaken at the EU level for gender equality in research, development and innovation (R&D&I), is the goal of the article. Therefore, the article will discuss the theoretical and cognitive contexts of the concepts of sustainable development and social innovations, which are closely linked to gender equality. This will allow the analysis of the R&D&I structures of/in the EU Member States and the actions undertaken by the European Commission to strengthen the position and role of women in real participation in con-temporary development processes. The most important structural conditions analysed in the article include degree subjects and graduates, the market and working conditions in the R&D&I sector, presence in decision-making positions in the R&D&I sector, the results of research and development activities, and the start-up market conditions.

The presented data demonstrate the increased activity of the EU institutions in terms of strengthening the participation of women in the R&D&I sector, which is based precisely on the paradigm of sustainable socio-economic development. It should be noted, how-ever, that deficits related to the participation of women in R&D&I sector are still visible. As a result, it can be argued that we are dealing with a short-term emergence level, which is the third of the five stages that lead to permanent social change described in the model of social emergence (Praszkier, Nowak 2012; Sztompka 2007).

In terms of research methods, the article uses both traditional research methods such as medium-order systemic analysis and institutional-legal method, as well as new me-thods, including sociological neo-institutionalism, as well as network analysis (Lowndes 2006). Using the medium-order system analysis method, the author aims to demonstrate how social innovations affect existing innovation systems and policies. To this end, the institutional and legal method will also be helpful, because it enables the analysis of the key formal and legal solutions adopted at the supranational level in the EU. Sociological neo-institutionalism and network analysis, in turn, help to determine the impact of social innovations on the effects, and scale, of social changes. Thus, to determine to what ex-tent the introduced programmes, and tools, contribute to permanent transformations of the targeted audience of such activities. The research techniques used in the analysis are quantitative, i.e., desk research or secondary analysis of databases, such as *She Figures* (see: European Commission 2021a), GEM, and Statista.com (see: Statista.com WWW).

Gender and the notions of sustainable socio-economic development and social innovation

Scientific and technological development, as well as innovation, are processes that since the beginning of the twentieth century have become dynamic and are associated with new challenges. The concept of sustainable socio-economic development has become a common denominator for the development of competitiveness and innovation, in micro-, meso- and macro- structural terms. This is based on the notion of a knowledge-

based economy, the measures of which are presented in the *Oslo Manual* (see: OEDC/ Eurostat 2018) or *Frascati Manual* (see: OECD 2015). However, these classifications refer to the so-called traditional innovations such as product, process, marketing and market innovations. They barely take into account new types of innovation, such as social innovation, which enables a more precise grasp of the issue of real social changes and related values, such as justice or equality.

This new approach to understanding development and innovation concepts allows us not only to consider the context of gender more broadly and precisely, but offers an alternative to the negative consequences of technological development (Gawor 2006). In this sense, the concept of sustainable socio-economic development and social differences enable a wide inclusion both in terms of subjectivity (gender, social change) and objectivity (technological and non-technological innovations) and should lead to the legitimisation of activities and expenditure on scientific, research and development or innovative policies.

The core of sustainable development is fulfilling the aim of establishing a state of integrated order, which arises from the combination of social, institutional-political, economic, environmental and spatial orders.

Figure 1: Five-element structure of integrated order.[1]
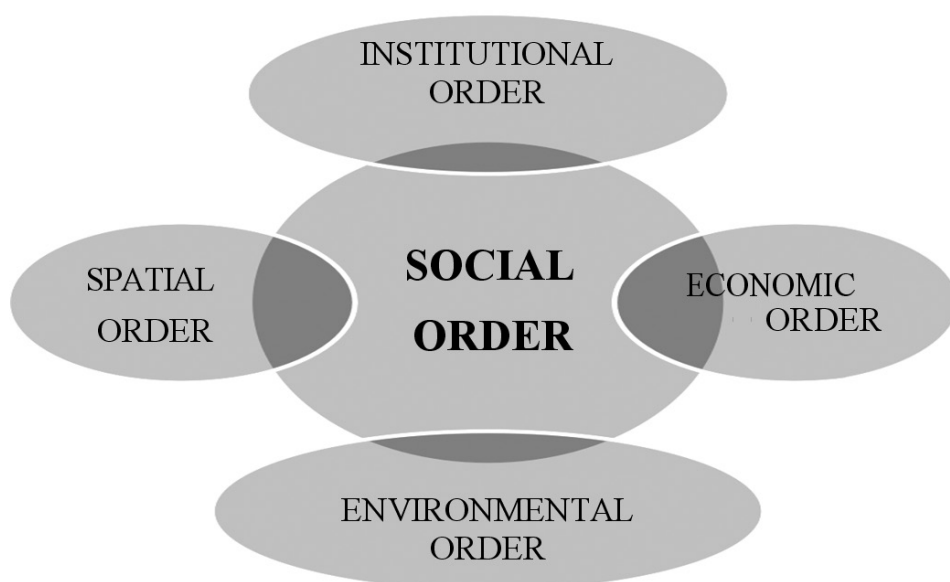
Source: author's own work, on the basis of the publication: Borys 2011: p. 78.

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[1] At the centre of the flowchart is social order, which is the most capacious category. It consists of the remaining four equivalent orders – institutional, spatial, environmental and economic, which have a more functional (sectoral) meaning.

Each of these orders can be assigned a kind of capital, as a factor with a certain value that shapes each order. Human capital is linked to the social order, the natural capital is linked to the environmental order, the economic capital creates and influences the development of the economic order, and the system of social institutions is created by social capital, which is shaped by the institutional order (Borys 2011).

The central value of sustainable development is anthropocentrism (social order) concentrated on values, which can be considered in terms of, inter alia, the category of justice, or equality in access to diverse resources:

- environmental,
- institutional-political,
- economic,
- spatial.

Anthropocentrism, which is focused on human interests, emphasises the need to improve relations with other people, to eliminate problems that are social in nature, as well as to take into account the needs of present and future generations. Additionally, it emphasises the unique potential of such issues as quality of life, justice, equality, progress and social change (Sołtys 2014).

The GOS approach informs us that the cultural context is responsible for the differences in innovation policies and systems. However, the innovation system is by its nature a social system, because it has three inherent properties: differentiation (diversity), dynamics and complexity. Like any social system, or perhaps by its very nature, the innovation system is an adaptive system with a triple adaptation (Radcliffe-Brown 1965):

- ecological adaptation (adaptation to a constantly changing environment),
- institutional adaptation (adaptation to changing patterns of behaviour),
- cultural adaptation (adaptation to changing norms and value systems).

As a result, the concept of sustainable socio-economic development, emphasising anthropocentrism and adaptation, adds social innovation to the existing traditional types of innovations. Social innovations, unlike technological innovations (i.e., traditionally understood and described innovations linked to the research and development sector, companies or complex economic systems), do not have to be framed by:

- individual profit,
- taking a risk,
- radical innovation (Olejniczuk-Merta 2014).

Such innovations must be related to the use of knowledge, ideas, concepts and actions of consumers, as well as users and potential users of various goods and services, who know their own needs and the needs of groups they belong to, and have a vision and ideas how to meet them satisfactorily. They may also be promoted by various social groups.

Social innovation should lead to:

- institutional change (activities within organisations and institutions, technology and technology, as well as networking, and openness), which should translate into:

- socio-axiological change (actions towards stakeholders, society, values, ways of solving complex social problems).

The convergence of these two processes should result in a modernisation and civilisational effect in the form of social emergence (scope, durability, and depth of changes). In the literature on the subject, there are five levels of social emergence:

1) Individual – individual experiences, attitudes, cognitive processes.
2) Interaction – cooperation, negotiations, discourse patterns, symbolic interactions.
3) Short-term emergence – participatory structures, first roles and statuses, common goals, interaction framework.
4) Stable emergence – emerging group structures, stable principles of dialogue, structuring of leadership, a strategy of action, and team building.
5) Emergence (social change) – the emergence of procedures, laws, and the emergence of integrated, complex social systems.

The essence of social change is linked with cultural diffusion. This diffusion should concern the change in the arrangement of positions occupied by individuals in the social structure, and in the case discussed here, it is about increasing the importance of women in innovation processes (Malinowski 1945).

To sum up, social innovation, which is appropriate for the concept of sustainable socio-economic development, allows for non-technical and non-technological contexts of innovative processes to be considered. This broader perspective allows us to connect contemporary policies and innovative systems with social change. However, in order to consider the scope and depth of this change, it becomes necessary to take into account the gender factor, which includes the wide spectrum of behavioural-structural-process dependencies as noted in the GOS approach.

One of the key conditions for successfully implementing sustainable socio-economic development is to build a community of interests or have appropriate legal, organisational, social or financial resources. Real changes, beneficial for society and resulting in positive social changes, require the genuine involvement of many international participants (Sztumski 2006). Thus, the role of collective actors, such as international organisations, who have the appropriate resources to initiate and implement such changes, is growing. The European Union is one of the key international actors that uses sustainable development and social innovation concepts to emphasise gender equality.

Gender equality in the context of social innovation in the activities of the European Union

For years, the EU has been actively involved in promoting sustainable development, both among Member States and internationally. Positive and lasting change in this area is associated with much broader support for social innovation, which the European Commission defines as „the development and implementation of new ideas to meet social needs and create new social relationships and cooperation" (European Commission 2013). Such understanding, and – more important – the implementation of innovations, leads

to the expected social change. The process of implementing the idea of gender equality as one of the key principles of sustainable development in the social innovation field requires a long-term perspective and remains *in statu nascendi*. At this point, it should be highlighted that gender equality is one of the fundamental principles of the political and axiological system of the EU, as stated in Article 8 of the Treaty on the Functioning of the EU: „In all its activities, the Union shall aim to eliminate inequalities and to promote equality, between men and women." (TFEU: art. 8).

The first document at the supranational level that equated sustainable growth with social innovation and social change was the EU's first sustainable development strategy document – *A Sustainable Europe for a Better World: A European Union Strategy for Sustainable Development* (see: European Commission 2001). According to it, sustainable development should be the overriding goal of all policies: common agricultural policy, common fisheries policy, transport policy, research and technological development policy, and cohesion policies. Investment in social innovation, science and technology, work for dialogue and openness in the decision-making process were considered as key priorities (see: European Commission 2001). The role of social innovation and social change in sustainable development was even more clearly stated in the *EU Sustainable Development Strategy*, which was renewed in 2006 (see: European Council 2006). This document is explicit that social innovation leading to social change aimed at sustainable development has to be intrinsically linked to the principles of solidarity, as well as social and intergenerational equality, and also to the ideas of an open and democratic society that can engage directly in the decision-making process.

Gender equality in the context of the implementation of the principles of sustainable development was directly included for the first time in the EU document *COM(2019) 22 final* titled *Reflection Paper: Towards a Sustainable Europe 2030* (see: European Commission 2019), which was the EU's direct response to the commitments made in 2015 at the UN forum, i.e. the *Millennium Development Goals*. According to the *Reflection Paper*, one of the key challenges of sustainable development is the need to eliminate income and access to education inequalities by ensuring equal treatment of women and men (European Commission 2019).

In the same year, 2019, the new European Commission led by Ursula von der Leyen made gender equality an absolute priority, including it later in the *Commission Working Programme 2020: A Union that strives for more*, which sets out the EU's priorities for 2030 (see: von der Leyen 2019; European Commission 2020a). Gender equality, as a key factor in sustainable development, social change and innovation, is addressed in Priority II titled *An economy that works for people*, and particularly in subtitle *A Union of equality* of the political guidelines for the next European Commission 2019-2024: *The Union that strives for more. My agenda for Europe* by candidate for President of the EC Ursula von der Leyen (see: von der Leyen 2019: p. 8, 11). Gender equality is directly linked to innovation, as it has been noted: „In business, politics and society as a whole, we can only reach our full potential if we use all of our talent and diversity. Diverse teams produce better results. Innovation happens when people from different backgrounds and perspectives blend

together." (von der Leyen 2019: p. 11). Gender equality and innovation are further linked to economic development: „Gender equality is a critical component of economic growth. The European Gender Strategy will systematically address the way laws impact the decisions women take throughout their lives…" (von der Leyen 2019: p. 11).

The *Ljubljana Declaration on Gender Equality in Research and Innovation* of June 2021 is confirmation of the future political direction of the European Commission. The document stresses the importance of maintaining the value of gender equality in research and innovation to unleash new and inclusive ways of living for all, as well as new opportunities for work and research. The Declaration sets out priority actions for the new *European Research Area* (ERA), meaning:

- "Ensure fair, open, inclusive and gender equal career paths in research" by changing outdated promotion rules in the scientific and academic community;
- "Employ existing and newly developed tools, such as Gender Equality Plans, to facilitate systemic institutional change and remove institutional barriers" to science, research and innovation;
- Combating gender-based violence;
- "Leverage synergies to enhance gender equality achievements within the European Research Area, but also within complementary fields such as the European Higher Education Area, Cohesion policy funds, innovation ecosystems, as well as in international cooperation." (Ljubljana Declaration 2021: p. 1).

Moreover, the Council of the EU, highlighted gender equality as an area "requiring priority actions to be developed and implemented under the ERA and the *Pact for Research and Innovation in Europe*" (Council Recommendation (EU) 2021/2122), as the foundation of the "new ERA", as well as a new governance framework for its implementation. The *Pact for Research and Innovation in Europe* underlines gender equality as the core of the Union's values and identifies gender equality and equal opportunities as the basis for research and innovation in the European Union.

Therefore, it can be said that in their political declarations both the Commission and the Council of the EU reaffirmed the need to focus policy on gender equality, particularly in the area of research and innovation, which will contribute to the process of increasing the resilience and quality of democratic institutions, but also to the sustainable development and competitiveness of the EU.

The aforementioned political declarations have become the basis for concrete actions related to gender equality in science, research and innovation in the policies of the EU institutions and Member States. The first decision that strengthened gender equality in long-term solutions that lead to innovation at the level of more than European research consortia were the regulations contained in the European Commission's Communication *A New ERA for Research and Innovation* (see: European Commission 2020b). The Commission implemented new criteria of financing under the Programme *Horizon Europe*. The mandatory conditions have been defined and must be met by both, entities and individual projects that are submitted under the EU's main instrument of its research and technological development policy (European Commission 2021a):

- all applicants, i.e., public authorities, research organisations and higher education institutions, must have a gender equality plan;
- gender mainstreaming has become an implicit requirement when defining the content of research and innovation calls across the programme;
- measures and actions to promote gender equality within the European Innovation Council (EIC) are defined and ensure the implementation of the gender equality principle in research teams, with the aim that women account for 50% of board members, expert groups and evaluation committees which are part of *Horizon Europe*;
- gender balance has become a deciding criterion for funding research teams for proposals with the same result.

In addition, *Horizon Europe* has established five new thematic areas (see: European Commission 2022):

1) Work-life balance and organisational culture;
2) Gender balance in leadership and decision-making;
3) Gender equality in recruitment and career development;
4) Integrating the gender dimension into research and teaching content;
5) Measures against gender-based violence, including sexual harassment.

Further actions taken at the supranational level to support gender equality in innovation, understood as market-focused rather than scientific and research endeavours, are the initiatives of the EIC, i.e., *Women TechEU* and the *European Award for Innovators*.

The new programme *Women TechEU* is aimed at close the gender innovation deficit by supporting women-led high-tech companies at the early, riskiest stage of their business. Through this programme, the EU's aim is to increase the number of women-led start-ups and to create a fairer and more prosperous European high-tech ecosystem. Advanced technologies are more than a quarter of Europe's start-up ecosystem, and European start-ups are currently valued at a total of €700 billion and are growing in value. However, women are largely under-represented in the most advanced technology field. Focusing on engineering innovations, high-tech start-ups typically have longer R&D cycles and often require more time and capital to build than other start-ups. Most of such projects might fail in the first years of operation if they do not receive adequate support and investment at the early stage. Women in the high-tech sector often face additional obstacles resulting from gender prejudices and stereotypes, especially in sectors such as technology.

Therefore, the programme *Women TechEU* offers grants with individual value of EUR 75,000 to support the initial stages of the innovation and development process (see: European Commission WWW). Mentoring and coaching are also provided on the basis of the *EIC's Women's Leadership Programme* and networking opportunities across the EU. In the first competition, which was decided in the spring of 2022, the Commission provided support to a group of 50 companies led by women from 15 countries. More than 40 of them are based in EU Member States, with 1/5 in countries with wider participation in *Horizon Europe*. In addition, around 1/5 of companies are based in countries associated with *Horizon Europe*. Companies that submitted funding tenders have developed innova-

tions in a wide range of areas, from early diagnosis and treatment of cancer to reducing the negative impact of methane emissions. They refer to the Sustainable Development Goals, such as combating climate change, reducing food waste, protecting health, as well as increasing access to education and empowering women. All funded initiatives meet the requirements of social innovation (see: EISMEA 2022).

The demand for initiatives such as *Women TechEU* is confirmed by the results of the call for proposals for the second edition of this programme. In October 2022, the EC received 467 applications from 35 countries: EU Member States and countries associated with Horizon Europe. Most of the applications, as in the pilot edition, were submitted by Spanish women managing start-ups. Companies from Germany and France once again took second and third place in terms of the number of submitted projects. The *Women TechEU* competition also attracted applications from countries associated with *Horizon Europe* – most of these applications came from Turkish and Norwegian start-ups, but companies from Israel, Albania, Moldova, Serbia and Ukraine also entered the competition. The proposals cover a wide range of high-tech areas, including, as in the previous edition, technologies, such as artificial intelligence, biotechnology, health technologies, clean technologies and ICT (see: EISMEA 2022).

In the second edition of *Women TechEU*, as many as 130 promising deep-tech start-ups from the EU Member States and associated countries will receive financial support in the form of grants of €75,000 as well as coaching and mentoring under the EIC's *Women Leadership Programme* (see: EISMEA 2022).

A separate initiative focused on the promotion of innovation activities amongst women innovators, is the possibility of applying for the *European Award for Female Innovators*. This award recognises women, who are the authors of breakthrough innovations in Europe. It is aimed at the creation of the role models for women and girls across Europe. In 2022, a record number of 277 applications were submitted so far. This fact demonstrates the rapidly growing number of women-led start-ups in Europe. In the previous three editions, the number of applications was as follows: 155 – in 2019, 197 – in 2020, and 264 – in 2021. One of the three main evaluation criteria in this competition is the social significance of innovation (impact), which must be a product or service that responds to specific social need or challenge, bringing significant benefits to people and/or the planet (see: European Innovation Council WWW).

The presented initiatives, as well as their implementation, are the response of EU countries and the EU itself to support the participation of women in the creation and implementation of innovations. These initiatives are to fit into the concept of sustainable development, and thus lead to social changes both through the implementation of innovative products or services and through much wider participation of women in these processes. The undertaken actions, which have intensified since 2019, are certainly desirable and valuable initiatives. The need to constantly create and support such initiatives is evidenced by the data presented in the reports published by the EC, titled *She Figures* (e.g. European Commission 2021b) and other documents on the subject matter, such as the *Global Entrepreneurship Monitor* (GEM), or Statista.com (see: Statista.com WWW).

Participation of women in processes supporting innovation on the example of the EU

In order to verify the theoretical assumptions of this article about the still insufficient participation of women in research, development and innovation (R&D&I) processes, the author shall use quantitative and qualitative lists illustrating the role of women in relation to the following structural areas:

- Studies and graduates;
- Market and working conditions in the R&D sector;
- Presence in decision-making positions in the R&D sector;
- Results of scientific and research activities, including the establishment and operation of start-ups.

Reports prepared by the EC, as well as other international institutions such as the *Global Entrepreneurship Monitor* or Statista.com, were used for the analysis. The main source of data, however, is the information contained in the reports *She Figures,* which have been published by the EC since 2003. The last report, published in 2021, covers the period from 2018 to 2021. This study monitors gender equality in research and innovation (see: European Commission 2021b).

The first of the analysed areas are the career development paths of women and men scientists in the period from the beginning of undergraduate and postgraduate degrees (first, second and third cycle degrees) to their completion. Analysing first- and second-cycle studies, on average, at the undergraduate and postgraduate (master's degree) level, female students account for 54% and at a graduate level, 59% are female students, and at the level of third-cycle female students account for 48%. However, differences between degree fields persist. For example, women still account for less than a quarter of ICT PhD graduates (22%). By contrast, in health and social care, and education, at least 60% of students are female (60% and 67% respectively). Similarly, visible disparities in favour of men are present in STEM (third cycle), i.e., production and processing (41% women), physical sciences (38%), architecture and construction (37%), mathematics and statistics (33%), engineering (27%), ICT (21%) (European Commission 2021b, p. 22–58).

One of the results of being a higher education graduate, in particular of the third cycle, is the possibility of women entering the labour market as a researcher. Analysing the most important data in this regard, it was noted that women made up around one-third (32.8%) of the total scientific population at European level. In 2018, women accounted for less than 25% of the population of self-employed science and engineering and ICT (STEM) professionals at European level. In the three main sectors of the economy (Higher Education Sector - HES, Government Sector - GOV, Business Enterprise Sector - BES), the largest percentage of female scientists were employed in HES, while the largest percentage of male scientists were employed in BES. In BES, the average annual growth rate for female researchers was higher than in the other two sectors (HES and GOV), which may reflect an increase in public finances support for R&D companies in the last decade (European Commission 2021b: p. 62–92).

In the context of the analysis of the R&D labour market, it is worth examining women's participation in decision-making positions, which is directly related to the process of professional

promotion. Gender diversity is closely linked to scientific positions A (professor), B (PhD), and C (young researcher). While women make up almost half of the academic teachers in C positions (47%), this number decreases in positions B (40%) and A (26%). In addition, at European level, in 2019, 23.6% of women were heads of institutes in higher education, an increase of 2.4% compared to 21.3% in 2016. When it comes to the management of universities and other higher education institutions (rector's function), in the EU, the ratio between men and women is 82% and 18%, respectively. Analysing data on women in managerial positions in the private R&D sector, gender disparity is also visible, because in 2019, just over three out of ten board members of private R&D institutes were women (31.1%) and less than a quarter were CEOs (24.5%) at European level (European Commission 2021b: p. 178–212).

The last area of gender differentiation analysed, is research and innovation, including the establishment and operation of start-ups. In this respect, the number of publications, being part of research teams, inventiveness, establishment and support of start-ups were analysed. At both European and national levels, between 2015 and 2019, women and men published at similar levels in the early stages of their careers. As authors get older, women publish less than men (European Commission 2021b: p. 219-220).

At the European and national level, between 2015 and 2019, men outnumbered women in research teams. Women were under-represented in natural sciences, engineering and technology. With regard to the changes introduced by the EC to *Horizon Europe*, their legitimacy can be demonstrated by the fact that at European level only about 1.7% of all Horizon 2020 projects took into account the gender dimension (European Commission 2021b: p. 235–242).

Between 2015 and 2018, women were also under-represented among inventors at European level. For every 10 inventions submitted by men, only slightly more than one invention was submitted by women (European Commission 2021b: p. 246–255).

The last analysed area is the findings from R&D&I studies, setting up and running one's own company. According to the GEM 2021 study, only every twentieth woman sets up her own business, while every eighth man does so (Women's Entrepreneurship 2022).

This information is complemented by data published by the Statista.com portal, which demonstrates that since 2017 the percentage of start-ups in the world with at least one woman as a founder has not changed and amounts to 19-20%. These disparities increase when the scope of start-up support is analysed. In 2020, start-ups founded by women received only $5 billion in support from VC funds, while start-ups co-founded by both men and women invested roughly $20 billion. What is particularly important in this regard, is that entities led by women perform better statistically, i.e., the average revenue generated per $1 of investments in start-ups run by women was $ 1.12, while for companies founded by men (or men and women) – $ 1.04 (Statista.com WWW).

Conclusions

Based on the discussed data, the most important findings are the following.

The concept of sustainable socio-economic development and the related to it concept of social innovation considerably take into account the impact and importance

of gender in innovation systems and policies. The implementation of social innovations, understood as solving complex socio-economic problems, requires broad participation, especially in the aspect of gender. The aim of social innovations is to improve the quality of life of people belonging to different social groups and representing different generations. In the literature on the subject, but above all in the activities undertaken at the European level, many processes take into account social innovations and are based on broadly understood equality. The following areas can be indicated here: social exclusion, development of social entrepreneurship, social inequalities, unemployment, the situation of refugees, climate change, engaging people in the activities of non-governmental organisations, supporting children and youth from dysfunctional families, educational activities for socially excluded people, social integration of minorities and nationalities, promoting diversity in civil society, combating violence, building an inclusive culture in society, facilitating the excluded people's access to new technologies, and improving the quality of health care institutions.

Since 2019, there has been a significant increase in organisational and financial activities at European level relating to the support and participation of women in innovation processes and activities. Actions undertaken by the European Commission within the proggammes *Horizon Europe* or *Women TechEU* and by the European Research Area (ERA) are certainly valuable initiatives that help to strengthen the participation of women from the world of science and business in solving current and future social and technological challenges in Europe. Subsequent editions of these projects and the growing interest of women clearly confirm that these are activities that reduce gender inequalities in European business and science.

The main deficits related to the participation of women in the R&D&I sector concern: the number of ICT, engineering and STEM graduates, the low representation of women scientists in the high-tech industry, the low representation of women in A positions in science and managerial positions in research, too few women involved in invention processes, entrepreneurship and support for start-ups, as well as the low representation of gender equality in the programmes *Horizon 2020* and *Horizon Europe*.

In effect, at European level, we can talk about a level of short-term social emergence gender issues in the R&D&I sector. This means that although new rules and arenas of action have been established, we cannot talk about a social change that would produce economies of scale and, thus, be significantly noticeable in European official statistics. Certainly, in order to move from the current level of short-term social emergence to a stable level of emergence that will induce social change, further and broader actions are needed both in relation to science (issues of promotion rules, participation of women in managerial functions, leading research teams) and business (financial and organisational support for entrepreneurship and inventiveness of women's teams). Since 2019, there has been a significant intensification of this type of initiatives, which is supported by the changing perception of innovation and development principles. Their further continuation and induction of new ones is required, also at the level of individual EU Member States.

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EU LAW, INSTITUTIONS AND POLICIES

Evolution of R&D state aid in Poland in the context of Multiannual Financial Perspectives

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Abstract

The aim of this article is to identify legislative-programmatic changes, as well as the scope and directions of research & development (R&D) aid granted in Poland after the accession to the European Union, in the context of Multiannual Financial Perspectives. The changes introduced into relevant legislation in the EU and Poland, and aid programmes implemented throughout three Multiannual Financial Perspectives were analysed. This was followed by in-depth statistical analysis of changes in granting state aid for R&D in Poland. The authors found in this study a strict correlation between R&D aid in Poland and changes arising from the successive financial perspectives. Small enterprises have been the greatest beneficiaries of these changes.
Keywords: state aid for R&D, research and development, Poland, European Union.

Ewolucja B+R w Polsce w kontekście Wieloletnich Ram Finansowych

Streszczenie

Celem artykułu jest identyfikacja zmian legislacyjno-programowych oraz zakresu i kierunków udzielonej pomocy na badania i rozwój (B+R) w Polsce po akcesji do Unii Europejskiej w kontekście Wieloletnich Ram Finansowych. W związku z tym zostały przeanalizowane zmiany

odpowiednich aktów prawnych w UE oraz w Polsce, a także programy pomocowe wdrażane w trakcie trzech wieloletnich perspektyw finansowych. Następnie dokonano pogłębionej analizy statystycznej zmian w udzielaniu pomocy publicznej na B+R w Polsce. Przeprowadzone badanie pozwoliło ustalić, iż pomoc finansowa dla B+R w Polsce była ściśle skorelowana ze zmianami wynikającymi z kolejnych perspektyw finansowych, z których w największym stopniu skorzystali mali przedsiębiorcy.
Słowa kluczowe: pomoc publiczna na B+R, badania i rozwój, Polska, Unia Europejska

State aid for research and development (R&D) falls within the concept of permitted state aid in connection with identified market failure. This in particular concerns the unwillingness of entrepreneurs to undertake high-cost activities accompanied by a relatively high risk of the expected results not being achieved, while ignoring at the same time the positive external effects of R&D transfer to other entities in the economy. Research is not possible without adequate funds (Szwacka-Mokrzycka, Miara 2018), which can be raised from either the private or the public sphere. In the latter case, the European Commission (EC) has taken the position that R&D aid meets the criteria set forth in both Article 107(3)(b) TFEU: "aid to promote the execution of an important project of common European interest", and Article 107(3)(c) TFEU: "aid to facilitate the development of certain economic activities or of certain economic areas, where such aid does not adversely affect trading conditions to an extent contrary to the common interest". The EC has developed guidelines for this aid, spelling out precise criteria for its identification and terms for granting it, both with regard to the beneficiaries and to the forms of such aid. At the same time, views have been expressed in literature highlighting the difficulty in evaluating the necessity of support for co-financed projects under R&D aid, which is a consequence mainly of the specificity of the projects them-selves (Nowak-Salles 2020).

R&D aid is often perceived as a stimulus for conducting research-and-development activities and for supporting enterprise innovation (Blauberger 2009; Di Bucci 2014). In consequence, it has become, beside public procurement, one of the major instruments of the state's economic policy, including the sphere of innovation (Dragos, Racolta 2017).

In becoming a Member State of the European Union, Poland too came under rules governing state aid, although existing studies indicate only a relatively small share of R&D aid in the total value of state aid offered in Poland, as compared to other EU Member States. Whereas the old Member States, in pursuance of a succession of Union strate-gies, have strengthened research-and-development activities, Poland has for many years continued to grant regional aid for new investments or for the creation of new jobs (Ambroziak 2021 2022).

The aim of this article is to identify legislative and programmatic changes, as well as the scope and directions of R&D aid granted in Poland after the accession to the European Union, in the context of the series of financial perspectives. In this connection, changes to EU legislation concerning the conditions for granting state aid for R&D were analysed; the analysis also covered the legislation excluding the obligation to notify

the EC of such aid. This analysis has made it possible to trace the evolution of R&D aid grants in Poland throughout the course of three Multiannual Financial Perspectives (MAFPs) (2004–2006, 2007–2013 and 2014–2020): from existing aid, in connection with accession to the EU, through individual aid, to aid granted under aid programmes. The next step was to analyse changes to the relative intensity of this aid in Poland in proportion to GDP, compared to other EU Member States and enterprises' internal R&D investments in the country. Analysis of data on R&D aid grants in Poland throughout the successive MAFPs revealed a structure of aid put in order of purposes and beneficiaries in the context of their importance to the country's economy.

The study is concentrated on R&D aid and follows the 2005–2021 period as the most illustrative of legal changes and changes to R&D grants, except for several data concerning other Member States or the situation in Poland, in the case of which the study period was shortened by one year due to availability limitations. Statistical data covered by the analysis originate both from the Polish Office of Competition and Consumer Protection (OCCP), as well as the EC (Scoreboard), as at 31 August 2022. The data on state aid are exclusive of COVID-19-related aid, the latter being of extraordinary nature and significantly distorting the picture of intervention in all EU Member States (more extensively see: Dziembała, Kłos 2021; Ambroziak 2022). Due to the lack of availability of comparable data in other states in the world, including within the EU, this is a unique study and a decisively novel publication.

One of the sources of financing of R&D aid was European funds. The Multiannual Financial Perspectives, the first in 2004–2006 (MAFP I), the second in 2017–2013 (MAFP II), and the third in 2014–2020 (MAFP III) are not co-extensive with the periods of disposal of such funds by the entities granting state aid in Poland. Holding competitions, selecting the projects and signing the contracts deferred the EU aid financing by approximately two years. In consequence, although this study includes an analysis of the legal bases within the time-frame delineated by the successive financial perspectives, for the purposes of statistical analysis aid grants are considered respectively in the 2005–2008, 2009–2015 and 2016–2021 time-frames.

Importantly, ever since the beginning, it has been possible to grant aid for R&D projects covering fundamental research, industrial research, and development works; nonetheless, prior to MAFP II, there was no reporting obligation concerning such aid in a breakdown according to the various types of R&D activities, which prevented the authors from being able to demonstrate the respective proportions of their financing under MAFP I.

The first part provides a concise overview of the literature on state aid for R&D in the EU, with an emphasis on Poland. It is more a presentation of the main areas of study of R&D aid and theoretical underpinnings of the bases of its admissibility. The evolution of the EU legal framework and of the most important Polish aid programmes involving R&D aid was then analysed, in a breakdown corresponding to the successive financial perspectives. The next section offers statistical analysis of the volume and significance of R&D aid in Poland compared to all EU Member States, followed by in-depth study of

the distribution of such aid in Poland and the beneficiaries, having regard for their size and importance to the country's economy. The final section gathers conclusions based on the study together with recommendations for economic policy in the area of R&D state aid.

State of art, and research methods used

The EC has modified its approach to state aid significantly in recent years. Firstly, it has been gradually departing from *ex-ante* in favour of *ex-post* evaluation, as clearly manifested both by the introduction of *General Block Exemption Regulation* (GBER) in 2008 (see: European Commission 2008) and its comprehensive amendment, including the addition of research infrastructure as a new objective, in 2014 (see: European Commission 2014b). The matter of legislative changes and primarily the legal consequences of the introduction of GBER came to dominate the subject literature (Heimler, Jenny 2012; Biondi, Righini 2014; von Wendland 2015; Ambroziak 2016; Kopeć 2020). Some existing legal-economic studies have dealt with the effectiveness of the various R&D aid instruments, such as tax incentives (Pérez Bernabeu 2014), as well as links to European funds (Galletti 2016).

As regards the situation in Poland, the available studies demonstrate that immediately its accession to the EU, compared to the EU-15 countries, its aid structure differed in many aspects, first and foremost because of the re-organisation needs of Poland's economy. The completion of the pertinent processes was to re-orientate the allocation of state aid towards horizontal aid, including support for R&D. During the years that followed, Poland as well as the other EU Member States faced an economic crisis. However, the recession period did not at all lead to increased restructuring or investment aid; instead, it led to increased R&D aid (Ambroziak 2021). Unfortunately, the implementation of the industrial policy in Poland, including the innovation policy, did not correspond to goals linked to elevating the technological level of advancement of the Polish economy (Radło, Spałek 2017). The factual industrial policy, as studied from the perspective of sectoral destinations of state aid, did not fully correspond to the stated goals of Poland's industrial policy, which was because of misallocation. In consequence, R&D aid was not always conducive to the improvement of the competitive position relative to foreign companies (Podsiadło 2017).

The available evaluation studies of R&D aid indicate a downward trend in the number of beneficiaries of selected financial-aid instruments, with a simultaneous upward trend in the number of serial aid recipients, improved recipient preparation for absorption of grants, as well as an increasing number of micro-entrepreneurs and newly-established entities among the applicants. Despite the comprehensive approach taken, the available research covers selected R&D aid programmes without indicating differences between the various financial perspectives or positioning within the changing EU legislation. This research gap is filled by the present article, which captures the changes both in

Polish aid programmes and in R&D aid granted as conditioned by the evolution of EU legislation in the context of Multiannual Financial Perspectives. It is the first study of this type in Poland due to the limited access to disaggregated data in other Member States of the European Union.

To this end, critical and comparative analysis of the source documents and original legal acts issued by Polish authorities, and the EU institutions (the European Commission, and the Council of the European Union) was conducted to establish a legal framework for national aid schemes for R&D&I applied in 3 consecutive Multiannual Financial Perspectives in Poland. In economic part of the research, authors carried out a comparative statistical analysis of data about state aid for R&D&I granted in Poland in the period 2004–2020.

Legal basis for R&D aid, and Polish R&D aid schemes

Beginning with accession to European structures, all of the Union legislation on state aid, including R&D aid, became the law of the land. The key document was the *Community Framework for State Aid for Research and Development* (see: European Commission 1996, 1998, 2005), later – *Community Framework for State Aid for Research, Development and Innovation – R&D&I* (see: European Commission 2006b, 2014a), setting out the criteria considered by the EC when evaluating the aid measures, for which notification was submitted. The *Framework...* specified four categories of R&D activities eligible for aid: fundamental research, industrial research, pre-competitive development activities (development works), and technical feasibility studies preceding the latter two categories of R&D activities. All costs incurred directly in connection with the implementation of an R&D project were considered to qualify.

The permitted intensity of such aid ranged from 25% to 100%, depending on the type of activities undertaken and their proximity to the market. The underlying reason was the correct assumption that the more advanced the R&D works, the greater the probability of an adverse impact distorting competition. Accordingly, the intensity of aid for fundamental research was greater than that of aid for industrial research or development works. Moreover, the aid could be increased in specific cases, e.g. due to the size of the beneficiary (preference for SMEs), broad dissemination of project results, projects completed as part of effective collaboration (e.g. among partners from two different Member States or between enterprises and public research institutions) or a less developed location (the less developed the region relative to the EU average, the greater the intensity of aid permitted) (see: *Table 1*).

Table 1: Intensity of permitted R&D aid in 2004–2020 (% and/or percentage points).

Framework	I MFP: 2004-2006 SME/large		II MFP: 2007-2013 small/medium/large	III MFP: 2014-2020 small/medium/large
Fundamental research	100%		100%	100%
Industrial research	Max75%	60/**50%**	Max 80% 70/60/**50%**	Max 80% 70/60/**50%**
- collaboration / - dissemination of results	+10 p.p.	70/60%	+15 p.p. 80/75/65%	+15 p.p. 80/75/65%
- region „a"	+10 p.p.	70/60%	-	-
- region „c"	+5 p.p.	65/55%	-	-
- accordance with objectives of current framework programme for R&D	+15 p.p.	75/65%	-	-
- abovementioned objectives + collaboration	+25 p.p.	75/75%	-	-
Experimental development (%)	Max50%	35/**25%**	Max 80% 45/35/**25%**	max 80% 45/35/**25%**
- collaboration / - dissemination of results	+10 p.p.	45/35%	+15 p.p. 60/50/40% / -	+15 p.p. 60/50/40%
- region „a"	+10 p.p.	45/35%	-	-
- region „c"	+5 p.p.	40/30%	-	-
- accordance with objectives of current framework programme for R&D	+15 p.p.	50/40%	-	-
- abovementioned objectives + collaboration	+25 p.p.	50/50%	-	-
Feasibility study for fundamental research	-		-	70/60/**50%**
Feasibility study for industrial research	75%		75/75/**65%**	
Feasibility study for experimental development	50%		50/50/**40%**	
Research infrastructure	-		-	50%
Block exemptions	only SME		small/medium/large	small/medium/large
Fundamental research	100%		100%	100%
Industrial research	Max75%	**60%**	Max 80% 70/60/**50%**	max 80% 70/60/**50%**
- collaboration / - dissemination of results	+10 p.p.	70%	+15 p.p. 80/75/65%	+15 p.p. 80/75/65%
- region „a"	+10 p.p.	70%	-	-
- region „c"	+5 p.p.	65%	-	-
- possible multi-sectoral application	+15 p.p.	75%	-	-
Experimental development	Max50%	**35%**	Max 80% 45/35/**25%**	Max 80% 45/35/**25%**
- collaboration / - dissemination of results	+10 p.p.	45%	+15 p.p. 60/50/40% / -	+15 p.p. 60/50/55%
- region „a"	+10 p.p.	45 p.p.	-	-
- region „c"	+5 p.p.	40 p.p.	-	-
- possible multi-sectoral application	+15 p.p.	50 p.p.	-	-
Feasibility study for fundamental research (%)	75%		-	70/60/50%
Feasibility study for industrial research (%)			75/75/**65%**	
Feasibility study for experimental development (%)			50/50/**40%**	
Research infrastructure (%)	-		-	50%

Source: authors' own elaboration.

Furthermore, immediately prior to Poland's accession to the EU, the European Commission had introduced a new legal solution enabling R&D aid grants without mandatory notification under Article 108 TFEU. The latter involved aid for R&D projects and aid for the technical analysis of the feasibility of industrial research and pre-competitive works. For such aid, the allowed intensity remained at substantially the same level as in the general framework. The significant difference, however, was that the exemption applied only to aid for SMEs (see: *Table 1*).

Already prior to official accession to the EU, Poland had notified the EC of measures identified as satisfying the criteria for state aid, which, due to no objections from the EC, became *existing* aid — consistent with the internal market and acceptable following accession. These measures extended to R&D aid schemes, under which the Minister of Science had been granting aid for R&D projects even since 2004.

Poland did not take advantage of Union-level legal solutions until two years after accession, preparing its first major R&D aid programme concerning industrial research and pre-competitive works (see: Regulation 2007). In principle, that kind of aid could be allocated to such purposes under the notification exemption, but only for SMEs. In view of this, Polish authorities accordingly decided to notify the EC of the draft programme, and the Commission accepted it in 2006 (see: European Commission 2006a). Under the programme, R&D aid was granted in the form of subsidies for enterprises in each size category, among them significantly for institutions of higher education, research institutions and science consortia.

Upon the onset of the 2007–2014 financial perspective, the EC introduced a new *Community Framework for State Aid for R&D&I* (European Commission 2006b). Other than expanding the scope of applicability to include innovation, no significant changes were made regarding R&D aid. The system of additional bonuses was streamlined (which included a departure from increasing the intensity for projects pursued in less developed regions) and certain innovative activities were counted as development works (allowing for the preparation of prototypes for potential commercial use and pilot programmes in cases when the prototype was a commercial end product with production solely for the purposes of demonstration and validation being too expensive) (see: *Table 1*).

Moreover, in keeping with the experience of the preceding years, the EC gathered the then-existing exemptions from the mandatory notification, including those relating to R&D, in a single regulation (European Commission 2008). Unlike the preceding perspective, allowance was made for R&D aid without mandatory prior notification also for large enterprises. Furthermore, the rules governing the admissibility of aid for R&D were harmonized with those defined in the Framework; notification thresholds at EUR 20 million for projects mainly involving fundamental research, EUR 10 million for industrial research, and EUR 7.5 million for development works became, in principle, the sole remaining demarcation line between the two legal bases.

From the moment the regulation came into force (European Commission 2008), the entirety of R&D aid in Poland was granted only on the terms of the *General Block Exemption Regulation*, i.e. without the need for prior notification to the EC. The rules for the

admissibility of R&D aid appeared to have already solidified, and thus they ceased to present any significant interpretative challenges, and the lack of necessity of EC approval unquestionably accelerated the granting of R&D aid in Poland. The new legal solutions along with the enablement of European funds resulted in an efflorescence of R&D aid programmes. Other than the Minister of Science, the grantors included the National Centre for Research and Development (NCRD), National Science Centre (NSC), Polish Agency for Enterprise Development (pl. PARP), chief executives of voivodships, National Fund for Environmental Protection and Water Management (pl. NFOŚiGW), fiscal offices, and entities implementing projects under regional operational programmes. The outcome of the above was a noticeable fragmentation of the aid (two programmes under MAFP I and II — not including changes and extensions — under MAFP II). Also noteworthy, however, was the emergence of two aid programmes soon to become the key legal basis for R&D aid grants in Poland. The latter concerned NCRD support for R&D projects involving fundamental research, industrial research or development works along with technical feasibility studies (55% of all R&D aid during the period, see: Regulation 2010) and project financing from PARP limited to industrial research or development works – 31% (see: Regulation 2008).

During the next financial perspective, for the years 2014 to 2020, there were both amendments to Union legislation and the corresponding adaptation of national law. On the EU level, the EC adopted a new *Community Framework for State Aid for R&D&I* (European Commission 2014a) and a new regulation governing block exemptions (European Commission 2014b). The novelty was that both of the documents defined the conditions for the admissibility of investment aid for the construction or modernisation of research infrastructure. In this case, the underlying assumption was to provide financing for facilities providing R&D services to multiple users on objective terms and at market prices. Such infrastructure could not be dedicated to any single enterprise or several enterprises. Although no limitations were introduced as to the ownership of such infrastructure (which could belong either to public or private entities), it would appear that public entities more often made the decision to create it. Significantly, the previous notification thresholds under the EU regulation were doubled (European Commission 2014b), solidifying even further the principle of Polish R&D aid grants not requiring prior EC approval.

The 2014–2020 period did not bring any major changes to Poland's mechanism for R&D grants. The significant fragmentation of grantors operating under different aid programmes continued, with the most aid being granted by the NCRD (85% of the sum total of the relevant aid), providing financing for R&D projects and feasibility studies (Regulation 2015b). Second place went to institutions managing regional operational programmes, which, in addition to providing financing for R&D projects and feasibility studies (Regulation 2015a), also supported the construction of research infrastructure at the regional level (Regulation 2016). During that period, the largest portion of all aid went to industrial research (49%) and development works (46%) (see: *Table 2*). The Polish Medical Research Agency (pl. ABM) joined the ranks of R&D grantors. The number of aid programmes, however, did not change, and continued to be 11, not counting extensions.

Table 2: Key R&D aid programmes in Poland under the successive EU financial perspectives.

The programme's number and name	Gross value of aid [mln PLN]	Share of aid per financial perspective (%)
MAFP I (2 aid programmes)	**599.7**	**100.0**
PL 35/2004 - Aid program for R&D works carried out by entrepreneurs	280.7	46.8
N 528/2005 - Industrial research and pre-competitive development	206.6	34.4
There aid (granted on the same legal regulations as PL 35/2004, reported without number of decision)	112.8	18.8
MAFP II (11 aid programmes)	**4 324.8**	**100.0**
SA.32233(2011/X) - Conditions and procedure for granting state aid and *de minimis* aid through the National Centre for Research and Development (next as SA.35857(2012/X))	2 358.6	54.5
SA.32221(2011/X) - Financial aid for research, advisory services and training provided by PARP under the Innovative Economy Operational Programme (next as SA.32863(2011/X), SA.35010(2012/X), SA.37089(2013/X))	1 063.7	24.6
Other programmes	902.5	21.2
MAFP III (11 aid programmes)	**24 723.2**	**100.0**
SA.41471(2015/X) – Providing public aid through the National Centre for Research and Development (next as SA.58757(2020/X))	20 611.2	83.4
SA.42839(2015/X) – Aid for fundamental research, industrial research, experimental development and feasibility studies under the regional operational programmes for 2014-2020 (next as SA.59139(2020/X))	2 827.0	11.4
Other programmes	1 285.0	5.2
Sum of R&D aid	**29 674.7**	**100.0**

Source: authors' own elaboration.

In addition to R&D aid provided under aid programmes, during the discussed period *ad-hoc* aid was also granted (PLN 582.6 million), the value of which, however, constituted only 2% of the total value of the relevant type of aid. It was mainly aid for research infrastructure, granted by the National Information Processing Institute — National Research Institute (pl. OPI — PIB). The latter organ financed large nationwide or international strategic infrastructure projects using funds from the *Operational Programme Intelligent Development*. Under MAFP II, the Commission was notified of 73 such aid cases, to a sum total of PLN 60.5 million, and under

MAFP III 125 cases to a total of PLN 521.1 million. This means a near-doubling of the number of cases of *ad-hoc* R&D aid granted, and an increase in the value more than eightfold during the last financial perspective as compared to the immediately preceding one. However, these are not significant amounts relative to the total volume of R&D aid.

Importance of R&D state aid in Poland

The volume of R&D aid granted in Poland has been systematically increasing, from PLN 153.1 million in 2005 to PLN 5.5 billion in 2020. A total of PLN 29.6 billion was granted in R&D aid in the studied period, corresponding to 6.8% of all state aid (see: *Figure 1*). During the first years following accession, the nominal value of R&D aid was relatively insignificant. A significant increase, to almost PLN 300 million, was to occur only in 2009, which marked the beginning of the first aid programme operated by the Minister of Science (Regulation 2007); subsequently, in the latter half of MAFP II and from 2016 onward under MAFP II, the volume of aid exceeded PLN 1.7 billion.

Figure 1: State aid for R&D in 2005–2021 (PLN million).[1]
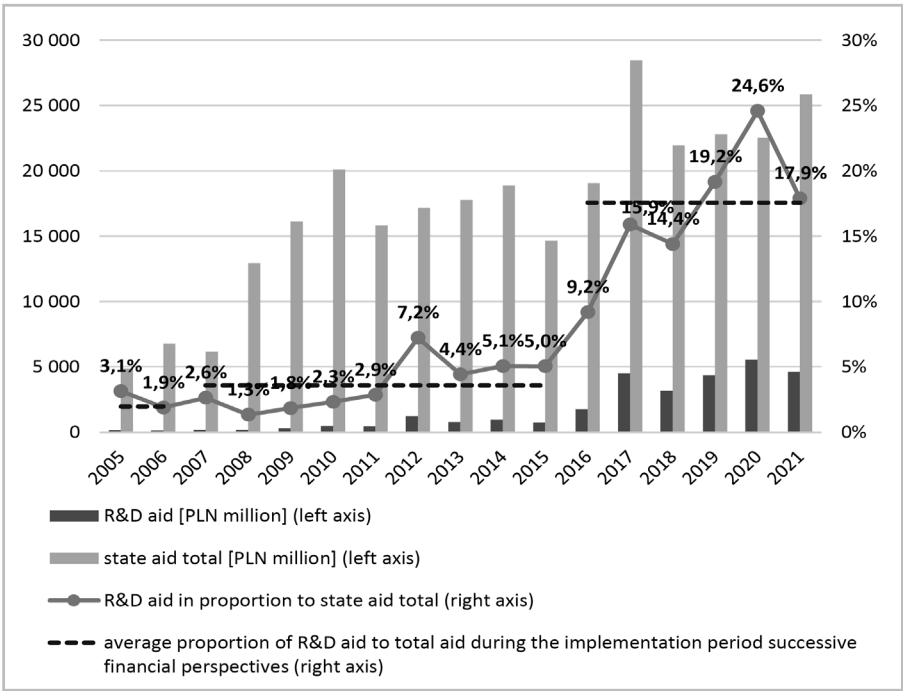
Source: authors' own elaboration.

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[1]   *Clarification:* data on state aid total do not include crisis aid granted in 2020–2021 in relation to the COVID-19 outbreak, or aid granted in the banking sector to IDEA Bank SA in 2021 — decision SA.60520(2020/N), or *de-minimis* aid.

The increase in the intensity of R&D aid was accompanied by increases in both GDP and the internal R&D spending in enterprises (see: *Figure 2*). Throughout MAFPs I and II, aid intensity in proportion to spending was relatively greater than the intensity in proportion to GDP, and since 2016 it has decreased significantly. As noted previously, the volume of R&D aid during MAFP III increased at a particularly fast rate, with companies' own R&D spending increasing at a much slower pace. This may imply that a portion of companies' own R&D expenditure was replaced by aid measures, especially coming from the EU.

Figure 2: Intensity of R&D state aid in Poland in 2005–2021.
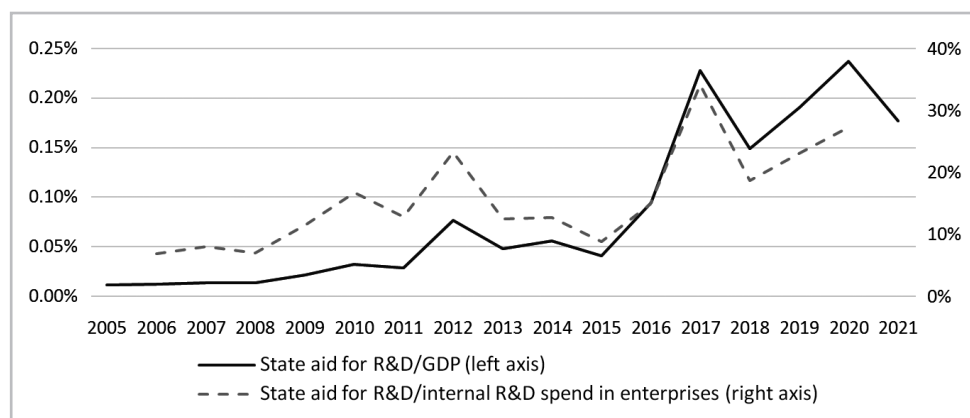
Source: authors' own elaboration.

Analysis of the proportion of R&D aid to the GDPs of EU Member States shows that the trajectory of the changes occurring in Poland differs markedly from the one observed in other states in Central and Eastern Europe or the largest European economies. A similar value of R&D aid in proportion to GDP in Poland (0.02%) immediately following accession to the EU was also observed in Slovakia (0.01%) but slightly higher in the Czech Republic (0.09%), Spain (0.03%) or Belgium, the Netherlands and Hungary (0.05%). Throughout the MAFP, one could observe a marked increase in this proportion in countries such as the Czech Republic (to 0.17%) and Belgium (0.25%), whereas in Poland this aid still did not play a significant role relative to GDP (max 0.02%). Only under MAFP III, Poland began to see a significant increase in the proportion of R&D aid to the national GDP, the latter reaching 0.25% in 2017 and 2020.

The visible link to the Multiannual Financial Perspectives is the result of the fact that sums originating from EU funds are also regarded as state aid if they satisfy the criteria for recognition as such pursuant to Article 107(1) TFEU. In consequence, when analysing state aid in Poland, including R&D aid, one has to consider both the central budget and the local budget and EU sources. External sources, especially EU funds, were first used for R&D financing in Poland in 2008, and the scale increase in the following years (under MAFP II) (see: *Figure 3*). In the years that followed, in order to comply with the requirements of fund-related regulations, R&D projects were financed almost exclusively

by *mixed sources* (national and cross-border sources at a proportion of 15%/85% — see: Council Regulation (EU) No 1083/2006). Starting from 2015, i.e. the commencement of the distribution of the funds under MFAP III, the proportion of foreign sources began to exceed 90% of total R&D aid in Poland.

Figure 3: Structure of sources of financing of R&D aid in 2005–2021.
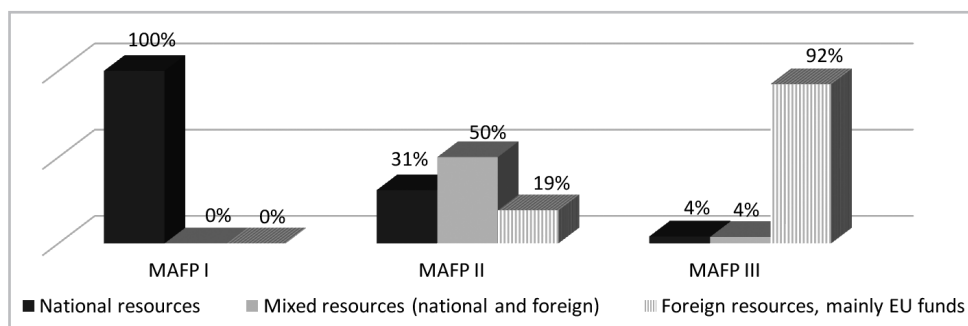
Source: authors' own elaboration.

Whereas at the beginning of Poland's membership in the EU (and at the same time in the final period of the financial perspective for 2000–2006), the proportion of R&D aid to the total value of state aid was 1.8%, in the next perspective, for 2007–2013, it was 3.9%, and for 2014–2021 it reached 8.7% (see: *Figure 1*). The intensity was not evenly spread in the years that followed, however, with the highest levels in 2017–2019, which is when the financing under MAFP III started, and decisively lowest under MAFP I.

Distribution of R&D state aid in Poland

During MAFP I and at the beginning of MAFP II, no distinction was made between the individual categories of such type of aid in reports, with this type of aid being regarded holistically as aid for research-and-development works (2005–2006) or for the execution of R&D projects (2007–2010) (see: *Table 3*). Only in 2011 did aid for fundamental research, industrial research and experimental development works begin to be treated separately in reports. The largest portion of the aid, both under MAFP II (74% average) and MAFP III (approx. 45% and 50%), went to industrial research and experimental development works. In recent years, the share of the last-mentioned category of aid both in terms of value and proportion to the total sum of R&D aid has been growing. The share of aid for experimental development works increased, and for industrial research decreased, consistently until 2016. Since the introduction of MAFP III, financing of the proportion of both aid categories has remained at a similar but decisively low level. Also, during MAFP I, no aid for feasibility studies was observed, with the first coming only as late as in 2012, of a negligible proportion to the total value of aid (0.2% under MAFP II and 0.03% under MAFP III).

Table 3: Structure of R&D aid in Poland according to purpose during the individual perspectives in 2005–2021 (values in PLN million).[2]

		MAFP I		MAFP II		MAFP III	
		aid value	share (%)	aid value	share (%)	aid value	share (%)
Research and development works	Fundamental research	599.74	100	44.9	1.0	304.5	1.2
	Industrial research			3 199.6	74.0	12 145.9	49.1
	Experimental development			1 069.5	24.7	11 259.1	45.5
Feasibility studies		0	0	10.8	0.2	6.3	0.0
Investment aid for research infrastructures		-	-	-	-	1 007.3	4.1
Total value of aid		599,74	100	4 324.8	100	24 723.2	100

Source: authors' own elaboration.

As already emphasised, under MAFP III, aid for the modernisation or establishment of research infrastructure used for the purposes of business activity was included in the admissible purposes of R&D aid under EU law. The essential criterion is the requirement that such infrastructure be made available to other entities on market terms. The above solution proved to be uninviting to business operators in Poland but attractive to research and scientific centres, which became the main beneficiaries of the aid and operators of the aforementioned research infrastructure.

Within the period under research, the shares of the various forms of aid have remained substantially unchanged: subsidies and reimbursements were prevalent (more than 99.8% of all R&D aid), with only temporary occurrence of aid programmes offering either tax relief or preferential loans. However, the structure of beneficiaries of R&D aid, by contrast, changed significantly in the discussed period from 2005 to 2021 (see: *Figure 4*). Under MAFP I, more than half of the funds went to large enterprises, and only 4.9% – to micro-enterprises. The implementation of complete MAFPs II and III caused the position of both micro- and small enterprises to grow significantly, as they each received one quarter of the sum total of R&D aid granted. The situation differs somewhat for the remaining recipients, including large enterprises,[3] with a recorded increase in this type of aid to 37% under MAFP III at the expense of medium-sized enterprises (14.6%).

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[2] *Note:* separate reporting of items for research and development works appeared in 2011. For the purposes of this study, the sum total of R&D aid at PLN 889.6 million in the initial years of MAFP II was broken down into the various purposes of the research in proportion to the shares recorded in the following years of MAFP II.

[3] While in this part of the study we use the term 'large enterprises', it must be emphasised that on the one hand the data obtained from OCCP refer to the category of companies other than SMEs (resulting to some extent from the reporting procedure) (Grzegorzewska 2020), but the data from Statistics Poland define large enterprises solely on the basis of workforce. Moreover, for SMEs, size is determined as at the time of granting, whereas all other entities are taken together. In the years 2005–2021, the latter group included 1,136 entities, but their size potentially could have changed over the years, and thus it is not possible to identify large enterprises alone. In consequence, the generalised conclusions made in reference to large enterprises must be treated with caution, only as an indication of certain trends.

Figure 4: Value of R&D aid granted according to beneficiary size.
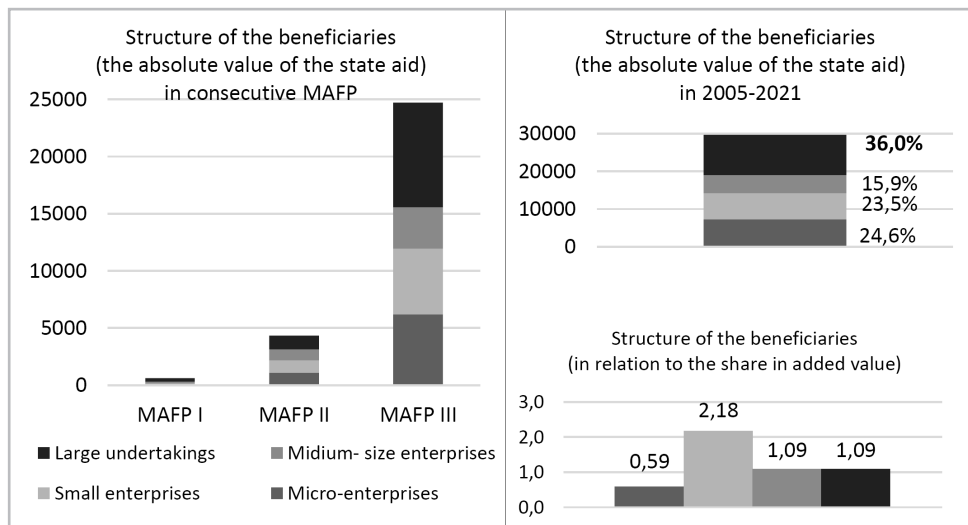
Source: authors' own elaboration.

In order to capture the relative distribution of R&D aid among enterprises, consideration was given to the various sizes of beneficiaries in the aid granted and in the added value. In consequence, it appears that the value of R&D aid for small enterprises exceeded double their share in the creation of added value (2.18), whereas aid for medium-sized and large enterprises was substantially balanced in proportion to added value.

Conclusions

The study demonstrates unequivocally that both the value and, in consequence, the intensity of state aid in Poland bears a correlation to the successive Multiannual Financial Perspectives, compelled by amendments to EU legislation. Polish R&D aid grantors, relying primarily on the exemptions provided by the relevant Commission regulations, offered that aid in accordance with the intentions of the Commission and of the European Union as a whole.

Even in the first years of MAFP II, and thus with the arrival of significant EU funds, on the one hand there was significant fragmentation of aid programmes, and on the other hand funds were concentrated in the hands of the NCRD, PARP and the institutions in charge of regional programmes. Ultimately, the Union funds played the greatest role in incentivising and financing R&D activities among Polish enterprises. This is indicated primarily by the 2014–2020 MAFP period, which is when the proportion of R&D aid to the sum total of state aid increased, along with its intensity relative to GDP. The above was the result of a change of direction in EU-fund programming, and, in consequence, increased budgets for priority actions in the R&D area. It appears that this significant

increase in the importance of R&D aid in recent years can be linked to the process of learning and gaining experience by the beneficiaries and by the grantors, although this particular aspect requires further in-depth study. On the other hand, the more developed Member States are departing from R&D aid *sensu stricto* in favour of aid for environmental protection and energy efficiency (Ambroziak 2021).

The identified trends in the structure of R&D allocation according to purpose in Poland indicate the dominance of those categories of aid, granted in the simplest form — subsidies, from which entrepreneurs can derive the most benefit (experimental works and industrial research). Accordingly, the advanced R&D works supported in recent years can be expected to bear fruit in the form of novel solutions, thus making Poland's economy more innovative. At the same time, the form taken by the state aid — direct grants — indicates that the grantors do not create budgets for successive years as could be the case with repayable instruments.

From the value perspective, the beneficiaries were primarily large, followed by small and micro-enterprises. The distribution of R&D state-aid funds was, therefore, somewhat universal, extending to different entities and different purposes. The significant increase in aid granted to small enterprises in proportion to their contribution to added value compared to medium-sized and large enterprises raises doubts from the perspective of the possibility of driving the commercialisation of R&D results and the country's general indicators of innovation performance. On the other hand, this indicates a change of SMEs' position in access to financing over the years. However, one must remain attentive to the doubts concerning the adequacy of the current definition of SMEs. Co-financing was required both for new initiatives supporting industrial research and for experimental works conducted, by their very design, with a view to the eventual introduction of a product to the market. The above means that the market is unsaturated with R&D aid to the extent that all funds offered thus far to enterprises have been used up, with the MAFPs, associated legislative changes, and Polish aid programmes giving direction to R&D aid in Poland in terms of purposes and beneficiaries rather than the other way round.

The discussed area certainly requires continued study of the effectiveness of aid granted both on the individual-enterprise level and the regional level. For it would be expedient to capture the actual impact of R&D aid on the innovation levels of the individual industries, regions and the country as a whole.

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Multidimensional analysis of the banking sector stability in the Eurozone countries. Effects in the context of risk

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Abstract

The aim of this article is to analyse the stability of the banking sector of the Eurozone countries in light of the turbulence in the contemporary global economy. This aim is achieved through the considering current changes and tendencies in the economy, the importance of stability, measures of stability, and empirical analysis of the main indicators of financial stability. The study ends with final conclusions as to the further analysis.

The research hypothesis is based on the statement that the banking system of the Eurozone countries, regardless of high risk and turbulence in the global economy, remains stable.

Research methodology is based on scholarly literature review, and the empirical analysis used the system of measures and selected indicators adopted by the International Monetary Fund within the scope of the stability analysis of the banking sector of the Eurozone.

The originality of the study stems from the time this topic is addressed, due to the highly unfavourable and turbulent situation in the global economy. The added value is the identification of indicators and measures, which demonstrate the tendency for further deterioration (however, the analysis involves indicators that are still acceptable) under the current economic and geopolitical circumstances in the world.

Keywords: crisis, Eurozone, financial fragility, risk, stability, banking sector.

Wielowymiarowa analiza stabilności sektora bankowego krajów strefy euro. Skutki w kontekście ryzyka

Streszczenie

Celem artykułu jest analiza stabilności sektora bankowego krajów strefy euro na tle turbulencji współczesnej gospodarki światowej. Realizację celu oparto na omówieniu aktualnych zmian i tendencji w gospodarce, istoty stabilności, miar stabilności oraz na empirycznej analizie głównych wskaźników stabilności finansowej. Całość opracowania zamykają wnioski końcowe do dalszej analizy.

Za hipotezę badawczą przyjęto stwierdzenie, że system bankowy krajów strefy euro, pomimo wielu zagrożeń i turbulencji w gospodarce światowej, pozostaje nadal stabilny.

Metodologia badań została oparta na badaniach literatury przedmiotu, zaś w analizie empirycznej wykorzystano system miar i wybranych wskaźników przyjętych przez Międzynarodowy Fundusz Walutowy w zakresie analizy stabilności sektora bankowego krajów strefy euro.

Oryginalność opracowania wynika z czasu, w którym podjęto temat, z uwagi na bardzo niekorzystną i turbulentną sytuację w gospodarce światowej. Wartością dodaną jest wskazanie tych miar i wskaźników, które na moment analizy wykazują tendencję do dalszego pogorszenia (choć przyjmują jeszcze wartości akceptowalne) w aktualnej sytuacji gospodarczej i geopolitycznej na świecie.

Słowa kluczowe: kryzys, strefa euro, niestabilność finansowa, ryzyko, stabilność, sektor bankowy.

The history of international finance demonstrates that instability has been an intrinsic quality of the financial systems. These systems move from stability to instability and crisis. The source of financial instability is a complex confluence of causes and factors originating from the financial system itself and its surrounding.

Nowadays, the world financial system is functioning under the conditions of high instability. This applies to the broadly defined connections between the financial and real spheres of the economy, operations of financial institutions, standing of financial markets, market valuation of financial instruments, as well as the world of public finance.

The aim of this article is to analyse the stability of the banking sector of the Eurozone countries in light of the turbulence in the contemporary global economy. This aim will be achieved through the considering current changes and tendencies in the economy, the importance of stability, measures of stability, and empirical analysis of the main indicators of financial stability. The study ends with final conclusions as to the further analysis.

EU banking system in a turbulent environment

The modern global economy is undergoing profound structural and market changes. The world economy has experienced shocks in recent years. However, such accumulation has not yet occurred. The instability of international economies, uncertainty in the financial markets, the still unfinished effects[1] of the financial crises of 2008 and 2013, the current armed conflict in Ukraine, the danger of a new armed conflict in the Middle East

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[1] The Eurozone suffered particular problems, when several peripheral countries, especially Greece and Ireland, fell into a debt trap.

area, rising global inflation – the risk of stagflation and the risk of economic slowdown, the impending energy crisis, integrity-related problems in the EU, a rapidly growing China, with a huge trade surplus and huge foreign exchange asset reserves (forming a disproportion compared to other national economies), the deepening dispute between the West and China, the still experienced effects of the COVID-19 pandemic, disrupted supply chains and changes in the political world – these are the main phenomena that are currently very strongly affecting and destabilising the national economies and have a significant impact on the stability of the banking sector, in terms of risk. On the background of the aforementioned phenomena, the liquidity of global financial markets is declining, prompting banking and non-banking financial institutions to seek new forms of competition that take into account the problem of risk.

For example, in Germany, inflation was only 7.9% in August 2022, equaling the highest level since 1952. In Lithuania, inflation of 22.4% is the highest since August 1996. Czechia, with a 17.2% increase in averaged prices, reached maximums since 1993. For comparing: CPI in Poland hit a more than 25-year high of 16.1% in August 2022. Inflation in Poland is still behind the following countries: Moldova, Estonia, Ukraine, Lithuania, Latvia, Belarus, Bulgaria, Czechia, and North Macedonia[2] (see: Frączyk 2022).

The European Central Bank is in a difficult position. It was unresponsive and delayed interest rate increases for a long time, arguing that inflation was temporary. Now it needs to raise the cost of money fast and hard. Nevertheless, the ability of central banks to raise interest rates is being increasingly constrained due to the decline in liquidity caused by volatility, credit, and the momentum of economic growth in key Eurozone countries is slowing. The ECB will be forced to raise rates further, despite the fact that global economic conditions are deteriorating, and a rate hike could push the Eurozone economy into recession, while the scale of the energy crisis in Europe remains an additional risk, and it is unknown.

HICP inflation in the Eurozone was at an all-time high in August 2022: 9.1% per year – see *Figure 1* and *Table 1*. The European Central Bank's main interest rate rose to 1.25%, it means an increase of 0.75 percentage points. Such high increase has not been seen in the ECB's history. The ECB has lowered its forecast for Eurozone GDP growth for 2023 by 1.2 percentage points to 0.9%. Eurozone GDP growth will reach 3.1% this year, before forecasted slowing to 0.9% in 2023, and 1.9% the following year, according to European Central Bank projections. At the same time, the ECB raised its inflation forecasts. It currently expects annual HICP inflation in the Eurozone of 8.1% in 2022, 5.5% in 2023 and 2.3% in 2024 (Eurostat WWW, 2022a,b).

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[2]   Countries in order from highest to lowest inflation.

Figure 1: HICP inflation in Eurozone countries, August 2022, %
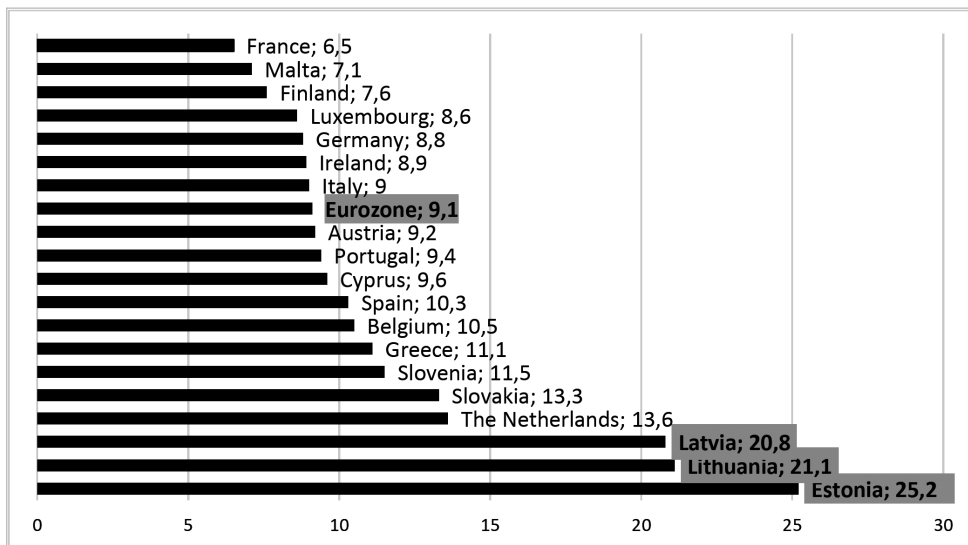
Source: Eurostat 2022b.

Table 1: Inflation in Eurozone countries, %

	Annual rate						
	Jul 21	**Feb 22**	**Mar 22**	**Apr 22**	**May 22**	**Jun 22**	**Sep 22**
Belgium	1.4	9.5	9.3	9.3	9.9	10.5	10.5
Germany	3.1	5.5	7.6	7.8	8.7	8.2	8.8
Estonia	4.9	11.6	14.8	19.1	20.1	22.0	25.2
Ireland	2.2	5.7	6.9	7.3	8.3	9.6	8.9
Greece	0.7	6.3	8.0	9.1	10.5	11.6	11.1
Spain	2.9	7.6	9.8	8.3	8.5	10.0	10.3
France	1.5	4.2	5.1	5.4	5.8	6.5	6.5
Italy	1.0	6.2	6.8	6.3	7.3	8.5	9.0
Cyprus	2.7	5.8	6.2	8.6	8.8	9.0	9.6
Latvia	2.8	8.8	11.5	13.1	16.8	19.2	21.1
Lithuania	4.3	14.0	15.6	16.6	18.5	20.5	20.8
Luxembourg	3.3	7.8	7.9	9.0	9.1	10.3	8.6
Malta	0.3	4.2	4.5	5.4	5.8	6.1	7.1
Netherlands	1.4	7.3	11.7	11.2	10.2	9.9	13.6

Austria	2.8	5.5	6.6	7.1	7.7	8.7	9.2
Portugal	1.1	4.4	5.5	7.4	8.1	9.0	9.4
Slovenia	2.0	7.0	6.0	7.4	8.7	10.8	11.5
Slovakia	2.9	8.3	9.6	10.9	11.8	12.6	13.3
Finland	1.8	4.4	5.8	5.8	7.1	8.1	7.6

Sources: Eurostat WWW, 2022a,b.

Inflation was initially driven by post-pandemic supply bottlenecks, yet at the moment the situation in Ukraine is the main culprit. It resulted in energy, metals and food price increase. While high energy prices remain a major inflationary factor, the prices of processed food and services have also risen sharply, suggesting that inflation is becoming more widespread. This is mainly behind the gigantic increases in energy prices, amounting to almost 40% per year. Food is getting more expensive at a rate of less than 10% (see: *Figure 2*).

Figure 2: Euro area annual inflation, July 2022, %
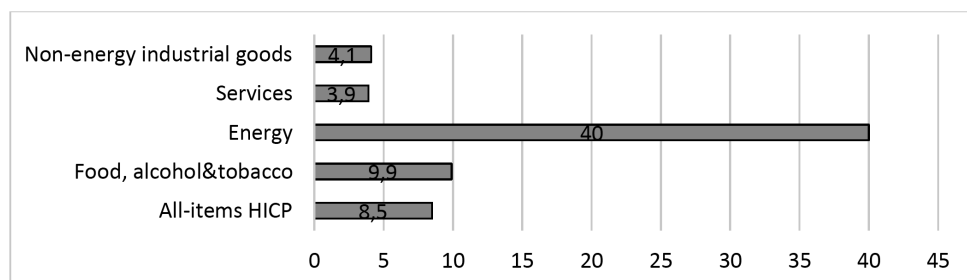
Source: Eurostat 2022a.

The issue of the money printing "spreading" around the economy is important in the analysis of inflation. The mass of money grew faster than the economy. In case of additional money printing in Eurozone, there are clear differences in inflation between countries. The high price growth in the Baltic states and low one in Germany or France may be explained by the highest investment rate in Lithuania, Latvia and Estonia compared to the Eurozone as an entirety. Simply speaking, "cheap money" in proportion to the size of the economy there affected those economies the most, therefore it rebounded when prices started increasing after the pandemic.

Such highly turbulent economic and geopolitical environment means that new risks are consequently affecting the EU's banking system. This is because we are currently facing a unique combination of rising geopolitical risks, the rise of global protectionism, the threat of total war and the stiffening of monetary policy.

**Stability of the banking system –
prediction of the issue in the literature**

Stability of the banking system is a state, in which it performs its functions continuously and efficiently, even in case of unexpected and adverse disturbances of significant magnitude and low probability of occurrence.

A stable banking system is one that:

- does not permanently demonstrate liquidity or insolvency (Masiukiewicz 2011: p.18);
- performs its functions continuously and effectively, even in the event of unexpected disruptions on a significant scale (NBP 2011a: p. 3);
- is able to withstand shocks without succumbing to growing risks that adversely affect the allocation of savings, the ability to invest them and the functioning of payments in the economy (Jurkowska-Zeidler 2008: p. 168).

The *Figure 3* demonstrates the global uncertainty index for euro area countries. In 2021 was marked a slight increase of 0.1–0.2 points in the index compared to the previous year. In 2022, a sharp increase (0.7–0.9 points) was recorded in the index. A maximum uncertainty of 1.0 points according to the forecasts is to be recorded from 2023 onwards, when a significant escalation is predicted in the range of: (1) – (12).

Source literature provides various definitions of stability and the lack thereof. One contradicts the other. Therefore, as we define stability, the lack of factors to specify it will testify to instability (Hall 2010; Legrain 2010). The definition of financial stability is best demonstrated on the basis of the approaches of A. Crockett (1996) and T. Paddoa-Schioppa (2002). For the first author, instability is simply the lack of stability. By describing the stability of the financial system, he analyses the stability of its two most important components – financial institutions and financial markets. Financial institutions are stable when they can fulfil their contractual obligations uninterruptedly, without obstacles and having to seek help outside, while the stability of financial markets is equivalent to the stability of asset prices (Crockett 1996: p. 2). According to the other author, the financial system is characterised by stability if it is capable of withstanding shocks without allowing the occurrence of cumulative processes adversely affecting the allocation of savings in investments and making payments in the economy (Paddoa-Schioppa 2002: p. 20).

Similarly, literature provides for a very simplified approach to financial stability, defining it as the condition of a banking system not affected by financial crises (Fidrmuc, Schardax 2000: p. 92). Between the state of financial stability and crisis, as already mentioned, there may be the state of financial instability (Tymoigne 2012; Borio, White 2004).

Figure 3: World Uncertainty Index[3] for the Eurozone 2021-2023 (*forecast) for Q2.
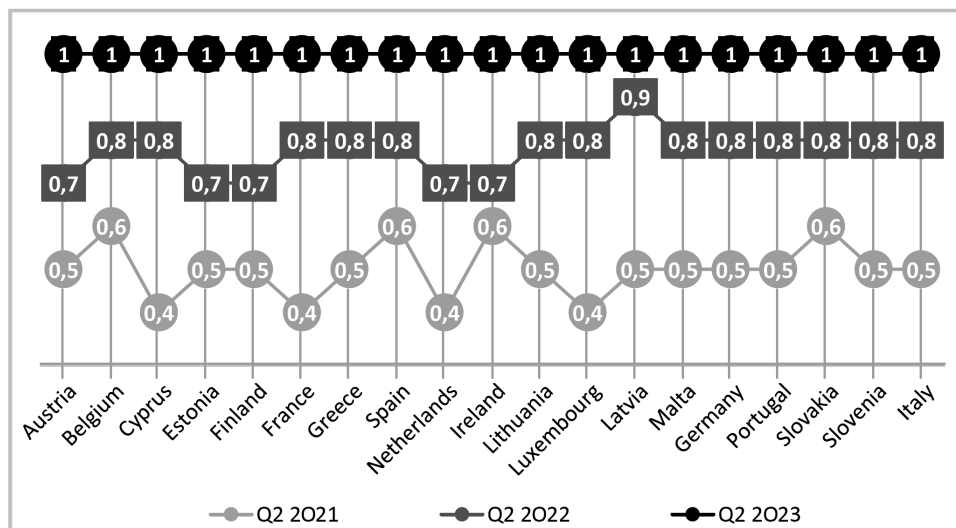
Source: author's own elaboration based on: https://fred.stlouisfed.org/series/WUIEUROPE (26.09.2022)

Literature also provides for the approach that stability is different from crisis in terms of *financial fragility* and *financial instability* (see: *Figure 4*).

Figure 4: Financial fragility and instability.
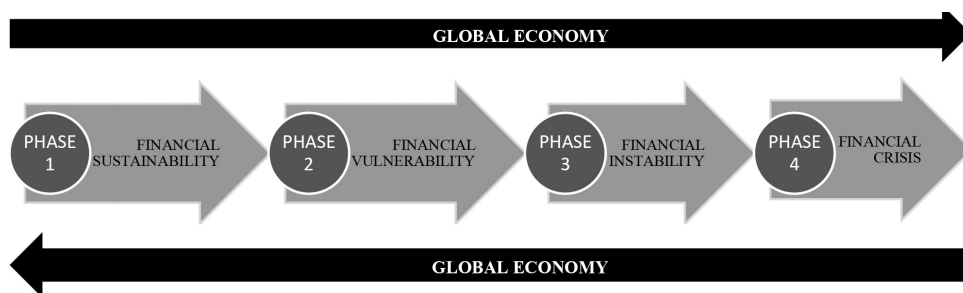
Source: own elaboration based on publication: Mitręga-Niestrój 2014: p. 11.

The state of financial fragility means that the banking system is characterised by increased vulnerability to risks. However, the system is capable of fulfilling its functions, while this fragility begins to interrupt the process of providing banking services in the state of instability.

Yet another definition is specified by J. Chant (see: Schinasi 2004: p. 13), who defines financial instability as conditions on financial markets, which are or may be detrimental to

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[3]   The World Uncertainty Index quantifies uncertainty based on the frequency of the word in the Economist Intelligence Unit's quarterly country reports.

the economic situation through their impact on the functioning of the financial system. According to another author, E. Ph. Davis (2003: p. 2), financial instability simply involves the increased risk of financial crisis.

R. Ferguson contends that financial instability is characterised by three essential properties:

- firstly, prices of several important classes of financial assets significantly deviate from the foundations;
- secondly, the functioning of the market and availability of loans and credits on the national level and, most likely, on the international level, are disturbed to a large extent;
- thirdly, it is probable that aggregated expenditure will deviate below or above the production capacity of the economy (Ferguson 2003).

With reference to the above-mentioned definitions, we can talk about the macro- and microeconomic characteristics necessary to consider a given system stable. Properties of macroeconomic importance include sound economy-wide fundamentals, consistency of fiscal and monetary policy instruments, as well as financial liberalisation. On the other hand, microeconomic properties include: legal system, accounting rules, market structure, supervision and control, as well as financial safety net (Capiga et al. 2010: p. 11). A prerequisite for the stability of the banking system is the stability of key financial institutions, especially banks, which constitute the most developed and largest segment of the banking market (NBP 2011b: p.12). The stability of the banking system is expressed in the ability of the system to maintain liquidity and of individual units to cover losses and risks from their own funds, and to maintain solvency (Jaworski, Zawadzka 2001: p. 203), with the level of stability being assessed differently by the bank's board of directors or the central bank, differently by supervisory authorities, and still differently by customers or shareholders (see: *Table 2*).

Table 2: Stability of the bank in the assessment of the environment.

Entity evaluating the stability of the banking system	Description of stability
Central bank	Equity in the amount required by law, compliance with prudential standards.
Shareholders	Growing dividend value, good image of the bank and its competitiveness.
Bank management	Positive evaluation of financial statements, positive assessment of profit levels, balance sheet total and capital.
Depositors	High bank rating, guarantee of interest payout and return of invested money funds, possibility to withdraw the deposit before maturity.
Borrowers	Regularity in meeting financial needs, minimum procedures and formalities.

Source: Żukowska 2007: p. 89.

Financial stability depends on the institutional conditions of the banking system and the economic and financial situation of individual banks (Dattels et al. 2010). The stability of the banking system is affected by the actions of the institutions of the legal and financial environment of banks, as well as the banks themselves as independent entities. Supporting financial stability is the responsibility of the central bank, supervisory institutions, the deposit guarantee scheme or the credit information bureau. Their efforts are directed at limiting the frequency and scale of disruptions in the banking system and mitigating the consequences when they occur, since the spread of banking sector problems could ultimately be the cause of a nation-wide economic crisis. A stable banking system is characterised by credibility, understood as customer confidence in individual bank and the banking sector as an entirety, as well as transparency, which contributes to reducing information asymmetry and uncertainty in financial markets. This allows investors to assess risks more accurately and make a more optimal decision. The banking system is stable when the troubles of individual banks do not translate into the operation of the banking system as a whole, i.e. they do not negatively affect the performance of its tasks (NBP 2000: p.7). However, it is important to remember that a stable banking system does not mean that all banks are financially stable. In turn, an unstable banking system does not preclude the existence of stable banking institutions that will prove resilient to a crisis situation.

The modern global banking system, as a result of the turbulence described above, operates under conditions of severe instability. It deals broadly with the relationship between the financial and real spheres of the economy, the activities of financial institutions, the situation in banking markets, the market valuation of financial instruments, and the world of public finance. The financial instability of the modern global economy – as evidenced by the observation of the changes taking place in it – seems to confirm H. Minsky's hypothesis that the world, characterised by the existence of a large financial sector and an extraordinary pressure to create new investment instruments, generates instability itself. Stability naturally leads to instability. The more stable the world is and the longer it maintains stability, the more unstable it becomes when the next crisis arrives (Tymoigne 2012).

F.S. Mishkin argues that financial instability occurs, when shocks in the financial system disrupt the flow of information, so that the financial system cannot perform its capital flow functions (Mishkin 1999: p. 6). He points out that one of the primary factors in financial instability is problems in the banking sector. Thus, the instability of the banking system is affected by the condition of the banking sector and the condition of banking institutions (Reinhart, Rogoff 2009). These entities are particularly vulnerable to the risk of destabilisation, which is due to the characteristics of banking institutions, the specifics of their operations and the characteristic structure of their balance sheets (Niedziółka 2011: p.79).

The recognition of the banking sector as the most important channel for the transfer of impulses determining the risk of financial destabilisation indicates the existence of the phenomenon of banking sector instability. The banking system, by collecting and allocating savings, transforming risk and information, and ensuring the functioning of

the payment system, plays a special role in the economy. Banks constantly interact with other segments of the economy, and are linked to the macroeconomic environment and foreign countries, therefore they should conduct their operational and investment activities in a way promoting economic development. However, it should be remembered that there is a strong feedback loop between the development of the economy and the development of the banking system, which means that the basis for the development of any economy is the stable development of the banking system (Żukowska 2007: p. 83), which should become the overriding goal of regulators and supervisory institutions. The financial stability of the banking system is important for the smooth operation of the entire economy, as both quantitative and qualitative changes have been taking place in the banking system over the past several years (Reinhart, Rogoff 2009).

Indicators of banking sector stability

The level of stability of the bank and the banking system as a whole is determined by selected **indicators** adopted by the International Monetary Fund (see: *Figure 5*), which include:

- capital adequacy (*Total Capital Ratio* – TCR, *Capital Adequacy Ratio* – CAR, *Capital to Risk-Weighted Assets Ratio* – CRAR) – provides a buffer to protect the bank against unforeseen losses;[4]

Figure 5: Measures of banking sector instability
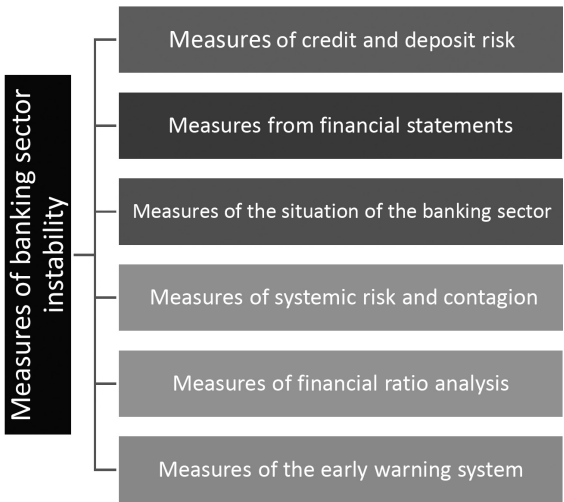
Source: author's own elaboration

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[4]   It is the ratio of the size of a bank's equity (*Tier 1* and *Tier 2* common funds) to its risk-weighted assets. Is a state in which the level of risk taken by the group in connection with the development of business activities, can be covered by the capital held; own funds and core funds to risk-weighted assets, non-performing loans less provisions to capital.

- quality and structure of assets (QSA) – non-performing loans to total loans, structure of loans to the non-banking sector;
- profitability (P) – return on assets, return on core funds, interest income and non-interest income to assets, operating expenses to banking profit;
- liquidity (L) – liquid assets to assets and liquid assets to current liabilities;
- sensitivity to foreign exchange risk (SFER) – net open foreign exchange positions to capitals;
- aggregate indices (AI) – relating to the magnitude of credit risk, developed on the basis of the value of the risk of individual banks, the macro coverage of which can be subject of generalisation, thus, it is illustrating the condition of the entire banking sector (e.g., Credit Default Swap indices);
- MES ratio – is a measure of the impact of an individual bank's situation on systemic risk; it is measured as a percentage of bank's total assets, and therefore the marginal expected loss shortfall; the higher the value of the MES ratio (the higher the level of systemic risk);
- SRISK indicator – the total systemic risk in the banking sector in a given period is equal to the sum of (positive) values of SRISKi for all i, that is, the sum of the risks of individual banks; the higher the value of the SRISK indicator (the higher the level of systemic risk);
- indexes: Markit and iTraxx Financial – estimated on the basis of CDS (Credit Default Swap) instruments;[5]
- indicators of lending activity (IFLA) – the ratio of the volume of loan receivables to the bank's total assets;
- deposit activity ratios (DAR) – the share of deposits in the total liabilities of banks; it characterises the structure of funding sources;
- measures, based on data included in the financial statements of individual banking institutions (MSF);
- indicators depicting the situation in the banking sector (e.g., LIBOR-OIS spread);
- indexes showing the size of systemic risk in the banking sector (IRS) – systemic risk is the risk of such a disruption in the banking system operation that, if materialised, disrupts the operations of the banking system and the national economy as an entirety;[6]
- indicators of the early warning system of instability in the banking sector – WSWO (systemic risk assessment, intensity of credit risk, security of financial institutions, health of the banking system);
- financial health indexes in assessing banking sector fragility – Bloomberg FCI (BFCIUS), Bloomberg European FCI (BFCIEU), BECIUS+, CFCILEVL, KCFSI, GF FSI, GFSI;

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[5] *iTraxx Financial* is the name of a set of indices relating to CDS operating in the European market, Australia, Japan and continental Asia. They reflect the cost of insuring against the insolvency of financial institutions, indicating the assessment of credit risk by the financial institutions themselves.

[6] Sources of systemic risk can include, for example, excessively fast credit growth, high leverage of financial institutions, households or companies, or highly concentrated links between financial institutions.

- class econometric models: RBC (Real Business Cycle), Diamond-Dybvig, DSGE (Dynamic Stochastic General Equilibrium), OLG (Overlapping Generation), FHGE (Finite Horizon General Equilibrium), SVAR (Structural Vector Autoregressive), Bartram-Brown-Hund;
- profitability ratios (PR) as measures of assessing the intensity of volatility in the banking sector, which illustrate the efficiency of the bank's operations.

Excessive declines in the rates of return for most of the world's leading banks or banks in selected regions of the globe may be indicative of increasing volatility, profitability indicators are interrelated. The most general indicator is ROE (Return on Equity), which stands at the top of the "pyramid". It can be calculated by multiplying ROA (Return on Assets) by the Assets/Equity ratio, which results directly from the Du Pont model. High ROA tends to characterise smaller banks – local and national banks – reflecting the lower cost of their capital and the higher profitability of their lending. Large banks, on the other hand, obtain lower index values due to the higher cost of capital used. Banks' equity accounts for a relatively small share of liabilities. Thus, only a portion of the institution's assets are financed by secure, non-refundable sources of funding. This is due to the high leverage used by banks. Thus, the return on equity is correspondingly higher than the return on assets (ROA).

ROE is also compared with the inflation rate. A lower ROE than the inflation rate means the bank is decapitalised. In developed market economy, it is assumed that for banking institutions, a ratio of 16–18 (with no or negligible inflation) is attractive and signifies the good condition of the entity.

Methods, research and results

The purpose of this research is to analyse the stability of the banking sector of the Eurozone countries with the consideration of the turbulence of the contemporary global economy. The stability of the banking system will be examined with 13 core measures and indicators: TCR, CRAR, QSA, P, L, MES, SRISK, Markit, iTraxx, IFA, DAR, PR-ROE, PR-ROA. In addition, the analysis is based on literature research. As the impending crisis will primarily affect Europe, therefore the 19 largest banks in Eurozone countries will be analysed in terms of their total asset size: Austria – Erste Group Bank (EGB), Belgium – Argenta Bank (AB), Cyprus – Bank of Cyprus (BC), Estonia – LHV (LHV), Finland – OP Corporate Bank PLC (OPCB), France – BNP Paribas (BNPP), Greece – National Bank of Greece (NBG), Spain – Banco Santander Central Hispano (BSCH), the Netherlands – ING (ING), Ireland – Bank of Ireland (BI), Lithuania – Šiaulių Bankas (SB), Luxembourg – Deutsche Bank Luxembourg SA (DBL), Latvia – Swedbank Latvia (SL), Malta – Bank of Valletta (BV), Germany – Deutche Bank AG (DBAG), Portugal – Banco Comercial Português (BCP), Slovakia – Slovenská sporiteľňa (SS) (Erste Bank), Slovenia – Nova Ljubljanska Banka (NLB), and Italy – Unicredit SpA (USPA). These institutions continue to be ranked as the largest systemically important banks for these EU countries.

The empirical study includes: source data from the banks' annual financial statements, published statistical data from the central banks' yearbooks and reports, empirical data from the World Bank, International Monetary Fund, Basel Committee on Banking Supervision, statistical offices – Eurostat and news agencies, namely Bloomberg and Reuters. The inclusion of such range of data is necessitated by selected indicators and measures to quantify the stability of the banking system.

The analysis covered the three-year period from 2021 to 2023 (forecasting). The choice of such short time interval is necessitated by the fact that during the previous period (2013–2020) the analysed banks remained stable in terms of the studied measures and indicators. Slight deviations (if they occurred sporadically) were a consequence of the following risks in the Eurozone: political problems, debt serviceability of Eurozone countries, sustainability, banks' implementation of non-performing loan (NPL) strategies, easing of credit standards, valuation adjustments in financial markets, consequences of Brexit, geopolitical uncertainty and risks related to climate change. The preceding years, together with 2021, generally were a period of stability, 2022 from Q4 has been a period of increasing imbalances, 2023 will be the first year of projected severe volatility. After 2024, further declines in finance are predicted; however, their magnitude cannot be precisely estimated at this point due to the difficulty in determining the magnitude and severity of turbulence in the global economy in 2024.

The following relations were applied to the calculations:

(1) Balance sheet total of the bank *i* for *i=1,2,3.....n*

$$D_i + C_i = \sum_{j=1}^{n} Xi, j$$

where:
D_i– all liabilities,
C_i– the bank's equity valued at the current market price,
$X_{i,j}$– assets of the bank concerned and valued at the current market price.

(2) The *MES* ratio was considered as a percentage of the bank's total assets *i* in the calculations.

$$MES_i^q = E\ (L_i|\ L > VaR^q\ )$$

where:
L_i – potential loss on the bank's assets *i*,
L – losses of the entire banking sector,
VaR^q – value of the maximum potential loss on the bank's assets *i* over a specified period of time *i* with the specific probability of occurrence *q*,
$E\ (L_i|\ L > VaR^q)$ – the final projected capital shortfall to occur in the banking sector as a result of the occurrence of the bank's loss *i* provided that the losses of the entire sector exceed *the VaR*, i.e. when a crisis occurs.
MES as a capital shortfall in the bank *i* in period *t* will occur, when:

$$k\,(D_i + C_i) - C_i > 0 \text{ , i.e.: } k > C_i \mid \sum_{j=1}^{k} Xi, j$$

where: k – nominal capital adequacy ratio, i.e. the ratio of equity to total assets of the bank.

(3) ***SRISK*** – equal to the expected size of the shortfall in the bank's required equity capital ***i*** in crisis conditions. This model uses the measure of systemic risk.

$$SRISK_i = E\,(k\,(\,D_i + C_i\,) - C_i \mid crisis) = kD_i + k\,(1 - LRMES_i\,)\,C_i - (1 - LRMES_i)\,C_i$$
$$= kD_i - (1 - k)\,(1 - LRMES_i)\,C_i$$

where:

E – expected size of the shortfall in the bank's required equity capital and ***i*** in crisis conditions.

k – nominal capital adequacy ratio, i.e. the ratio of equity to total assets,

D_i – all liabilities of the bank ***i***,

C_i – the bank's equity valued ***i*** at the current market valuation,

$LRMES_i$ – *long-run marginal expected shortfall* is the expected percentage decline in the value of the bank's equity ***i*** in crisis conditions at a specific time ***t***.

(4) TCR, which is the ratio of the size of a bank's own funds and to its risk-weighted assets and off-balance-sheet liabilities:

$$W1 = \frac{ktier1 + ktier11 - k\,deduction}{r\,cred} \geq 8\%\ r\,cred = r_{bs} + r_{obs}$$

where:

W 1 – credit side solvency ratio,

ktier1 – core funds,

ktier11 – matching funds,

k deduction – items reducing total funds,

r cred – credit risk exposure,

r_{bs} – credit risk exposure from balance sheet items,

r_{obs} – credit risk exposure from off-balance sheet items.

$$\text{(5) } W11 = \frac{ktier1 + ktier11 - k\,deduction + ktier111}{r\,cred + 12.5\,r\,market} \geq 8\%$$

where:

ktier111 – Category III funds,

r market – exposure to market risk.

$$\text{(6) } W111 = \frac{ktier1 + ktier11 - k\,deduction + ktier111}{r\,cred + 12.5\,(r\,market + r\,oper)} \geq 8\%$$

where:

r oper – operational risk exposure.

$$(7)\ \text{Solvency ratio} = \frac{enhanced\ Tier\ 1 + Tier\ 2\ capital}{capital\ requirements}$$

$$(8)\ \text{Tier I Capital Ratio} = \frac{core\ Tier\ 1\ funds}{risk{-}weighted\ assets}$$

$$(9)\ \text{Bank lending activity ratio} = \frac{total\ loans}{total\ assets}$$

$$(10)\ \text{Bank's deposit activity ratio} = \frac{total\ deposits}{total\ liabilities}$$

$$(11)\ \text{Loans/deposits ratio} = \frac{total\ loans}{total\ deposits}$$

$$(12)\ \text{ROA} = \frac{net\ profit}{total\ assets}$$

$$(13)\ \text{ROE} = \frac{net\ profit}{equity}$$

In 2021, the MES ratio for all the banks under analysis was at an acceptable level, averaging between 1.1% and 2.3%. The ratio increased in Q3–Q4 2022, especially for the following banks: BC, OPCB, BNPP, BSCH, NLB, USPA. A significant progression of this indicator is predicted for 2023, especially for the following banks: BC, NLB, USPA. This means that the amount of the marginal expected capital shortfall in the conditions of the financial crisis caused by the capital shortfall in the above-mentioned banks was 20%, 30%, 30% of their balance sheet totals, respectively.

Similarly to the MES indicator, the SRISK indicator did not show any significant deviations in the examined banks in 2021, which translates to the low level of systemic risk. From Q2 2022 onwards, its value started to increase in all the examined banks, especially in: LHV, SL, SS, BV, DBAG, BCP. This means the total percentage capital shortfall for these banks on the order of: 30%, 35%, 40%, 38%, 35%, 43% of their balance sheet totals, respectively. Therefore, this indicator demonstrates the high level of systemic risk in these banks. The 2023 forecast for this indicator is unfavourable for all the examined banks, it demonstrates a significant increase in systemic risk. This is particularly true for the following banks: LHV, OPCB, BV, USPA, SS, BCP, DBAG, SL, SB, BI, where the growth range is 40%, 45%, 50%, 43%, 51%, 41%, 40%, 48%, 49%, 45%, respectively. This situation predicts difficulties for these institutions. The analysis of the MES and SRISK indicators aimed at examining system risk leads to a conclusion that they are highly informative and predictive. Therefore, they should be included in modern early warning systems.

For the Markit and iTraxx Financial indices issued (the research was based on such assumption) after 2016 with maturities of 5 and 10 years, it was adopted that they would cover the period before and during the forecasted 2023 crisis. From 2022 onwards, their values began to rise. In 2021, these indices were below 100 basis points on average. From Q4 2022, increases are recorded at 165,555 to 189,432 basis points. In 2023, increases of

387,612 basis points are predicted. Therefore, the examined indices demonstrate a significant increase in credit risk among the analysed banks and an increase in its volatility.

IFA-DAR (LTD – *Loan-To-Deposit Ratio*). The ratio of loans to the banks' balance sheet total in 2021 was relatively low. The increase in loans occurred (%) in Q2 2022, which is attributable to the impoverishment of the population in the Eurozone due to skyrocketing inflation. Certain banks increased the amount of loan receivables in relation to their total assets.

There is marked an increase in the loan portfolio of the examined banks, but it also confirmed the earlier thesis as regards the impoverishment of EU societies. The largest loan receivables were recorded by the following banks: BC, BNPP, BSCH, ING, BI, SB, SL, BV, BV, SS, NLB, DBAG. Growth at a similar level to 2022 is also projected for 2023. These increases demonstrate added volatility risk at the banks under examination.

The ratio of deposits to total liabilities of the examined banks adopted the highest values in 2021. From Q3 2022 onwards, this ratio decreases significantly, which marks the banks reducing the share of deposits in their funding mix. Declines were recorded by all the banks covered by the analysis, in particular: OPCB, BNPP, DBL, BV, DBAG, SS, NLB. As it can be concluded from the analysis, the LTD ratio exceeded 100% as for all the banks, which means that the volume of loan receivables exceeded the total of accepted deposits in these banks. Simultaneously, the banks had to fund a part of their loan receivables from other sources, which in practice testifies to a significant increase in their risk of financial instability. As loans increased, non-performing loans (bad loans) increased also. In practice, this translated into a deterioration of the loan portfolio of the banks, which, in turn, presented a higher risk of instability for them and, consistently, instability for the banking sector at large.

Profit is the basic figure that determines the financial health of a business. By Q2 2022, the examined banks had recorded increased net profits. For the purposes of the analysis, the size of this growth was not taken into account but the fact of the growth itself. The forecast for Q4 2022 and the entire year of 2023 demonstrates drastic declines in the banks' net profits. The following banks will suffer the largest losses: BC, SB, SL, BV, SS, NLB. This indicates a serious deterioration in the financial health of these banks within just one financial year.

The banks' profitability is in detail expressed by two ratios: ROE and ROA. The research demonstrates that the ROA values of the banks examined at the time of the analysis, i.e. Q2 2022, are positive. The projected declines are related to the entire 2023 year, when banks can start to see negative returns by the month. This will particularly affect the following banks: AB, SB, EGB, NBG (decreases 50%, 62%, 69%, 72%, respectively), in which assets will be reduced due to the lower resilience of the economies to the crisis (including the size of GDP), where these banks operate in relation to the other banks in the group under study. The return on assets of individual banks and, consistently, the entire banking sector of the Eurozone countries will therefore be decreasing.

Analysing the changes in ROE for the adopted research period, it is evident that for the years 2021–2022, the value of the examined indicator exceeded 10% in the case of the

majority banks. It means that the net profit of the Eurozone banks represented at least 10% of their equity value. This good trend can start to deteriorate by the month in the projected Q4 2022 and throughout 2023, which marks even further deterioration in the banks' return on equity. At the end of 2023, significant declines in ROE values are already recorded for the following banks: BCP, DBAG, SS, NLB, NBA, USPA – negative values.

In terms of TCR until 2022, the Eurozone banks had met the requirements set by the Basel Committee on Banking Supervision. The TCR ratio was above the established threshold value of 8%. Therefore, the banks adopted themselves to the prudential regulations imposed on them. The following banks had the highest values for this indicator: BNPP, ING.

For the CRAR ratio – in compliance with the New Capital Accord, the banks should maintain this ratio at no less than 4%. Similarly as for the TCR, this indicator had exceeded the set threshold by Q4 2022. Therefore, the banks adapted themselves to the regulations imposed on them also in relation to this indicator. The highest values of this indicator were recorded by the following banks: BSCH, NBG, BC. However, it should be borne in mind that capital adequacy ratios alone, even if within the threshold values, do not guarantee the safety and stability of the banks and, consistently, of the entire banking sector of the Eurozone countries. The lower the value of these indicators, the higher the risk of instability in the banking sector.

The design of a market-based early warning system should also include the assessment of confidence in the banking sector. While assessing this level, the verification of two indicators was adopted for the purpose of the analysis: LIBOR-OIS spread and TED spread. An increased LIBOR-OIS spread indicates irregularities in the functioning of the banking sector and an elevated risk of instability. Whith the increased size of the spread between LIBOR and the OIS, the cost of funding interbank loans grows. This indicator had remained stable at 10 basis points until Q1 2022, but it had increased afterwards. It is predicted to be very high for 2023: 282 basis points. The growth of TED[7] indicator is also unfavourable, and it indicates a decline in the confidence of financial institutions in banks. Until Q2, the ratio had been at a low level in the group of the banks subject to analysis, and was 20 basis points on average. Afterwards, the value of this indicator is projected to deteriorate at a rolling rate – 5 basis points by the end of 2023 on average. Both LIBOR-OIS and TED already foreshadow irregularities in the functioning of the banking sector in the Eurozone countries.

Conclusions

The aim of this article was to analyse the stability of the banking sector of the Eurozone countries in light of the turbulence in the contemporary global economy. This aim was achieved through the considering current changes and tendencies in the economy, the importance of stability, measures of stability, and empirical analysis of the main indicators of financial stability of the banking sector.

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[7]   It indicates the level of confidence of financial institutions in the solvency of banks.

The research hypothesis, based on the statement that the banking system of the Eurozone countries, regardless of high risk and turbulence in the global economy, remains stable, was verified positively. This confirms the circumstances, in which the banks of the Eurozone countries found themselves during the analysed period. The banking performance deteriorated as the COVID-19 pandemic escalated and the first symptoms of the energy crisis occurred.

The research demonstrates that an early warning system for monitoring the economic and financial health of the banking sector remains an important element for analysing the fragility of the banking system. The selection of indicators used for the research proves to have been suitable and meaningful. In author's opinion, it represents the basic set of measures which should be included in a modern early warning system. It is important to emphasise that today's early warning system should be quick and effective in assessing the financial health of the banking sector. In the author's opinion, the proposed system meets such requirements.

The empirical verification of the indicators selected in the analysis leads to the following **conclusions**:

1) The proposed indicators can be divided into those that can be referred to as informational and predictive (here we can distinguish e.g.: MES, SRISK, Markit iTraxx, ROA, ROE, LTD), as well as those that are purely informational – deposit and loan activities.

2) An early warning system structured in such manner should become an important component of the system, to complement the already existing tools for assessing the central banks' response to the instability of the banking sector.

3) Additionally, effective early warning system should be characterised by very early and quick identification of instability sources. For this purpose, the proposed information and forecasting indicators should be used.

4) Today's banks operating in volatile and risky environment need to respond to risks flexibly. They need to be equipped with effective analytical tools, taking this volatility into account and mitigating it in risk terms.

5) Further research should be conducted on the continuous upgrading of early warning systems with new measures and indicators adapted and taking into account the volatility of the macroeconomic environment of the global economy.

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Youth labour market in the European Union countries – convergence or divergence?

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Abstract

The permanent division of the EU Member States into a southern region (with huge imbalances in the youth labour market) and a northern region (with a relatively good situation for the youngest part of the workforce) is a serious challenge for the cohesion policy. The aim of this research is to assess the divergence of the youth labour market in the EU countries and the impact of the COVID-19 pandemic on it. In the research, classical measures of dispersion were used and the gamma convergence method was adopted. The used indicators were: NEETs and the unemployment rate (age group between 15–24 years old). Research results: despite significant disproportions, the existence of convergence was found, although the COVID-19 crisis inhibited it.

Keywords: youth labour market, NEETs, European Union, cohesion policy, COVID-19

Rynek pracy młodzieży w krajach Unii Europejskiej – konwergencja czy dywergencja?

Streszczenie

Trwały podział krajów Unii Europejskiej na południe (z olbrzymimi nierównowagami na rynku pracy młodzieży) i północ (z relatywnie dobrą sytuacją najmłodszej części siły roboczej) jest poważnym wyzwaniem dla polityki spójności. Celem zaprezentowanych w tym artykule badań jest ocena dywergencji rynku pracy młodzieży w krajach Unii Europejskiej oraz wpływu pandemii COVID-19 na tę dywergencję. W badaniach wykorzystano klasyczne miary dyspersji oraz zaadoptowano metodę konwergencji typu gamma. Użyte wskaźniki to NEETs i stopa bezrobocia (grupa wiekowa 15–24 lat). Pomimo wyraźnie utrzymujących się bardzo dużych różnic pomiędzy krajami UE, w badaniu stwierdzono zachodzącą między nimi konwergencję, aczkolwiek kryzys COVID-19 zahamował ją.

Słowa kluczowe: rynek pracy młodzieży, NEETs, Unia Europejska, polityka spójności, COVID-19

The economic policy of the European Union is embedded with a philosophy of cooperation and solidarity ensuring security and prosperity, which seems more rational when compared to competition. On this basis, the EU cohesion policy was constructed, the underlying goal of which has become convergence. The adopted development concept assumes that the inhabitants of the EU, in the long run, will live at a similarly high level (Jegorow 2018: p. 61). EU cohesion policy contributes to strengthening economic, territorial and social cohesion in the European Union. Its aim is to correct imbalances between regions, countries, and social groups. "Labour fragmentation, flexibility without security and informality have been key characteristics of the EU southern labour markets throughout the 20th century, determining the structures and cultures found therein" (De Luca et al. 2020; Leontidou 2012; qtd. in: Avagianou et al. 2022: p. 425).

"Young people are particularly disadvantaged during the periods of economic recession as their unemployment is more responsive to the business cycle than other age groups" (Mascherini et al. 2012: p. 18; see also: Kotliński 2017). "This is because they tend to be more concentrated in certain cyclically sensitive industries" (Mascherini et al. 2012: p. 18; see also: Bessant et al. 2017), and they are disproportionately presented among those holding part-time positions (Wysocka 2021; Petreski et al. 2021), temporary contracts or freelance jobs (Juznik Rotar 2022). "The proportion of young people on a temporary employment contract increased since the onset of the financial crisis, leaving young people in an even more insecure position regarding their labour market participation" (Mascherini et al. 2012: p. 18). The COVID-19 pandemic crisis was the cause of further shocks, both in terms of demand and supply. The economic vulnerability of young people increased in regions such as the countries of Southern Europe, where seasonal work based on tourism is widespread (Avagianou et al. 2022).

The following **research questions** were raised in this study:

1) Did youth unemployment increase more than the older age group during the COVID-19 pandemic?
2) Did the number of NEETs rise during the COVID-19 pandemic?
3) Is there a convergence or divergence of the youth unemployment rate among the EU countries?

The following **research hypothesis** was put forward: the convergence of youth labour markets among European Union countries occurred in the second decade of the 21st century, but the COVID-19 pandemic crisis inhibited this convergence.

The main **research method** is the analysis of standard dispersion measures, i.e. standard deviation and coefficient of variation. Additionally, for the need of assessing the convergence of the youth labour market, gamma convergence was adopted. Generally, γ-convergence (gamma convergence) "occurs when countries change their positions in the ranking ordered in terms of some features" (Próchniak 2019: p. 228; Kotliński 2021: p. 696). "Gamma convergence (γ-convergence) is defined as the ranking concordance over time of per capita incomes within a group of countries (Siegel 1956; Boyle, McCarthy 1997)", but another indicator can also be used. "In other words, γ-convergence highlights

whether, and to what extent, the highest-unemployment and lowest-unemployment countries remain the same within a given country grouping over time" (Kotliński 2021: p. 696). The Kendall rank concordance coefficient can be used to verify the γ-convergence. hypothesis (Próchniak 2019: p. 228). Kendall's coefficient of concordance ranges from 0 (no agreement) to 1 (complete agreement). The value of 1 would indicate no changes in the ranking, and, thus, signal a permanent nature of the differences among the countries (either large or small); thereby indicating no γ-convergence. The occurrence of convergence is "signalled by a correlation coefficient amounting to 0. The lack of concordance of ranking also means that the initial ranking in terms of a given variable is different – random – from that in the final period under study" (Kusideł 2013: p. 70–71; qtd. in: Krupowicz 2020: p. 87).

The analysis covers the 2009–2021 period for 27 EU countries, Great Britain is excluded. The calculations were based on two indicators: the annual rate of unemployment time series and NEETs, obtained from Eurostat database. Both indicators are for the age group of 15-24 years old, which is the youngest segment of the labour force.

The existing studies focus on legal convergence and on the convergence of GDP per capita. There is a lack of research focusing on the convergence of youth labour markets. This study fills this gap.

Youth unemployment rate differentiation

"The main indicator of youth unemployment is the *youth unemployment rate* for the age group 15-24 [years old]. This uses the same standard definition as the *unemployment rate* for the working-age population. For a given age group, it is the number of those unemployed divided by the total number of people in the labour force (employed plus unemployed). [...] Given that not every young person is in the labour force, the youth unemployment rate does not reflect the proportion of young adults who are unemployed among all young people. [...] Young people outside the labour force are not included (or not taken into account) in this rate, they are neither in the numerator nor in the denominator." (Eurostat 2022).

Figure 1 demonstrates the average rate of unemployment for the age group less than 25 years old and its standard deviation in the 27 EU Member States. Looking at the graph, the average rate of youth unemployment increases after the financial crisis, and the standard deviation ascends too. The differentiation grew until 2013. Then the unemployment rate drops until 2019. The COVID-19 crisis is a turning point, when the average rate of youth unemployment peaked at 18.5%. However, the standard deviation of the youth rate of unemployment has been consistently declining since 2013.

The coefficient of variation, which is a relative measure, stayed almost the same between 2013 and 2019 (see: *Figure 2*). It decreased during the coronavirus crisis.

Figure 1: Average rate of unemployment (age 15-24 years old) and standard deviation.
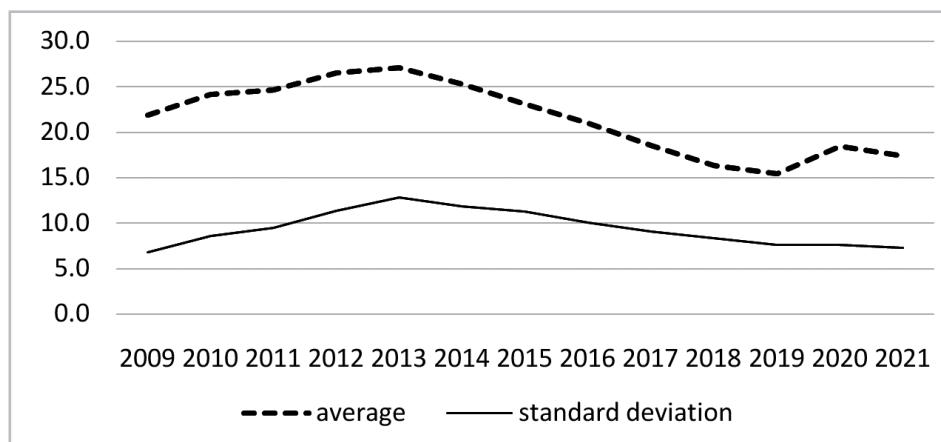
Source: author's own calculation based on Eurostat database.

Figure 2: Coefficient of variation of the unemployment rate (age 15-24 years old).
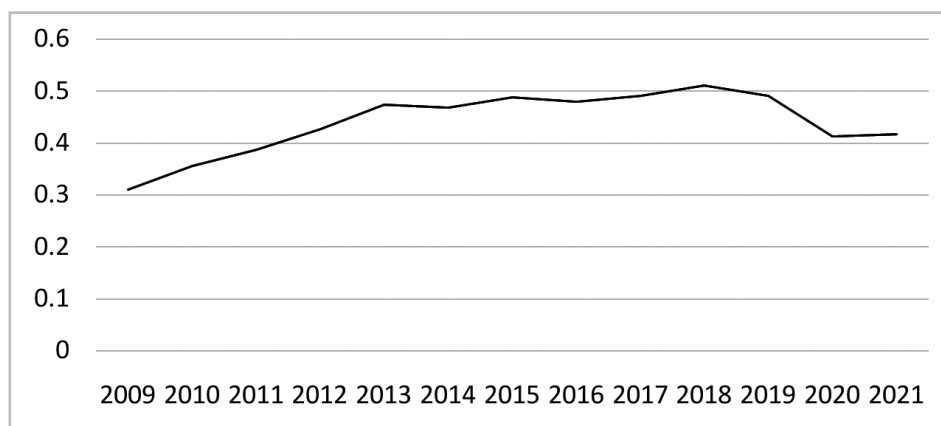
Source: author's own calculation based on Eurostat database.

The Kendall concordance coefficient stands at 0.477143, and it is significant with p-values less than 0.050000. The indicator should be assessed as a moderate γ-convergence.

Despite the moderate convergence of the unemployment rate for the youngest part of the labour force, the countries permanently high and permanently low in the ranking clearly stand out. *Table 1* presents 6 countries with the highest rate of youth unemployment and 6 states with the lowest rate. In the analysed period of 2009–2021, the countries with the highest youth unemployment rates were Spain, Greece and Italy. The youth labour markets in Germany, Denmark, Austria and the Netherlands have remained in the best situation.

Table 1: The highest and the lowest rate of unemployment by countries (age 15-24 years old).

Year	6 countries with the highest rate of youth unemployment	6 countries with the lowest rate of youth unemployment
2009	Spain (37.7%); Latvia (33.4%); Lithuania (29.6%); Slovakia (28.5%); Estonia (27,2%); Greece (26.1%)	Austria (11.3%); Netherlands (11.6%); Germany (11.9%); Denmark (13.5%); Slovenia (13.8%); Cyprus(13,8%)
2012	Greece (55.9%); Spain (52.9%); Croatia (42.1%); Portugal (38.1%); Slovakia (35.3%); Italy (35.3%)	Germany (8.6%); Austria (10%); Netherlands (12.9%); Malta (12.9%); Denmark (15.8%); Luxembourg (18.8%)
2015	Greece (50.3%); Spain (48.3%); Croatia (42.3%); Italy (40.3%); Cyprus (32.8%); Portugal (32%);	Germany (7.7%); Austria (11.3%); Malta (11.6%); Denmark (12.2%); Netherlands (12.5%); Czechia (12.6%)
2019	Greece (50.3%); Spain (32.5%); Italy (29.2%); Romania (21%); France (20.7%); Sweden (19.4%)	Czechia (5.6%); Germany (6.2%); Slovenia (8,1%); Netherlands (8.5%); Austria (9,1%); Malta (9.3%)
2020	Spain (38.3%); Greece (38%); Italy (29.8%); Sweden (23.5%); Luxembourg (23.2%); Portugal (22.5%)	Czechia (8%), Germany (8%); Netherlands (10.6%); Malta (10.9%); Poland (10.9%); Denmark (11.6%)
2021	Greece (35.5%); Spain (34.8%); Italy (29.7%); Sweden (24.7%); Portugal (23.4%); Croatia (21.9%)	Germany (6.9%); Czechia (8.2%); Netherlands (9.3%); Malta (9.6%); Denmark (10.8%); Austria (11%)

Source: Eurostat database.

Young people neither in employment nor in education or training – NEETs

"The indicator *young people neither in employment nor in education and training*, abbreviated as NEET, corresponds to the percentage of the population of a given age group and sex, who is not employed and not involved in further education or training. The numerator of the indicator refers to persons meeting these two conditions: they are not employed […] and they have not received any formal or non-formal education or training in the four weeks preceding the survey. The denominator is the total population of the same age group, excluding the respondents who have not answered the question about participation in regular (formal) education and training." (Eurostat 2019). Governments with EU help "have been very active in promoting policies for re-engaging young people into the labour market or education system" (Mascherini et al. 2012: p. 109; see also: Sándor et al. 2021). "However, questions remain regarding […] how well they perform in meeting their targets" (Mascherini et al. 2012: p. 109).

Figure 3 demonstrates an average NEETs ratio in the EU-27 during the period 2009–2021. The decline in the number of NEETs from 13% in 2009 to 9.6% in 2019 is a suc-

cess. Surprisingly, the increase during the pandemic was modest, and the rate of NEETs peaked at 10.3%. The standard deviation dropped slowly and steadily between 2013 and 2021. This convergence among the EU Members States is confirmed by the reading of the decreasing coefficient of variation since 2013 (see: *Figure 4*).

Figure 3: Average NEETs ratio in the EU-27.
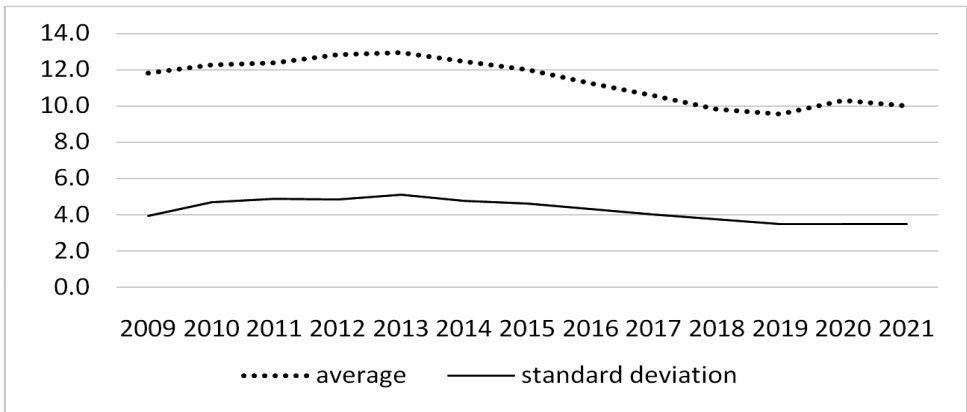
Source: author's own calculation based on Eurostat database.

Figure 4: Coefficient of variation of the NEETs among EU Member States.
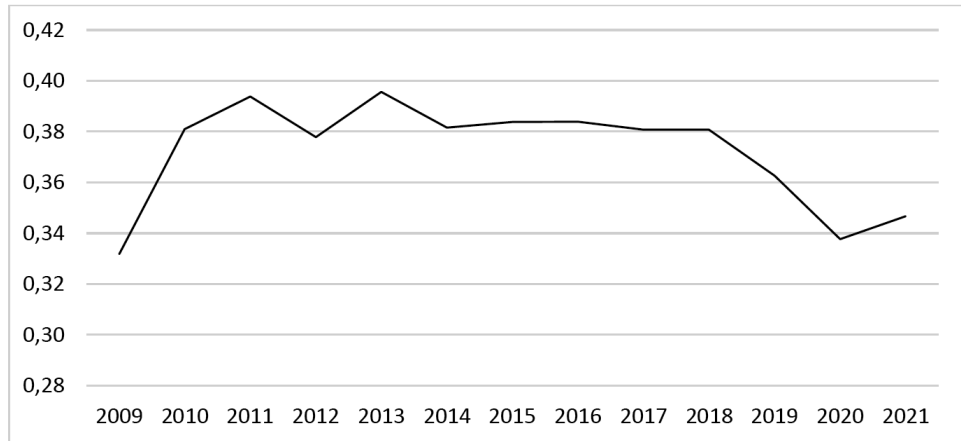
Source: author's own calculation based on Eurostat database.

The Kendall concordance coefficient between 2009 and 2021 time series stands at 0.406347, and it is statistically significant with p-values less than 0.050000. The indicator should be assessed as a moderate gamma (γ) convergence. Despite this, several countries face severe problems with high numbers of NEETs throughout the period under the conducted review. *Table 2* presents 6 Member States with the highest NEETs ratio and

6 countries with the lowest ratio. The countries with the highest NEETs are Bulgaria, Romania, Italy and Spain during the entire period of 2009-2021. In contrast are the countries with the lowest NEETs rate over the entire study period: the Netherlands, Luxembourg, Sweden, Denmark, and Czechia.

Table 2: The highest and the lowest NEETs ratio (age 15-24 years old).

Year	6 countries with the highest NEETs ratio	6 countries with the lowest NEETs ratio
2009	Bulgaria (19.3%); Italy (18.6%); Ireland (18.3%); Spain (37.7%); Latvia (17.5%); Romania (15.9%)	Luxembourg (5.8%); Netherlands (6.3%); Denmark (6.5%); Slovenia (6.8%); Czechia (8.5%) Austria (9%)
2012	Italy (22.1%); Bulgaria (21.2%); Romania (21.2%); Ireland (19.1%); Spain (18.6%); Greece (17.3%);	Luxembourg (5.9%); Netherlands (6.2%); Denmark (7.3%); Austria (7.4%); Sweden (7.5%) Finland (7.9%);
2015	Romania (22.8%); Italy (22.5%); Bulgaria (191%); Croatia (18,1%); Spain 15.6%.; Cyprus (15.3%)	Netherlands (6.%); Luxembourg (6.2%); Sweden (6.5%); Denmark (7%); Germany (7%); Czechia (7.5%)
2019	Italy (19%); Romania (18.4%); Cyprus (13.7); Bulgaria (13.6); Spain (12.1%); Croatia (11.8%)	Sweden (5.3%); Netherlands (5.5%); Luxembourg (5.6%); Czechia (5.7%); Slovenia (6.3%); Germany (6.4%)
2020	Italy (20%); Romania (18.4%); Cyprus (14.4%); Bulgaria (14.3%); Spain (13.9%); Croatia (12.2%)	Netherlands (5.8%); Sweden (6.2%); Luxembourg (6.5%); Czechia (6.6%); Slovenia (6.9%); (12.9%); Latvia (7.1%)
2021	Italy (19.8%); Romania (18%); Cyprus (12.8%); Croatia (12.7%); Lithuania (11.3%); Poland (11.2%)	Netherlands (5.1%); Sweden (5.1%); Czechia (6.5%); Slovenia (6.6%); Denmark (7.1%); Belgium (7.4%)

Source: Eurostat database.

For the 27 EU Member States, the Pearson's correlation coefficient between the percentage of NEETs in the population 15–24 years old and the unemployment rate of adolescents aged 15–24 years old is 0.685337 for data from the period 2009–2021. For one year in 2021, the data from the Pearson's correlation was only 0.421397. This should be assessed as a moderate dependency. It might be expected that the high unemployment rate and, hence, the poor employment opportunities, would have a demotivating effect on young people, so we expected a very high correlation between the NEETs rate and the unemployment rate. Such a significant decrease in this correlation during the recovery from the COVID-19 pandemic requires further research to explain this phenomenon.

Discussion

The implications of the COVID-19 pandemic also have their territorial dimension, which is very diverse (Conte et al. 2020). Meinen et al. (2021) suggest that "the propagation of the economic impact of COVID-19 across regions cannot be explained by the regional spread of infections only. Instead, a region's economic structure is a significant driver of the observed heterogeneity. [...] On the one hand, this may be related to shortfalls in demand for the local region's exports. [...] On the other hand, COVID-19 related shocks may have caused disruptions in inter-regional supply chains. [...] Regions relying on intermediate goods sourced from foreign suppliers heavily exposed to the pandemic have experienced a significantly larger increase in the number of employees in short-time work." (Meinen at al. 2021: p. 2). The economic impact varies greatly depending on the degree of regional involvement in global value chains and specialisation in specific sectors. The characteristics of the regional economy determine the final effects of COVID-19, e.g. the concentration of jobs in the tourism sector in the region will result in greater job losses (Dziembała, Kłos 2021: p. 84–86). The actions taken related to the lockdown resulted in the emergence of supply and demand shocks in the European economy. As a result of the lockdown, the mobility of people was reduced, which reduced the demand in the service sector. Factory closures, production downtime and employee absences had an impact on supply chains, including their interruption. Household spending decreased and uncertainty about the overall economic situation contributed to the postponement of purchases. Planned investments of companies have been limited or have been postponed. These unfavourable phenomena have been reflected in the economic performance of the EU, including the labour market.

"Until the outbreak of the COVID-19 pandemic, young people often saw migration to make their lives easier. They believed that thanks to leaving the country, they would improve their financial position and life prospects" (Kowalewska et al. 2021: p. 301, 2018: p. 541). "Emigration was associated with severe economic problems of the country, such as the high unemployment rate among young people (Cerdeira et al. 2016) or the economic crisis (Cairns 2017). [...] The increase in migration flows impacted the European integration processes and the resulting free movement of capital, goods, people, and services within the framework of the free market of the European Union" (Kowalewska et al. 2021: p. 292). At the same time, it was a factor contributing to the broadly understood convergence of the Member States. "The outbreak of the pandemic and the fear of an unknown threat changed the perception of one's mobility and approach to emigration. It is also a factor that negatively affected migration movements" (Kowalewska et al. 2021: p. 301).

For example, the character of Khaby Lame became a spectacular symbol of changes in the youth labour market. "In 2020, as the pandemic flipped the world on its head, a 20-year-old factory worker in Italy was made redundant. Fast forward 12 months and that same young man had amassed over 200 million followers across social media platforms." (Lundberg Toresson 2022). In this environment, gigantic recognition is followed by enormous money, and Khaby Lame has become a millionaire after only several months

of activity on social media. It ignites the imagination of young people all over the world. It is a new "American Dream" about the way of work, where young people want to make money by making satirical videos on *TikTok*, instead of working day and night in factories.

Conclusions

The EU cohesion policy is currently supporting employment and labour mobility. Linked to its contribution in the area of social inclusion, EU cohesion policy supports labour market reforms that promote equal opportunities for all, including young people. Despite many actions taken, the differentiation of youth labour markets among the Member States is still large.

Nevertheless, this study shows that the differentiation of the youth unemployment rate among the EU-27 countries is decreasing. The standard deviation has been decreasing since 2013, and the coefficient of variation has been significantly decreasing since 2018. Gamma convergence, understood as a situation where countries change their positions in the ranking according to the youth unemployment rate, occurs to a moderate degree. In the entire period under examination 2009–2021, the countries with the highest youth unemployment rates are: Greece, Spain and Italy. Invariably, the countries with the lowest youth unemployment rate include: Germany, Austria, Denmark and the Netherlands.

While across all countries the unemployment rate of young people has been typically higher than that of adults, the COVID-19 pandemic crisis hit young people extremely hard. On average in the EU, the unemployment rate in the age group under 24 years old increased by 4 percentage points, and in the total population over 25 years old it only increased by 0.9 percentage points.

Since 2014, the number of people aged 15-24 years old who are unemployed, not in education and not remaining on an internship (NEETs) has been gradually decreasing. This should be assessed as a joint success of the EU cohesion policy and the Member States. During the COVID-19 pandemic, this decline was halted. Invariably, the countries with the highest percentage of NEETs in the population aged 15-24 years old are: Italy, Bulgaria, Romania and Spain. Countries with the lowest percentage of NEETs are: Luxembourg, Sweden, Denmark, the Netherlands, and Czechia. The standard deviation of NEETs among EU Member States dropped slowly and steadily between 2013 and 2021. The coefficient of variation decreased, too. The gamma convergence should be assessed as moderate, but noticeable (the Kendall's concordance coefficient between 2009 and 2021 time series stand at 0.406347).

The research hypothesis was confirmed: the convergence of youth labour markets among the EU countries occurred in the second decade of the 21st century, but the COVID-19 pandemic crisis inhibited this convergence.

Pearson's correlation coefficient between the percentage of NEETs and the unemployment rate is 0.6853 for 2009–2021 and only 0.4214 for 2021, which should be assessed as a weak correlation. The relationship between the unemployment rate and the

proportion of young people not in employment, education or training decreased during the COVID-19 pandemic. The conclusion is that participants remaining as NEETs hardly depends on actual job opportunities.

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Cohesion policy and the EU's response to climate change challenges

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Abstract

The aim of this article is to analyse the role of European cohesion policy (ECP) in tackling the negative effects of climate change, and to answer the research question of whether a just transition towards climate neutrality is possible. The study comprised an analysis of data about ECP spending, literature review of relevant regulatory documents, studies and reports. The results of this research suggest that the issue of climate change mitigation has been placed among key priorities of ECP since 2014. This conclusion is supported by a comprehensive set of data. The results confirm that the EU funds constitute an important source of climate related investments in Poland. The design of ECP and its instruments, if used appropriately, can help to make the "green transition" more fair.

Keywords: European cohesion policy, climate change, low carbon economy

Polityka spójności i odpowiedź UE na wyzwania związane ze zmianą klimatu

Streszczenie

Celem artykułu jest analiza roli europejskiej polityki spójności w przeciwdziałaniu negatywnym skutkom zmian klimatu oraz próba odpowiedzi na pytanie badawcze, czy możliwe jest sprawiedliwe przejście w kierunku neutralności klimatycznej. Badanie obejmuje analizę danych dotyczących wydatków w ramach europejskiej polityki spójności, przegląd odpowiednich dokumentów regulacyjnych, studiów i raportów. Wyniki badania sugerują, że od 2014 r. kwestia łagodzenia skutków zmian klimatu znajduje się wśród kluczowych priorytetów polityki spójności UE. Wniosek ten jest poparty obszernym zestawem danych. Wyniki potwierdzają, że fundusze unijne stanowią ważne źródło inwestycji związanych z klimatem w Polsce. Zasady polityki spójności i jej instrumenty, jeśli zostaną odpowiednio wykorzystane, mogą przyczynić się do bardziej sprawiedliwej „zielonej transformacji".

Słowa kluczowe: Europejska polityka spójności, zmiany klimatu, gospodarka niskoemisyjna

There is widespread agreement that a joint, internationally coordinated response to the threat of climate change is needed. Taking into account the importance of combating climate change, the EU's institutions are setting ambitious targets, such as reducing greenhouse gas emissions "by at least 55% by 2030, and becoming the first carbon neutral continent by 2050" (Ciffolilli et al. 2011: p. 2). The European Union stresses the key role of cohesion policy in achieving these objectives, as well as the role of regional and local authorities in these processes. These policy measures are intended to help the Member States and regions to develop risk assessments and increase overall EU's efforts to adapt to climate change. Furthermore, they are intended to help ensure a fair transition for all territories and citizens, leaving no one behind. The EU's regional policy is particularly important for mobilisation of the potential of European regions to decouple growth from overuse of resources, and it can play a significant role in this process (Murzyn 2020). This is an essential topic both in the current debate about new challenges (such as climate change) and as a potential capacity to support environmental action.

The aim of this article is to analyse the role of European cohesion policy in counteracting the negative effects of climate change and to answer the research question of whether a just transition towards climate neutrality is possible. The **hypothesis** posed by the author of this article relies upon the statement that cohesion policy can help to ensure such transition.

The objectives of this study are:
1) to provide a summary overview of all climate related projects co-financed by the EU cohesion policy funds in Poland between 2014–2020;
2) to define the share of projects devoted to climate change mitigation among all cohesion policy projects;
3) to assess the total value of the EU's contribution to climate change related investments in comparison to national public funds (central government budget).

Materials and methods

The study included the analysis of data about cohesion policy expenditure, literature review of relevant regulatory documents, studies and reports, over the 2014–2020 programming period. The research includes the analysis of primary sources (desk research), such as EU legislation and policy documents. Data about projects co-financed by the EU cohesion policy has been retrieved from the *Kohesio* project database (maintained by the European Commission) in April 2022. The data covers all projects implemented within the financial perspective 2014–2020. The classification of a project as "climate-related" was done according to the type of specific priority/task, under which the project was implemented (i.e. thematic objectives: climate change adaptation and risk prevention, low-carbon economy, environment protection and resource efficiency). For each project, the following information was retrieved: project duration (years), total value of the project,

value of the EU's contribution, name of beneficiary, overview of the project. The analysis was carried out for 27 Member States of the European Union.

Moreover, the total value of the EU contribution to environment and climate change related investments was compared with public budget spending on the same purposes in Poland (Poland is the biggest beneficiary of EU cohesion policy and therefore can be a "laboratory" for further analysis). The budgetary data was retrieved from the Polish Ministry of Finance's website in April 2022. The analysis timeframe was 2014–2020.

Research results

Climate change related issues
in European cohesion policy 2014–2020

In implementing its policies, the European Union is looking for effective ways to make the European economy more climate-friendly and less energy-intensive. This is in line with the principle of sustainable development embedded in the Treaty on European Union (TEU: art 3). Sustainable development is an overarching objective of the European Union, to ensure economic growth, the well-being of the Union's citizens, and a higher quality of life for present and future generations (Murzyn 2018). Sustainable development goals are most often reduced to three categories: environmental, economic and social (socio-cultural). At the same time, the indicated objectives should be integrated, i.e. the measures taken should contribute to the achievement of all the objectives at the same time, and should be implemented taking into account strong interdependencies.

When analysing various definitions of sustainable development in the scientific literature, it is clear that the concept is imbued with multiple goals and components, complex interdependencies and a moral burden. Gladwin, Kennelly and Krause (1995) identify five principles of sustainable development: *inclusiveness, connectivity*, *prudence*, *equity* and *security*. When analysing these characteristics, we can see their particular relationship with climate change challenges. "*Inclusiveness* implies human development over time and space". *Connectivity* includes "ecological, social and economic interdependence". *Equity* suggests "intergenerational, intra-generational and interspecies fairness". *Prudence* means "duties of care and prevention: scientifically, technologically, and politically". *Security* requires protection from long-lasting threats and harmful disruptions (and climate change as such threat). (Gladwin et al. 1995: p. 878, qtd. in: Ricart et al. 2004: p. 4).

Sustainable development was one of the priorities of *Europe 2020* – the European Union's long-term socio-economic development strategy for the period 2010–2020. In this document, *sustainable growth* was understood as growth that promotes a more resource-efficient economy, which should be greener and more competitive (European Commission 2010). With *growth* defined in this way, eco-efficiency is important; it can be interpreted as the relationship between the economic cost or value creation and

the added environmental impact (Huppes, Ishikawa 2005). Such development is also associated with the idea of the transition to low-carbon economy. "Carbon intensive fuels generate a significant negative externality which is quite relevant for climate change mitigation policy" (Nyambuu, Semmler 2020).

In order to achieve the objectives of the strategy *Europe 2020*, the European Union has aligned its budget to it. Cohesion policy was the most important investment policy of the EU in this respect. Cohesion policy priorities include promoting environmental technologies, sustainable transport and energy systems, as well as investment projects that improve water, air and soil quality, and tackle climate change. Since the 2000–2006 period, cohesion policy has increasingly integrated environmental aspects into its framework, which has become particularly evident in the 2014–2020 period.

European cohesion policy has set 11 thematic objectives for 2014–2020, three of which are related to climate change issues: supporting the shift towards a low-carbon economy; promoting climate change adaptation, risk prevention and management; preserving and protecting the environment and promoting resource efficiency (Regulation (EU) 1303/2013: art. 9). The European Regional Development Fund's investment was concentrated on four key priorities (so-called "thematic concentration"): (1) research and innovation, (2) the digital agenda, (3) support for small and medium-sized enterprises, and (4) the low-carbon economy. Each region, depending on the category of region, had to allocate an appropriate percentage of its allocation to these objectives – less developed: 50%, in transition: 60% and more developed: 80% (Regulation (EU) 1301/2013: art. 4; see also: Murzyn 2018: p. 38). Moreover, a part of the ERDF funds had to be specifically directed to low-carbon projects (less developed regions – 12%, transition regions – 15%, and more developed regions – 20%). Funding for cohesion policy in the 2014–2020 period amounts to EUR 351.8 billion, from which approximately EUR 56.5 billion were assigned for climate action, 15.9% of total planned cohesion policy funds (Ciffolilli et al. 2021: p. 2; see also: Murzyn 2018: p. 39). This should help the Member States and their regions to make much-needed investments in renewable energy, energy efficiency in buildings, sustainable urban transport, as well as in research and innovation in these areas.

General overview of climate related projects co-financed by EU cohesion policy funds between 2014–2020

Under the financial perspective of 2014–2020, more than 11000 projects in the area of "climate change adaptation and risk prevention" were implemented in the EU, with a total value of EUR 10.7 billion, including EU contributions of EUR 6.9 billion (64.5%). This is approximately 2% of cohesion policy resources for the whole period. The distribution of funds for climate actions varies across the EU Member States. The situation in individual countries is presented in the *Figure 1*.

Figure 1: Number of projects, EU's contribution (left-hand side on axis) and percentage of country cohesion policy allocation (right-hand side axis) in the area of "climate change adaptation and risk prevention" in the EU.[1]
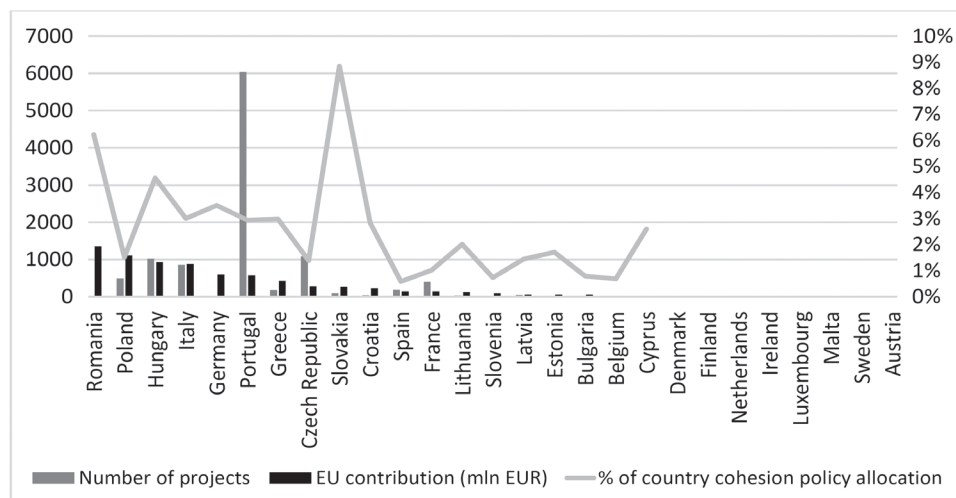
Source: own elaboration based on data retrieved from https://kohesio.ec.europa.eu (15.04.2022).

Portugal was the country with the highest number of projects in this area (over 6 thousands, of which over 4,5 thousands in Madeira region); Romania spent the most EU's money (in nominal terms) – EUR 1.36 billion; and Slovakia allocated the highest percentage of its cohesion policy allocation – 9%. In Poland, 493 projects with a total value of EUR 1.5 billion were implemented between 2014 and 2020, of which EUR 1.1 billion was the EU's contribution. Several countries did not implement any projects in this area.

Significantly more projects, and of higher value, were implemented in the area of "low-carbon economy". More than 60 thousands projects were implemented with EU's co-financing of almost EUR 36.5 billion,. Poland was the country with the most cohesion policy funds spent on this objective (over EUR 9.6 billion, 13.2% of country allocation), with over 8.7 thousands projects. Slovakia has again allocated the largest share of its cohesion policy funding (38.8%) to this objective (see: *Figure 2*).

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[1]   Countries have been sorted according to the size of the EU's co-financing for the projects.

Figure 2: Number of projects, EU's contribution (left-hand side on axis) and percen-tage of country cohesion policy allocation (right-hand side axis) in the area of "low--carbon economy" in the EU.[2]
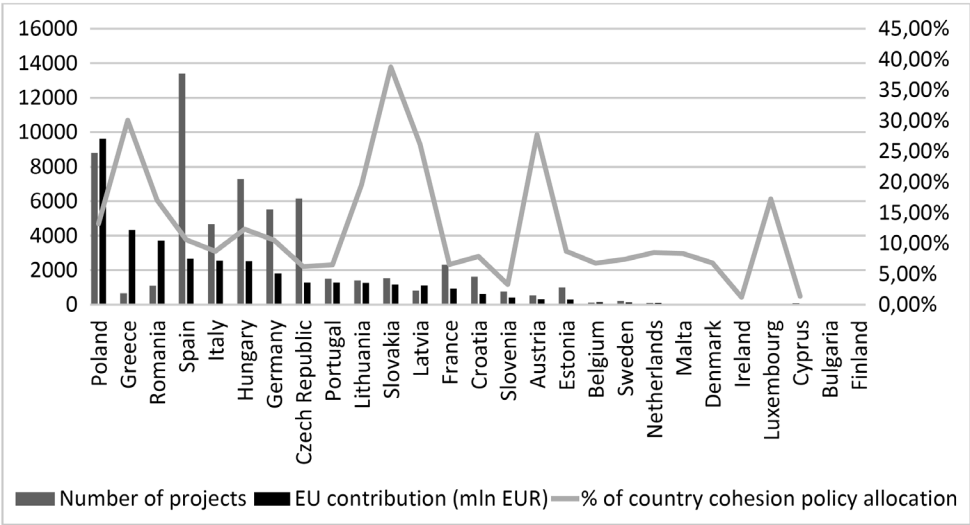
Source: own elaboration based on data retrieved from https://kohesio.ec.europa.eu (15.04.2022).

In the framework of the policy objective "greener, carbon-free Europe", over 34 thousand projects were also implemented in the category "environment protection & resource efficiency", with over EUR 35.9 billion of EU contribution. Slovakia has again allocated the largest share of its cohesion policy funds (40.4%) to this objective, while Romania spent the most EU money on it in nominal terms (over EUR 6 billion) (see: *Figure 3*).

The funds actually spent on climate related projects were even higher than planned. Particularly large amounts of cohesion policy resources have been committed to these objectives in central and eastern European countries. On the one hand, this is due to the fact that these countries are the biggest beneficiaries of the cohesion policy, but on the other hand, it means that the support from this policy can be a significant source of funding for public investment in the area of adapting to climate change in these countries.

[2] In the case of Bulgaria, it was not possible to distinguish projects implemented in this area due to their assignment to different categories at the same time.

Figure 3: Number of projects, EU contribution (left-hand side on axis) and percentage of country cohesion policy allocation (right-hand side axis) in the area of "environment protection & resource efficiency".
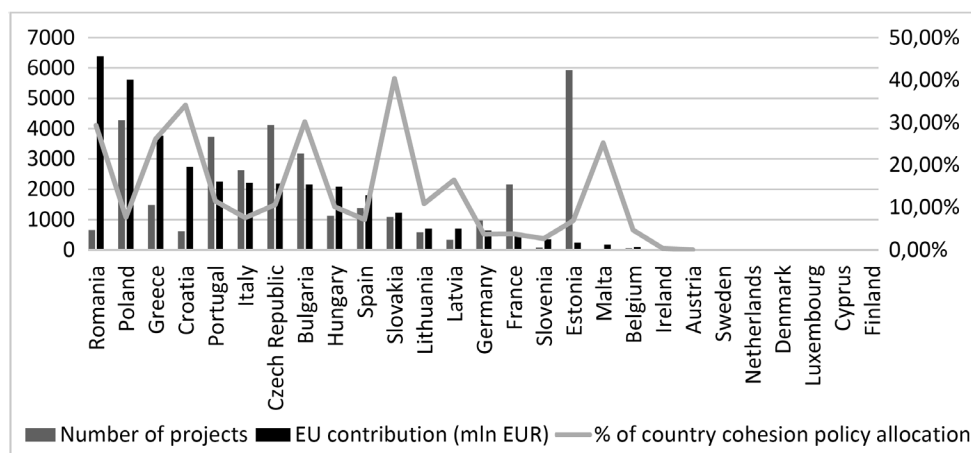
Source: own elaboration based on data retrieved from https://kohesio.ec.europa.eu (15.04.2022).

To see how large these expenditures are compared to national public expenditure on environment and climate change related investments, Poland was taken as an example. Poland is the largest beneficiary of cohesion policy funds among the Member States. For the period 2014–2020, Poland has been allocated approximately EUR 77.6 billion (in current prices), which is more than 20% of all cohesion policy funds (Murzyn 2020). Central government devotes a relatively small share of its total budget to environment – 1.05% (the average between 2014 and 2020). Environmental and water protection and management issues fall under this category, including measures concerning the waste management system, treatment plants and sewerage systems, biodiversity-oriented measures, air protection and the fight against climate change, water protection, water resources management. On average, the expenditures on air protection and tackling climate change constitute only approximately 1.67% of the total environmental expenditures. The share of European funds in co-financing environmental policy is very high – 58.67% on average, in the case of spending for air protection and tackling climate change even higher – 64.32% (in 2016 and 2017 – over 80%) (see: *Table 1*).

This is information of the state budget only, at the local government level the percentage may be even higher. Cohesion policy funds are therefore the main source of funding for investments related to combating climate change and the low-carbon economy in Poland. Such significant resources have also mobilised regional authorities towards low-carbon activities. The best example are municipalities' plans in low-carbon economy. Although there was no statutory obligation to create such plans, most Polish municipalities have prepared them. "Even if the quality of these plans varies, they still are an important precondition for building low-carbon economy and improving the air quality in Poland" (Murzyn 2018: p. 46).

Table 1: Central budget environmental expenditures between 2014 and 2020 in Poland, million PLN.

Year	(0) Total budget	(1) Including European funds budget	(2) Including Budget for Environment	(3) Incl. Budget for air protection and tackling climate change	(4) European funds budget for Environment	(5) European funds budget for air protection and tackling climate change	Share (%) Share of (1) in (0)	Share of (2) in (0)	Share of (3) in (2)	Share of (4) in (2)	Share of (5) in (3)
2014	380 925.18	68 405.66	6 039.44	11.74	4 286.70	0	17.96	1.59	0.19	70.98	0
2015	399 438.88	67 695.45	6 340.83	13.82	4 455.21	0	16.95	1.59	0.22	70.26	0
2016	412 543.84	51 700.72	3 274.81	176.34	1 460.34	141.34	12.53	0.79	5.38	44.59	80.15
2017	423 770.67	48 002.22	2 731.70	245.72	1 037.46	207.24	11.33	0.64	9.00	37.98	84.34
2018	457 307.13	66 852.78	4 244.56	49.22	2 212.41	4.75	14.62	0.93	1.16	52.12	9.65
2019	485 179.61	70 906.60	5 278.36	24.47	2 830.14	0	14.61	1.09	0.46	53.62	0
2020	585 586.59	80 809.98	4 999.94	27.99	3 026.46	0	13.80	0.85	0.56	60.53	0
SUM	**3 144 751.90**	**454 373.41**	**32 909.64**	**549.30**	**19 308.72**	**353.33**	**14.45**	**1.05**	**1.67**	**58.67**	**64.32**

Source: author's own elaboration based on Polish Ministry of Finance's data, https://www.gov.pl/web/finanse/budzet-panstwa (15.04.2022).

It is worth looking at the breakdown of cohesion policy funds by expenditure category (see: *Table 2*). Most projects were implemented in the area of energy efficiency renovation of public infrastructure, demonstration projects and supporting measures – 2948; a large number of projects also concerned solar energy – 2464. In terms of the value of the EU's contribution, the most resources were committed in the area of clean urban transport infrastructure and promotion (including equipment and rolling stock) – over EUR 4.1 billion, and waste water treatment – over EUR 2.6 billion.

Table 2: Cohesion policy expenditure in Poland in the area of "greener, carbon-free Europe" broken down by specific expenditure categories.

Thematic objective / Category	Number of projects	Total expenditure (mln EUR)	EU contribution (mln EUR)
Climate Change Adaptation & Risk Prevention:	**493**	**1 524.85**	**1 108.70**
Adaptation to climate change measures and prevention and management of climate related risks e.g. erosion, fires, flooding, storms and drought, including awareness raising, civil protection and disaster management systems and infrastructures	468	1 433.04	1 032.85
Risk prevention and management of non-climate related natural risks (i.e. earthquakes) and risks linked to human activities (e.g. technological accidents), including awareness raising, civil protection and disaster management systems and infrastructures	25	91.81	75.84
Low carbon economy:	**8 790**	**13 240.65**	**9 619.38**
Clean urban transport infrastructure and promotion (including equipment and rolling stock)	532	5 738.27	4 132.94

Cycle tracks and footpaths	347	565.40	430.28
Electricity (storage and transmission)	118	700.18	592.13
Energy efficiency and demonstration projects in SMEs and supporting measures	646	283.94	209.00
Energy efficiency renovation of existing housing stock, demonstration projects and supporting measures	683	552.10	429.80
Energy efficiency renovation of public infrastructure, demonstration projects and supporting measures	2 948	2 409.83	1 943.12
High efficiency co-generation and district heating	416	1 159.19	587.36
Intelligent Energy Distribution Systems at medium and low voltage levels (including smart grids and ICT systems)	32	141.58	104.54
Promotion of energy efficiency in large enterprises	21	57.24	42.46
Support to environmentally-friendly production processes and resource efficiency in SMEs	346	108.47	58.61
Renewable energy: biomass	64	98.27	52.47
Renewable energy: solar	2 464	1 291.81	954.96
Renewable energy: wind	11	22.93	12.59
Other renewable energy (including hydroelectric, geothermal and marine energy) and renewable energy integration (including storage, power to gas and renewable hydrogen infrastructure)	162	111.43	69.10
Environment Protection & Resource Efficiency:	**4 278**	**7 065.65**	**5 614.27**
Air quality measures	459	505.03	344.86
Commercial, industrial or hazardous waste management	129	42.55	32.58
Household waste management (including minimisation, sorting, recycling measures)	373	273.63	224.92
Household waste management (including mechanical biological treatment, thermal treatment, incineration and landfill measures)	52	343.64	248.14
Waste water treatment	983	3 153.93	2 605.49
Water management and drinking water conservation (including river basin management, water supply, specific climate change adaptation measures, district and consumer metering, charging systems and leak reduction)	13	54.49	46.00
Provision of water for human consumption (extraction, treatment, storage and distribution infrastructure)	197	120.83	92.62
Development and promotion of public cultural and heritage services	118	124.93	92.50
Development and promotion of public tourism services	71	99.32	76.39
Development and promotion of the tourism potential of natural areas	88	75.39	57.49
Protection and enhancement of biodiversity, nature protection and green infrastructure	632	623.34	516.08
Protection, development and promotion of public cultural and heritage assets	863	1 250.67	978.46
Protection, development and promotion of public tourism assets	207	187.44	135.98
Protection, restoration and sustainable use of Natura 2000 sites	50	48.99	41.64
Rehabilitation of industrial sites and contaminated land	43	161.47	121.12
TOTAL	**27 122**	**43 662.29**	**32 684.67**

Source: author's own elaboration based on data retrieved from https://kohesio.ec.europa.eu (15.04.2022).

Climate change related issues in EU cohesion policy 2021–2027

Responding to the challenges related to environmental degradation and global warming, the European Union has developed an action plan – the *European Green Deal* (see: European Commission 2019). Its aim is "to help transform the EU into a modern, resource-efficient and competitive economy that to achieve zero net greenhouse gas emissions by 2050" (Ślimko et al. 2021: p. 4). The aims of the *European Green Deal* are the following: to increase resource efficiency through a transition to a clean, circular economy and to tackle climate change, reverse biodiversity loss and reduce pollution. It outlines the necessary investments and available financing tools "and explains how to ensure a just and inclusive transition" (*The European Green Deal*… 2020).

The entire EU financial system has been adapted to finance green transition objectives, including the Union's most important investment policy – the cohesion policy. The EU cohesion policy has five policy objectives in 2021–2027:

1) "a more competitive and smarter Europe by promoting innovative and smart economic transformation and regional ICT connectivity;
2) a greener, low-carbon transitioning towards a net zero carbon economy and resilient Europe by promoting clean and fair energy transition, green and blue investment, the circular economy, climate change mitigation and adaptation, risk prevention and management, and sustainable urban mobility;
3) a more connected Europe by enhancing mobility;
4) a more social and inclusive Europe implementing the European Pillar of Social Rights;
5) a Europe closer to citizens by fostering the sustainable and integrated development of all types of territories and local initiatives" (Regulation (EU) 2021/1060: art. 5).

The first two of these objectives are the subject of the thematic concentration under the European Regional Development Fund (ERDF). All regions and Member States should concentrate at least 30% of their allocation to policy objective related to green and low-carbon transition (Regulation (EU) 2021/1058: art. 4). Therefore, ERDF should "contribute to strengthen economic and social cohesion in the European Union by correcting imbalances between its regions, while delivering on the Union's political priorities through thematic concentration of resources" (European Commission 2021). Moreover, the Member States and the Commission shall regularly monitor respect of the climate contribution targets.

Climate change issues have been included in EU cohesion policy for years (Thoidou 2013), but in the last programming period they were given even greater importance and financial allocation. "In 2021–2027, the amount planned for climate change is expected to increase to at least EUR 77.2 billion" (or 83.7 billion, if REACT-EU is considered – a component of *Next Generation EU*, which tops up ERDF and ESF until 2023). "This is roughly 25% of total Cohesion Policy, a significantly higher share than previously, which should ensure a stronger contribution to the delivery of climate policy outcomes" (Ciffolilli et al. 2021: p. 2).

"The unevenness and unpredictability of how climate change will impact any specific community means there is no top-down, one-size-fits-all recipe for preparedness. Instead, community resilience depends on residents' active involvement in building capacity to collectively and creatively respond to adversity" (Phadke et al. 2015: p. 63; see also: Moser, Boykoff 2013). The same can be applied to the green transformation process. Cohesion policy has been supporting regions in a more difficult socio-economic situation for years. Since 2009, it has also had a strong territorial focus (place-based policy), with an approach based on the concept of supporting specific territories and assisting the areas concerned according to their specific characteristics and needs (Barca 2009). Moreover, the *European Green Deal* assumes that no region will be left without support in the process of green transformation. These are, particularly, coal areas, where communities will be most affected by the process of moving away from coal. This is to be achieved through the Mechanism for Fair Transition, thanks to which the most affected regions in Europe are to receive at least EUR 65–75 billion in the years 2021–2027. One of the pillars of this mechanism is the new Just Transition Fund, which completes the set of cohesion policy funds, with an overall budget of EUR 19.2 billion. Its aim is to mitigate the social and economic costs of the transition to a climate-neutral economy, through a wide range of measures mainly aimed "at diversifying the economic activity and helping people adapt in a changing labour market" (European Commission 2021). In order to unlock and implement its resources, EU Member States must "prepare strategic Territorial Just Transition Plans (TJTP) – identifying the eligible territories that are expected to be the most negatively impacted by the climate transition" (European Commission 2021).

Conclusions and discussion

The European Union started the transition to a low-carbon and resource-efficient economy already in 2014–2020 by allocating cohesion policy funds for this purpose. The *European Green Deal* launches a new phase of green and digital transformation and mobilises even more funding, not only for 2021–2027, but planning a perspective to 2030 and 2050. The results of this research suggest that the issue of climate change mitigation has been placed among key priorities of cohesion policy since the past programming period (2014–2020). This conclusion is supported by a comprehensive set of data on thematic concentration. Moreover, the contribution of cohesion policy to the *Green Deal* can have an important catalytic effect, particularly in those Member States, where it is a major source of public investment.

This study provides an overview of how EU cohesion policy currently contributes and can contribute in the future to the attainment of the goals of EU climate policy. Achieving climate targets is a major challenge, and it involves huge efforts by all Member States. Cohesion policy, as the EU's main investment policy, is one of the most important tools in achieving the EU's goals. It allows the Member States and regions to use European funds to combat climate change; this involves both large projects and innovative local solutions. Cohesion policy can therefore make a significant contribution to achieving the EU's climate priorities.

The research also assesses the cohesion policy's role in financing climate-related projects in Poland since 2014. Between 2014 and 2020, more than 27 thousands climate related projects were implemented, with a total value of EUR 43.7 billion, including EU's contribution of EUR 32.7 billion. Although projects focused on energy efficiency and renewable energy prevailed in terms of their total number, the infrastructural projects (clean urban transport and waste water treatment) consumed the vast majority of funds. The research results confirm that the EU cohesion policy funds constitute an important source of environmental investments in Poland. In the analysed period, the total value of European funds' contribution was higher than the total capital expenditure from central national budget, and the share of EU funds in co-financing environmental policy was 58.67% on average, in the case of spending for air protection and tackling climate change even higher – 64.32%. The role of cohesion policy in climate action is essential.

Poland's transition from coal-based production to a renewable-oriented society is particularly challenging. It faces a particular challenge in reducing CO_2 emissions due to its dependence on domestic coal resources. Moreover, despite the progress made over the past two decades, Poland's economy remains twice as energy-intensive as the EU average. However, climate change is not only a threat, but also an opportunity to do some green modernisation and develop a more low-carbon economy. EU cohesion policy contributes to wider EU's objectives also through leveraging public and private investment. The EU climate and energy policy can be an important step towards modernising the energy sector in Poland, but the transformation should be fair. A just transition also means implementing strong economic policies to develop and diversify regional economies that have historically relied on fossil fuels for growth and employment. The investments supported by cohesion policy requires conjunction and cooperation from different financial instruments and sources as well as the implementation of non-economic policies (regulation, partnership, etc.).

There are several limitations to be noted. First of all, the statistics concerning the number and value of projects should be treated with caution. Estimates relating to the value of total capital investment include only EU cohesion policy funds and public budgets. Thus, private sources are omitted, as well as other external sources, such as the *European Economic Area Financial Mechanism* and the *Norwegian Financial Mechanism* (so-called Norway Grants), the Swiss-Polish Cooperation Programme and capital investments made under EU's research and innovation programmes such as *Horizon 2020*. Consequently, the results provide rough estimates rather than exact calculations, and they are focused on a limited number of external sources of climate-related investment funding. In addition, the 2014–2020 programmes are still in progress, and proper conclusions can only be drawn when they have been completed (after 2023). Due to this peculiarity, further cases of climate-related implementations in both Poland and other EU Member States should be investigated before abandoning the level of speculation.

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HISTORY, CULTURE AND SOCIETY IN EUROPE

The impact of the jurisprudence of the International Criminal Tribunal for the former Yugoslavia on the development of the commander's individual liability under international criminal law[1]

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Abstract

The issue of military command is an issue, which under the rules of international criminal law involves numerous issues, related to the regime of commander liability. Since the Nuremberg Tribunal, the issue of *superior responsibility* has undergone extensive changes. The article presents the influence of the jurisprudence of the Yugoslav Tribunal on the formation of regulations on military command. This is because it was the first international court that had to face this issue. The International Criminal Court built on its experience, clarified the concept of commander's liability and supplemented it with new components.

Keywords: military order, army, commander, International Criminal Tribunal for the former Yugoslavia, international criminal law, criminal liability.

Wpływ orzecznictwa Międzynarodowego Trybunału Karnego dla byłej Jugosławii na rozwój koncepcji odpowiedzialności dowódcy na podstawie międzynarodowego prawa karnego

Streszczenie

Problematyka rozkazu wojskowego jest zagadnieniem, które na gruncie przepisów międzynarodowego prawa karnego wiąże się z szeregiem licznych zagadnień, powiązanych z reżimem odpowiedzialności dowódcy. Od czasu Trybunału Norymberskiego problematyka *superior responsibility* została poddana szerokim zmianom. W artykule zaprezentowano wpływ orzecznictwa Trybunału Jugosłowiańskiego na ukształtowanie się uregulowań dotyczących rozkazu wojskowego. Był to bowiem pierwszy międzynarodowy sąd, któremu przyszło się zmierzyć z tą problematyką. Na jego doświadczeniach bazował Międzynarodowy Trybunał Karny, który doprecyzował koncepcję odpowiedzialności dowódcy i uzupełnił ją o nowe komponenty.

Słowa kluczowe: rozkaz wojskowy, wojsko, dowódca, Międzynarodowy Trybunał Karny ds. byłej Jugosławii, międzynarodowe prawo karne, odpowiedzialność karna.

One of the most important issues of international criminal law is the principle of individual criminal liability, according to which those who commit international crimes are personally liable for them, regardless of their position or function.

One of the most interesting issues in this matter remains the problem of the military order, the origins of which date back as far as the 15th century (see: International Criminal Tribunal for the former Yugoslavia 2003). As an example, we can cite the provisions of the French Criminal Code of 1439, in which it was indicated that according to the king's order – every captain and lieutenant is to be held liable for abuses and misdemeanors committed by members of his company, and in the event of receiving a complaint about such abuse, he is obliged to punish the perpetrator (Cryer et. al 2010: p. 387).

This text provides an opportunity for a discussion on how the path to the formation of the commander's liability provisions under international criminal law looked like.

The aim of this article is to analyse the influence of International Criminal Tribunal for the former Yugoslavia (ICTY) jurisprudence on the formation of the legal framework, concerning the issue of military command, and to answer the question: what is the basis of the commander's liability and whether the regime of this liability is also subject to the so-called non-military superiors, as well as whether the commander can be held liable, for the actions of subordinates whom he does not know personally?

The author uses the dogmatic-legal method for analysis of the legal provisions contained in the statute of the ICTY, as well as their impact on the formation of aspects of criminal liability of the commander and superior in the international context.

1. The first legal regulations on the commander's liability

The doctrine of commander's liability was overlooked for a long time under the rules of international criminal law. The seeds of the modern concept of this liability can be found in the *Report of the Commission on the Responsibility of the Authors of the [First World] War*

and on enforcement of Penalties, which stated that superiors could be held criminally liable, for crimes committed by their subordinates (see: Report 1919). This document became the basis for the creation of lists of individuals who were to answer to German courts for crimes committed during the First World War. The atrocities that occurred at that time shocked public opinion and brought the issue of punishing war criminals back into the public discourse. In the Leipzig trials, military commanders were held criminally liable for crimes committed by their subordinates (Bantekas, Nash 2003). However, after the Second World War, International Military Tribunal in the area of *superior liability* did not introduce new solutions. However, in the text of the Nuremberg Judgment we can find annotations referring to these issues (see: International Military Tribunal... 1946).

In the Geneva Conventions of 1949, there is no clear indication of the liability of the commanders. The wording of Article 49 of the Geneva Conventions of 12 August 1949 regarding the protection of victims of war indicates: "The High Contracting Parties undertake to enact the necessary legislation to establish appropriate criminal sanctions against those who have committed or ordered the commission of any of the grave violations of this Convention specified in the following article. Each Contracting Party shall be obliged to seek out persons suspected of having committed or ordered the commission of any of these grave violations and should prosecute them before its own courts without regard to nationality..." (see: Konwencje 1956/171: Article 49). Instead, detailed regulations were found in the 1977 Additional Protocols to the Geneva Conventions (see: Protocol Additional I, 1977; Protocol Additional II, 1977). According to Article 86(2): "The fact that a breach of the Conventions or of this Protocol was committed by a subordinate does not absolve his superiors from penal or disciplinary responsibility, as the case may be, if they knew, or had information which should have enabled them to conclude in the circumstances at the time, that he was committing or was going to commit such a breach and if they did not take all feasible measures within their power to prevent or repress the breach." (Protocol Additional I 1977: Article 86(2)). The duties of commanders are set forth in the wording of the provision of Article 87, in which it is indicated that superiors have the duty "to prevent and, where necessary, to suppress and report to the competent authorities" – violations that have been committed by their subordinates (Protocol Additional I, 1977: Article 87(1)).

2. Nature of the commander's liability

The issue of the earlier lack of explicit regulation of the commander's liability was dictated by the high degree of complexity of such cases and the close relationship between the subordinate and the superior. In the early days, the commander's liability was treated as some form of incitement or aiding and abetting in the commission of crimes by direct perpetrators. Superiors were held criminally liable for the support they provided to their subordinates or for their participation in international crimes.

In the course of time, however, there has been an inclination to distinguish the commander's independent liability. In this regard, M. Damaška noted that in military jargon

"command" is a kind of term – an umbrella, under which various models of individual criminal liability are hidden (Damaška 2001: p. 455). At the same time, the commander's liability is supported by the numerous "privileges, honors and responsibilities that command entails" (Cryer et.al. 2010: p. 387). His role may come down to initiation and execution of the intent to commit an international crime. Primary tasks include: making decisions on behalf of the collective, identifying the goals of the collective, as well as creating a management structure and enforcing certain ways of functioning of the organised body. This is a kind of qualified liability, as the commander is liable not only for his own acts, but also for the acts or omissions of those he commands. The justification for his overriding liability in this regard is to ensure compliance with the norms of international humanitarian law.

3. Commander's liability in ICTY jurisprudence

A new perspective on commander's liability has been proposed in the statutes of *ad hoc* criminal tribunals. The pioneer in this regard was the Yugoslav Tribunal (see: Statute 1993). Judges adjudicating in this tribunal had to face many aspects of criminal liability related to acting on orders. At the same time, a number of cases heard under the jurisdiction of this tribunal were not reflected in the provisions of international criminal law, hence the great difficulty associated with the formation of the framework of the commander's liability regime.

A key item in these considerations is the provision of Article 7(3) of the ICTY Statute, according to which the fact that any act listed in Articles 2-5 of the Statute was committed by a subordinate does not relieve a superior from criminal liability if he knew or should have known that the subordinate intended to commit such an act or committed it, and the superior did not take the necessary and reasonable measures to prevent such act or to punish its perpetrator (Statute 1993: Article 7(3); see also: Judgement of the International Criminal Tribunal 1998).

The issue of the commander's liability regime was first considered by the ICTY in the case of *Mucić et al.* (Judgement of the International Criminal Tribunal 1998). At the time, the Tribunal emphasised that holding military commanders and other persons in positions of authority criminally liable is a well-established norm of customary and treaty international law, whereby a commander's liability may result from direct actions or may take the form of indirect prescriptive liability (culpable omission). The basis for a commander's criminal liability here is his initial act or culpable negligence. Thus, a superior is liable for his orders to commit crimes, as well as for failing to take measures that would have prevented criminal acts committed by subordinates or for failing to stop them from such actions (Judgement of the International Criminal Tribunal 1998: item 333). In this ruling, the ICTY clearly emphasised the dual nature of the liability of the commander on whom the duty to prevent and punish subordinates for crimes committed by them rests, and failure to carry out such actions is sanctioned by the imposition of individual criminal liability on the superior officer.

3.1. Civilian superiors vs. military commanders

At this item, the question arises: will only military officers be tried under this regime, or does this liability extend to civilian superiors as well? In the case of the war in the former Yugoslavia, this issue seems particularly pertinent given the strong militarisation of Yugoslav society, the breakdown of state structures and the lack of precise definition of control and leadership formations at that time (Judgement of the International Criminal Tribunal 1998: item 434). In considering this issue, the ICTY stated that the responsibilities of military commanders or those resulting from the fulfillment of military orders were not subject to limitation (Judgement of the International Criminal Tribunal 1998: item 424). As a result, the lack of existence of formal structures of a superior nature should not result in the exclusion of such liability. Moreover, in determining the question of a commander's liability, attention should be paid to the effective exercise of authority or control, not formal titles (Judgement of the International Criminal Tribunal 2001: item 196). Indeed, in many modern armed conflicts, there can only be self-appointed governments, and thus subordinate armies and paramilitary groups. Command structure organised in haste can be disorderly and primitive (Judgement of the International Criminal Tribunal 2001: item 193). Accepting as evidence of authority the existence of only formal structures would nullify the enforcement of humanitarian law (Judgement of the International Criminal Tribunal... 2001a).

The wording of Article 7(2) of the ICTY Statute indicates that: „The official position of any accused person, whether as Head of State or Government or as a responsible Government official, shall not relieve such person of criminal responsibility nor mitigate punishment." (Statute 1993: Article 7(2)). The phrases used in this provision: "head of state or government", "a responsible government official", allow its scope to be extended beyond the liability of military commanders to include political leaders and other civilian superiors. In *Strugar* case, the ICTY stressed that the relationship of superiority need not be based on formal subordination (Judgement of the International Criminal Tribunal 2005: item 375). An additional argument for this position is the distinction between the concepts of command and control. Command is a power that is associated with a military superior, while the definition of control includes civilian commanders (Judgement of the International Criminal Tribunal 2001: item 195).

The ICTY made a distinction between *de jure* and *de facto* control. It defined *de jure* control as the formal power to issue orders and control subordinates (Judgement of the International Criminal Tribunal... 2001a: item 197). Mere possession of *de jure* authority is not a sufficient prerequisite for establishing a commander's liability if it does not manifest itself in the exercise of effective control. *De facto* control, on the other hand, implies informal authority, command and control over subordinates, with the person issuing the orders having to be of higher rank than the subordinates. This position was challenged by the appellant in the *Aleksovski* case, where the accused claimed that in his role as a civilian superior he was not subject to liability under the provision of Article 7(3) of the ICTY Statute. This statement was criticised by the ICTY Appeals Chamber (Judgement of the International Criminal Tribunal 1999: item 103), which said that it was irrelevant

whether the supervisor was a civilian or military officer, what was relevant was the ability to prove that he had the authority to prevent or punish subordinates (Judgement of the International Criminal Tribunal... 2000a: item 76).

Summarising the above considerations, it should be stated that persons, who effectively command of informal structures and have the authority to prevent and punish crimes committed by persons under their control, may be held, under certain conditions, criminally liable specific to military commanders. The mere lack of formal legal authority to control actions cannot be understood as an exclusion of such liability (Judgement of the International Criminal Tribunal 1998: item 354; Galand et al. 2016: p. 56).

3.2. Superior's knowledge

The key issue in terms of the liability of a commander for the actions of the subordinate is his or her knowledge, which includes the information or objective reasons for being aware of criminal act (Judgement of the International Criminal Tribunal... 2001b: item 465). Elies van Sliedregt writes about liability before and after the crime (van Sliedregt 2011: p. 382). The ICTY took the position that a superior would be liable for neglecting his or her duties, provided that the information was available to him or her (Judgement of the International Criminal Tribunal... 2001a: item 241).

In this regard, two forms of knowledge can be distinguished:

1) Superior's actual knowledge, established through direct or circumstantial evidence, that his subordinates intended to commit or have committed offences;
2) Constructive or implied knowledge, meaning that the superior had information that would have at least alerted him to the current and real risk of such crimes and alerted him to the need for additional investigation to determine whether such crimes had been committed by his subordinates.

The superior's knowledge must be based on objective considerations. The term "know" requires actual knowledge, whereas the phrase "should have known" implies that the superior was negligent by failing to acquire knowledge regarding the unlawful conduct of his subordinates. In this regard, there is a presumption of knowledge on the part of the superior, when he or she had the means to obtain relevant information about the offence and deliberately failed to do so.

A commander/superior's command liability, therefore, materialises when he or she fails to take the necessary measures available to him or her, and which he or she could have used to prevent the commission of unlawful acts by his or her subordinates, or which could have been used to punish them (van Sliedregt 2011: p. 379; ICLS 2018: p. 4). Commander's liability is related to negligence resulting from the failure to perform one's duties properly, such as maintaining discipline (see: International Criminal Tribunal for the former Yugoslavia 2003). Thus, if the commander takes immediate steps to punish the guilty, he himself will avoid criminal liability. The liability of the superior is limited by his authority in relation to his superiors, which means that he is not obliged to do the impossible, i.e. to apply measures that are beyond his capacity. The obligation to prevent a crime, arises as soon as the superior (or commander) has knowledge or

reasonable grounds for suspicion that crime can be committed, while the obligation to punish arises after it has been committed (Judgement of the International Criminal Tribunal... 2005: item 373).

Due to the seriousness of international crimes, the superior must act with urgency. This is not equivalent to the obligation to personally investigate or impose sanctions. It is his liability to investigate the case and report back to the competent authorities for further investigation or repressive measures. The superior's lack of legal competence does not exempt him from pursuing what his material or actual capacity allows him to do. A superior's liability may also arise from a failure to create or maintain an environment of discipline and respect for the law among his or her subordinates.

3.3. Soldiers' anonymity

Due to the large number of soldiers in each formation, there is a possibility that the superior will not know them personally. This situation raises a fundamental question: can a commander be held liable, for the actions of subordinates who are anonymous to him? In the *Hadžihasanović* case (Judgement of the International Criminal Tribunal... 2006), the ICTY took the position that a superior may be liable for crimes committed by anonymous perpetrators, as long as such a perpetrator can be identified by his or her membership in a group or individual. This has already been noted by the Nuremberg Tribunal, which penalised the very membership in organisations such as the Gestapo, SA, SS or NSDAP. According to the content of Article 10 of the *International Military Tribunal Charter*: "In cases where a group or organisation is declared criminal by the Tribunal, the competent national authority of any Signatory shall have the right to bring individuals to trial for membership therein before national, military or occupation courts. In any such case the criminal nature of the group or organisation is considered proved and shall not be questioned." (Agreement 1945: Charter of the International Military Tribunal, Article 10).

The *Statute of the International Criminal Tribunal for Rwanda* (ICTR), with regard to command liability (Article 6 ICTR), has directly reflected the provisions included in the content of Article 7 of the ICTY Statute and has not introduced innovative regulations in this regard. Following the termination of the ICTY and the ICTR, their functions were taken over by the *International Residual Mechanism for Criminal Tribunals* (see: Statute 2010). It is mandated to perform most of the tasks previously performed by the International Criminal Court for Rwanda and the International Criminal Court for the former Yugoslavia. According to the content of Article 1 of the ICTR Statute, it will continue the substantive, territorial, temporal and personal jurisdiction of the ICTY and the ICTR, in accordance with Articles 1-8 of the ICTY Statute and Articles 1-7 of the ICTR Statute. It has the power to prosecute individuals among the most senior leaders and indicted by these tribunals (Statute 2010: article 1(3)). In performing these core functions, the *Mechanism* preserves the legacy of these two pioneering *ad hoc* International Criminal Courts and seeks to reflect best practices in international criminal justice.

4. Order in the Rome Statute of the International Criminal Court

The statutes of *ad hoc* criminal tribunals have significantly influenced the International Criminal Court's framing of the issue of command liability (e.g. see: Rome Statute 1998). Influenced by the jurisprudence of these tribunals, the ICC has made these provisions more specific and supplemented them with new components. The Hague Tribunal was aware that previous tribunals had insufficiently clarified the issue of command liability and superior liability (Królikowski 2011: p. 246).

The provisions in Article 28 of the *Rome Statute of the International Criminal Court* (RSICC) separate military commanders from other superiors and introduce alternative form of criminal liability (van Sliedregt 2011: p. 17). The content of Article 28(a) refers to military commanders or other individuals, actually acting as military commanders, while the liability of other superiors is regulated in the content of the provision of Article 28(b) of RSICC.

Military commander or any other individual, who is actually acting as a military commander, shall be criminally responsible for crimes committed by subordinate armed forces, when they were "under his or her effective command and control, or effective authority and control" (Rome Statute 1998: Article 28(a)). It is necessary that there is a relationship between the commander (or the individual performing his role) and the subordinate soldiers, which in turn is related to the commander's ability to influence the behaviour of the subordinate forces. These aspects have been repeatedly highlighted by the ICTY and the ICCR.

The key requirement for this form of liability is the element of the existence of knowledge or duty that the commander should have known of the criminal acts of subordinate forces. Such liability also materialises in the event of failure to take reasonable measures within commander's powers to prevent or deter the commission of international crimes (Rome Statute 1998: Article 28(a)). An individual actually acting as a commander may include police officers (who are given command of armed police units) or individuals, who are in charge of paramilitary units that are not part of the armed forces. The term also applies to individuals, who have taken over the role of armed forces, armed police units or paramilitary units (Klamberg 2017: p. 283). On the backdrop of the *Bemba* case, the ICC noted that the notion of an individual effectively acting as a commander is intended to include individuals, who are not elected by law to act as a military commander, but who do so by exercising *de facto* effective control over a group of individuals within the chain of command (Judgement of the International Criminal Court 2016: item 409).

The ICC introduced the concept of a superior being "criminally responsible for crimes within the jurisdiction of the Court committed by his subordinates under his or her effective authority and control" (Rome Statute 1998: Article 28(b)). Unlike a military commander (and an individual actually acting as a military commander), a superior will be liable when he or she knew or knowingly disregarded information clearly indicating that subordinates had committed or intended to commit crimes that are under the actual liability and control of the superior. Moreover, such a superior is subject to the jurisdiction of the ICC, when he or she has failed to take necessary and reasonable measures within

his or her power to prevent or deter his or her subordinates from committing such acts, or as a result of failing to refer the matter to the competent criminal prosecution authorities.

It should be recalled that ICTY jurisprudence has introduced a three-tiered test for determining whether an individual can be convicted under the command liability regime, including such elements as the existence of a superior–subordinate relationship, a subjective element and actual knowledge (Klamberg 2017: p. 279). The same components are indicated in the content of the provision of Article 28 of the RSICC, but they differ in some respects from the standards that have been set out in ICTY jurisprudence (Klamberg 2017: p. 280). Pursuant to the content of the provision in question, proof of an order or action taken by a superior is not required. Therefore, he or she is liable for his or her omission or failure to prevent the commission of the crimes or to punish their perpetrators (Judgement of the International Criminal Court 2016: item 432).

Furthermore, the RSICC introduced the requirement of a causal link, which was not present in previous regulations relating to a military order (van Sliedregt 2011: p. 8). This comes down to the obligation of existence of causal link between the commander's conduct and the act, for which criminal liability is attributed to him. This issue has already been highlighted in the *Blaskić case* (Judgement of the International Criminal Tribunal... 2000b). The ICTY noted that the very principle of a superior's liability for failure to punish subordinates set out in Article 7(3) of the ICTY Statute, as well as in common law, indicates that there is no separate element of causation in the regime of superior liability (Judgement of the International Criminal Tribunal... 2004: item 77).

Neither should it be forgotten that the RSICC included, for the first time under International Criminal Court rules, circumstances excluding criminal liability in a normative framework, as they were not present in the statutes of *ad hoc* tribunals. Pursuant to the content of Article 33 of RSICC, an order issued by a government, civilian or military superior leads to the exclusion of criminal liability on the cumulative occurrence of the following conditions: the perpetrator was under an obligation to carry out the order, the perpetrator did not know that the order was unlawful, the order was not obviously unlawful. Whereby the commission of crimes of genocide and crimes against humanity does not lead to the exclusion of the unlawfulness of the act if the perpetrator was aware of their commission.

Conclusions

Although command liability has grown out of the practice of International Criminal Courts, national judicial efforts on these issues should not be forgotten. Following the completion of the work by the *ad hoc* tribunals, some cases were referred to the national courts, which are today supported by the Residual Mechanism. The ICC operates independently of it, which considers the criminal liability of individuals for the commission of international crimes committed after 1 July 2002.

In this regard, it should be recalled that the establishment of *ad hoc* tribunals has been met with numerous criticisms, including with regard to their legitimacy (Chmura-Piwowarczyk 2011: p. 40; Żarna 2011: p. 301). It has been noted that neither the UN Charter nor any other

international agreement gave the Security Council explicit authority to establish international courts (Matyasik, Domagala 2012: p. 78). This aspect of functioning of the ICTY, or the ICTR, has often been raised in individual cases under their jurisdiction. One should, however, agree with M. Matyasik and P. Domagała, who justify such a basis for the establishment of the tribunals by the need for an immediate response to the crimes (Matyasik, Domagała: 2012: p. 79). In this regard, it should be recalled that similar allegations have been made against the IMT in the past. Senator R. Taft in 1946, for example, described the tribunal's verdict as "a miscarriage of justice which the American people will long regret" (Grosz 1948: p. 7).

The Yugoslav Tribunal did a tremendous amount of work, which is being continued by MR today. A particularly important achievement is the establishment of cooperation with prosecutors' offices in Bosnia, Serbia and Croatia. This ensures that cooperation in combating impunity and bringing justice to victims continues (Brammertz 2021: p. 48). The Court was confronted with many cases that had not previously been dealt with in international criminal law. The issue of commander's liability has taken shape over many years. In the past, it was not singled out, but over time it has been shaped, as an independent act. Influenced by the experience of *ad hoc* tribunals, the *Rome Statute of the International Criminal Court* distinguished its various forms and stipulated that, when specific conditions are met, the commander's liability regime also applies to individuals actually acting in that capacity, but also to civilian superiors. Due to the large number of soldiers, there may be times when an individual in a leadership role does not know them personally, but this is not an automatic indication that the commander/superior is not immediately to blame for the orders/commands he/she has given.

Serge Brammertz (Prosecutor of the ICTY and the ICTR) emphatically states that international crimes are not committed by nations or people, but by individual persons, who must be held personally liable for them (Brammertz 2021: p. 43). Holding individuals for criminal liability, when they hold managerial positions or supervise subordinates, can have a valuable deterrent effect against future crimes.

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The new trends in the luxury market in the 21st century[1]

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Abstract

The main aim of this article is to present and analyse changes in the global luxury goods market in the 21st century, with particular emphasis on the effects of the supply shock caused by the COVID-19 pandemic. In the part devoted to the period before the pandemic, the following market trends will be described: the democratisation of luxury, brand consolidation process, the emergence of *Generation Alpha*, the evolution of *masstige* goods relied on fast-fashion processes, "Chinese bulimia", market "retailization" processes, the growing importance of mono-brand stores, rejection of online sales by European brands, e-commerce development, and growing environmental awareness. The article's part, dedicated to the period of the pandemic and the changes immediately after it, presents trends such as the emergence of non-fungible tokens (NFTs) and gaming goods (metaverse gaming), the rebirth of the vintage market and secondhand stores, an increase in sales of casual goods, new multi-brand sales platforms, and the growing importance of local markets. The article is based on literature query and comparative analysis of industry reports prepared by *Deloitte*, *Bain & Company*, and *Luxe Digital*.
Keywords: luxury, market analysis, luxury market, COVID-19

Nowe trendy na rynku dóbr luksusowych w XXI wieku

Streszczenie

Celem artykułu jest przedstawienie i analiza zmian na światowym rynku dóbr luksusowych mających miejsce w XXI wieku, ze szczególnym uwzględnieniem skutków szoku podażowego wywołanego pandemią COVID-19. W części poświęconej okresowi przed pandemią COVID-19 zostały omówione

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takie trendy rynkowe jak: demokratyzacja luksusu, proces konsolidacji marek, pojawienie się kolejnych generacji klientów (ang. *Generation Alpha*), zaistnienie masowych dóbr luksusowych (ang. *masstige*) wraz z procesami *fast-fashion*, „chińska bulimia", „retailizacja" rynku i wzrost znaczenia sklepów monobrandowych, odrzucenie przez marki europejskie sprzedaży internetowej, wzrost znaczenia *e-commerce* oraz rosnąca świadomość ochrony środowiska. W części artykułu poświęconej okresowi pandemii i zmianom bezpośrednio po niej przedstawiono takie trendy jak: pojawienie się niewymiennych tokenów (NFTs) i towarów do gier (ang. *metaverse gaming*), odrodzenie się rynku *vintage* i sklepów z dobrami używanymi, wzrost sprzedaży dóbr typu *casual*, powstanie wielobrandowych platform sprzedażowych oraz wzrost znaczenia rynków lokalnych. Artykuł powstał na podstawie przeprowadzonej kwerendy literatury oraz przy wykorzystaniu analizy porównawczej raportów branżowych, przygotowanych przez firmy *Deloitte*, *Bain & Company* oraz *Luxe Digital*.

Słowa kluczowe: luksus, analiza rynku, rynek dóbr luksusowych, COVID-19

The luxury market has experienced huge changes in the 21st century. It started at the beginning of this century with processes of market democratisation, then the market was hit by the 2009 crisis, but the COVID-19 pandemic changed everything. Both the demand and supply sides of the market experienced rapid and unpredicted variability, which forced urgent changes in the short-term and the long-term market conditions and strategies, as all market agents had to adapt to the new reality. Consumers and firms had to adjust quickly to the new way of living and their outlook on luxury goods was shifted. The two pandemic years financially devastated the €283 billion luxury goods sector (Financial Times 2022). Many of the usual triggers for high discretionary demand, such as international travel, confidence in the economy, and social occasions suddenly disappeared. Stores were closed, reopened, and closed again. Fashion shows and other key marketing events moved to the Internet, supply chains were broken or experienced significant delays, and prices of materials and labour increased (Financial Times 2022). The overall luxury market shrank by 20% to 22% at current exchange rates between 2019 and 2020 (D'Arpizio et al. 2021b).

Each market has to adapt to changes in the environment. If the environment is changing suddenly and unexpectedly, these changes can be both positive and negative. The future of the market depends on how well and quickly the market reacts. It might seem that some markets, of a more traditional and static nature, will be particularly vulnerable to sudden changes. Nevertheless, the luxury goods market surprised and delighted all commentators with its adaptability and flexibility to change and create new trends. The main aim of this research is to identify the main determinants, which shaped and reshaped the luxury market in the 21st century, with putting special attention to the supply shock caused by the Covid-19 pandemic. The most specific and unique trends that occurred before the pandemic and after it will be mentioned and shortly described.

Materials and methods

The economics literature dedicated to theoretical aspects of luxury is relatively narrow and limited. Among the most influential and cited papers concerning theoretical

aspects of luxury are: Heine (2012), Vigneron & Johnson (1999), Jung Choo et al. (2012), Dubois & Laurent (1994), and Ko et al. (2019). The conceptual model of luxury is presented by Gurzki & Woisetschläger (2017), and the theoretical dimension of luxury products is deliberated by Vickers & Renand (2003). The economic aspect of conspicuous consumption and bandwagon paradox is described, *inter alia*, by Memushi (2013), and Bronner & de Hoog (2018).

The analysis of trends and changes in the luxury market can be found in publications: Agrawal et al. (2021), Holmqvist et al. (2020), and Kapferer & Michaut (2015). Sustainable aspects of the luxury market are analysed by Li & Leonas (2019), and Kapferer & Michaut (2015). However, most of the papers are based on annual reports on the luxury goods market published yearly by *Bain & Company*, *Deloitte*, and KPMG, which present overall overviews of the market changes and future trends.

Research results

Luxury is "constantly on the move" (Kapferer 2008: p. 96), which means that this economic concept remains subject to a constant process of change and improvement (Heine 2012). Traditional luxury goods can be defined by very high prices, scarcity and uniqueness, excellent quality, ancestral heritage (Dubois et al. 2001: p. 8), and superfluousness (Bearden, Etzel 1982). Moreover, they are usually characterised by symbolism, timelessness, and honesty. Luxury goods are tailored, bespoke, and often irrational and emotional, they sell "dreams and well-crafted emotional benefits to relatively affluent consumers" (D'Arpizio et al. 2005).

The luxury market before the pandemic

For many decades, the golden rule of the luxury business model was "to be elegant, consistent, and effective". The market motto of that time was: „Don't ask consumers what they want, tell them what they should have" (D'Arpizio et al. 2005).

Democratisation of luxury

At the beginning of the XXI century the traditional perception of luxury had changed, the existing luxury market called *sortie du temple* was replaced by the *new luxury*, so-called *neo-luxury*. It "offers high-quality products and services at a more affordable price to the majority of middle-class consumers" (Cabigiosu 2020). The luxury business experienced impressive growth resulting from a process called *democratisation of luxury* – the "movement, in which goods formerly reserved to the elite are now consumed by a large public, even if only occasionally" (Dubois et al. 2001: p. 5). The democratisation of luxury, according to Anna Wintour, "means more people are going to get better fashion. And the more people who can have fashion, the better" (qtd. in: Salter Reynolds 2018).

Silverstein et al. (2008) described this as the phenomenon of trading-up: people desire and intend "to pay a premium price for goods that have a high degree of quality and aesthetic taste" (qtd. in: Cabigoisu 2020). New customers were inclined to spend

more money on the product categories they were interested in some selected brands (trading up) and less – on less interesting product classes (trading down) "to be able to invest savings in new luxury products". This process changed the traditional recognition of luxury, which became perceived "as social identity, search for experiences and emotions, the desire to be satisfied with oneself, and gratification" (Cabigiosu 2020). Luxury became pleasure, beauty, dream, and it involved customers' multiplicity of the senses.

The process of luxury democratisation led to the major phenomenon that took place in the luxury market (Cabigiosu 2020). Individual fashion brands were bought by luxury conglomerates that expected immediate results. For example, LVMH acquired *Givenchy* in 1988, *Berluti* – in 1993, *Kenzo* – in 1993, *Guerlain* – in 1994, *Céline* and *Loewe* – in 1996, *Marc Jacobs* and *Sephora* – in 1997, *Thomas Pink* and 50.1% ownership of *Tag Heuer* – in 1999, *Emilio Pucci* and *Rossimoda* – in 2000, *La Samaritaine* and *Fendi* – in 2001. In 2001, LVMH acquired 89% stake in the New York-based brand DKNY and acquired an initial stake in *Hermès* of 4.9% through subsidiaries (raised its stake to 23.1% as of 2013). The name LVMH itself was generated from the merger between Louis Vuitton and Moët Hennessy in 1987.

The 1999 was the first year when *Pinault–Printemps–Redoute* (PPR) first entered the luxury sector via the acquisition of 42% stake in *Gucci Group NV* for $3 billion, then *Yves Saint Laurent* (now *Saint Laurent Paris*), *Sergio Rossi*, and *YSL Beauty.* In 2001, through the *Gucci Group*, PPR bought *Balenciaga* and *Bottega Veneta,* as well as signed partnerships with Alexander McQueen and Stella McCartney. The PPR was renamed *Kering* in 2013 (Donzé, Fujioka 2018).

In 2012 took place the acquisition of *Valentino* for €858 million by *Mayhoola* (a company owned by a leading investor in Qatar, see: Sowray 2012), in 2017 – the acquisition of *Christian Dior* for $13.7 billion by the Arnault family, in 2018 – the acquisition of *Versace* for €1.83 billion Michael Kors (see: Euronews 2018). The study *Fashion Luxury Private Equity and Investors Survey 2019,* published by *Deloitte*, highlighted precisely "this race for consolidation in the luxury market and the growing interest of investors in this sector". A total of 265 merger and acquisition transactions in the luxury market "were recorded in 2018, of which 73 focused on luxury fashion and took place mainly in Europe" (Cabigiosu 2020; Deloitte 2019a). To raise capital, the global companies were entering the stock exchange. The consequence of this situation was additional investors' pressure to improve financial indicators. Therefore the luxury companies and brands were forced to get to the widest possible number of customers with the tremendous number of products.

Simultaneously, the new, more aware, less loyal, young, and open-minded consumer appeared. During that time, market experienced a reshaping of traditional social patterns in societies: growing financial and social independence of women, new family patterns with the growing role of children, often the only child, and changes in attitudes towards life. The increasing financial capability of households, lower maintenance costs, and the unprecedented access to consumer credit allowed to generate a surplus ready to be spent on luxuries. This profile of customers became more attractive for luxury producers and sellers. Therefore the new brands called subbrands appeared (such as *Baldessarini*

created by *Hugo Boss*, *Variazione* – subbrand created by *Yves Saint Laurent*, *Versus* – by *Versace*, and *Fendissime* created by *Fendi*), and a new type of discount stores, facilitating the purchase of luxury goods for relatively small, often discounted prices, emerged. It resulted in the appearance of a new category of goods called: accessible superpremium or masstige[2]. These changes imposed a redefinition of the luxury market and its customers.

The *Bain & Company* defined four rules for luxury companies:

1) "strive to know your consumer, not just be known by them";
2) "think merchandising, not just creativity";
3) "offer a tailored customer experience, not just exclusive stores";
4) "refresh, refresh, refresh" (D'Arpizio et al. 2005).

The additional market pattern was "fast fashion". Stores were equipped with collections of new designs several times during the season, "achieving a new and different kind of exclusivity by putting customer value, commercial appeal, individualisation, and variety at the centre of their strategies" (D'Arpizio et al. 2005). The new high-end fashion phenomena appeared responding to consumers' needs.

"Chinese acceleration", or "Chinese bulimia"

The „democratisation of luxury" was stopped by the 2009 crisis, then between 2009 and 2014 market experienced „Chinese acceleration" (D'Arpizio, Levato 2021b), so-called „Chinese bulimia" (Francone 2017/2018). In 2008 and 2009, luxury sales continued to grow despite the global financial crisis on the background of dramatic growth in Asia. Sales in that region grew at over 8% a year (starting from 2008), that is 80% of revenue growth for the industry. Tourism accelerated by Chinese consumers and increased tenfold, with a large proportion of Chinese consumers. Their luxury goods purchases occurred mainly during a vacation as buyers take advantage of reimbursements of value-added tax. In 2015 "Chinese consumers played a primary role in the growth of luxury spending worldwide. They account for the largest portion of global purchases (31%), followed by Americans (24%) and Europeans (18%)" (D'Arpizio et al. 2015: p. 2).

The changes were observed also in selling channels. Wholesale was still dominant in the personal luxury goods market, capturing 66% of the total market. However, retail continued to gain share, driven by network expansion and the growth of mono-brand stores. The wholesale channel's slower performance was stemmed from three factors:

1) the ongoing "retailization" of luxury (converting franchised locations into company-owned stores or joint ventures),
2) the performance of US department stores across product categories (particularly in leather goods),
3) the decreasing sales of Asian watch retailers (D'Arpizio et al. 2015: p. 2).

E-commerce grew to a 7% market share in 2015, and then nearly doubled its penetration since 2012. Specialised e-commerce players outperformed the global market as

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[2]   „Accessible superpremium" is s group of goods that are priced at or near the top of their category but they are still affordable to the middle-market consumer. „Masstige" is a neologism for "mass prestige". Most luxury brands sell „masstige" products directed to a wider group of consumers.

Chinese e-tailers progressively extended their geographic reach and gained share on a global basis. The e-commerce websites of American and European retailers (mainly department stores) continued to grow, as "a response to customer demand for an omnichannel experience" (D'Arpizio et al. 2015: p. 2). Luxury brands, especially European monobrands, were losing online share. Some brands refused to sell online relying on the physical networks of their boutiques or third-party multi-brand retailers. Brands believed in traditional shops promoting exclusivity, craftsmanship, authenticity, and excellent consumer service that influenced consumer experience.

The role of airport retail remained high and accounted for 29% growth rate (in current exchange rates) and 18% in constant exchange rates. In 2015 airport retail accounted for 6% of the global luxury market. From 20% to 30% of industry revenues were generated by consumers making luxury purchases outside their home countries. "In 2018, Chinese consumers took more than 150 million trips abroad; […] purchases outside the mainland accounted for more than half of China's luxury spending that year" (Kim et al. 2019; qtd. in: Achille, Zipser 2020: p. 2). Asian shoppers bought "luxury goods outside their home countries not only to benefit from lower prices in Europe, but also because shopping became an integral part of the travel experience: buying a brand in its country of origin come with a sense of authenticity and excitement" (Achille, Zipser 2020: p. 2).

"Reboot" and "New Normal"

After the period of „Chinese Acceleration" the luxury market experienced periods called „Reboot" and then „the New Normal" (D'Arpizio, Levato 2021b). Improvement was based on new generations, higher volumes, and changes in the types of clients. Another special feature of the luxury market of that time was growing awareness of environ-mental concerns, mainly focused on sustainable production (circular fashion: recycling, upcycling, thrifting; ethical fashion: production methods, working conditions, fair trade; conscious fashion: eco-friendly and green fashion), offsetting carbon emission, searching for environment-friendly materials, mainly biomaterials (biomaterials are any natural or synthetic materials that are created through interaction with biological systems, they are biological in origin, circular by design). The customer became more ecologically aware and eco-oriented.

To sum up, before the COVID-19 pandemic, luxury market grew based on traditional values and slowly changing supply chains. The changes in the geographical structure of the market reflected the overall worldwide economic and social changes: the growing role of the middle-class and women in economies, changes in social stratification, the slow process of digitalisation, and the increasing importance of Chinese customers and globetrotters.

Luxury market during the pandemic

During the two years 2019–2020, COVID-19 created huge challenges for all compa-nies and markets across the globe, and the luxury goods market was no exception. Once the pandemic started, demand for luxury items dropped sharply as consumers changed

their purchasing behaviour, stores were closed under lockdown regulations, and international travel was dramatically curtailed. "Over 80% of the *Top 100* companies reported lower sales" in 2020 (Deloitte 2021: p. 26). Moreover, market experienced a reduction in production due to temporary factory closures (supply-constrained industries) and supply-chained disruptions. Especially supply chains caused problems as luxury companies traditionally limited their suppliers as they wanted to maintain product control, ensure minimum threshold volumes, and avoid the possibility of counterfeiting. Many luxury markets were characterised by significant regional concentrations of skilled craftsmen. This process also limited the diversification of suppliers because the geographical concentration of suppliers made it difficult to mitigate problems in the supply chain (del Mar 2020).

The pandemic changed the luxury market forever. The character of the majority of alternations is long-term, and it is no longer possible to return to the past. Some of the trends occurred earlier, the others were deepened during the pandemic, e.g. the processes of digitisation. Additionally, during the pandemic, new processes emerged that made the modern luxury market redesigned and renovated. Among many emerging trends were: the emergence of new types of products, secondhand market development, a decrease in wholesale, and a parallel rise of e-commerce.

The emergence of non-fungible tokens (NFTs) and gaming goods

Nowadays among the new types of luxury products are *non-fungible tokens* (NFT) and gaming products. The NFTs "represent the ownership of a digital (cryptographic) item or asset". They are created through blockchain technology. Each token is a unique good that "cannot be replaced with something else". Additionally, its holder also is "the unique owner of the digital assets" (Deloitte 2021: p. 7). The process of certification takes place via *blockchain* (the system, which regulates, and records transactions and tracking).

Another new type of luxury product are gaming products. *Financial Times* reported in January 2022 that to find new customers among *Generation Z*, luxury brands will invest further in gaming partnerships (e.g. *Honor of Kings, Fortnite*). The developmental prospects and possible profits seem to be surprisingly abundant, for instance, *Dolce & Gabbana* "auctioned off a nine-piece collection of NFTs for $6 million in September 2021" (Financial Times 2022).

The *Morgan Stanley report* claims that NFTs and social gaming (online games and concerts attended by people's avatars) represent two near-term opportunities for luxury brands, allowing them to monetise their IP (intellectual property) built over decades. The report predicts that NFTs and metaverse gaming are €50 billion annual revenue opportunity for luxury companies, and could offer 25% uplift to industry profits by 2030 (Morgan Stanley 2021).

Rebirth of the vintage and secondhand market

The resurgence of the vintage and secondhand market is another trend in the luxury market that fosters future growth based on circularity and reuse. This market segment

was formerly ignored by the luxury industry. Nowadays luxury brands prefer more circu-lar business models and serve the niche dedicated to customers who no longer want to buy new products. Many luxury brands cooperate "with secondhand platforms such as *Vestiaire Collective* and *The RealReal* to offer authentication services and incentivise customers to consign their past purchases via store credit" (Financial Times 2022). There is noted that "some smaller brands, including *Rachel Comey* and *Marques' Almeida*, are using their websites to facilitate secondhand sales directly" (Financial Times 2022), and it is expected that larger brands will follow that trend.

Bain & Company claims that the secondhand luxury market reached €33 billion in 2021, and the "secondhand luxury market grew by 65% between 2017 and 2021" (D'Arpizio et al. 2021b). During that period „firsthand" product growth accounted for 12%. This trend is driven by growing demand and an increasingly competitive offer and is described by many new economic terms: resale, re-commerce, luxury consignment, or pre-loved. *ThredUp* in 2021 noted that 50% of people were cleaning out their wardrobes more often than they had done during pre-Covid times. ThredUp's president Anthony Marino noticed: "We've seen a strong uptick in supply, with many people spending more time at home staring at their full closets and looking to earn some extra cash." (D'Arpizio et al. 2021b; ThredUp 2021).

Growing social responsibility and environmental awareness

Ongoing changes were also connected with growing social responsibility and environmental awareness among customers and firms, which were both trendy and objectively justified. Luxury and sustainability were not always aligned. Sustainability practices attract customers but involve huge financial outlays. In 2017 Aybaly et al. claimed that the shift to sustainability in the case of well-established reputable brands was very difficult. It wasn't surprising that "the true trendsetting in the sustainability" sphere was more frequently seen in specialised, smaller, and often independent luxury brands with a higher propensity of risk-taking and having less to lose (Aybaly et al. 2017: p. 546). Pandemic changed that feeling. For example, big brands (including *Chanel, Prada*, and *Zegna*) began to acquire more suppliers, because "access to the best materials and manufacturers [became] more difficult and costly, and customers demanded greater transparency about where and how products were made" (Financial Times 2022).

Additionally, the lockdowns forced changes in types of preferred goods, consumer profiles, and selling channels. People who were closed at home preferred more comfort and relaxed fashion. Therefore the growing role of the casual luxury fashion sector was noticed. As the new *Generation Alpha* entered this market, new consumer behaviour and habits were created mainly influenced by constant living in a digitalised economy.

New selling channels

During the pandemic, many selling channels were destroyed and new players in the luxury market, especially in e-commerce, appeared. Among them were *Farfetch* and *YOOX NET-A-PORTER Group* (owned by Richmond) in Western markets and *Alibaba's*

Tmall Luxury Pavillion in Asia (including China). These companies offered multi-brand marketplaces, hosted mono-brand e-commerce sites, and offered such innovations as reselling and buyback.

The new trends in the post-pandemic luxury market limited the role of wholesale channels (so-called „wholesale Darwinism") and increased the importance of mono-brand and online stores. The retail channel accounted for almost half the market (49% in 2021). Online and mono-brand stores were the key channels after the COVID-19 recovery. After a 50% increase from 2019 to 2020, the online market continued to grow by 27% from 2020 to 2021, and it reached €62 billion in market value in 2021. Websites dedicated to a single brand controlled 40% of the online segment, up from 30% in 2019 (D'Arpizio et al. 2021b). The „wholesale Darwinism" described the process of exclusion from vertical integration. This process was experienced by many independent luxury wholesalers in Europe (usually small, family-owned boutiques) and some of the large North American luxury department stores. It was accomplished with the growth of e-commerce, which might force some of them out of business (Achille, Zipser 2020).

Traditional luxury shop owners tried to attract potential customers by opening new, experimental shops. Luxury retailers used mixed reality, such as virtual reality (VR) and augmented reality (AR), as well as AI technology. *LS Retail* in 2018 indicated some examples of mixed reality: „In London, *Tissot* allows shoppers to try on their luxury watches virtually at Selfridges and Harrods' windows. *Christian Dior* developed VR glasses called "Dior Eyes" that give visitors a sneak peek behind the scenes at their ready-to-wear fashion shows. In New York City, the flagship *Rebecca Minkoff* store features a smart video wall that suggests new styles when people pass by or enter" (LS Retail 2018).

The modern fitting rooms were equipped with interactive mirrors allowing consumers to set the light mode: to see their new outfit on a sunny day or in a club. Additionally, clients could "order a different size or color, or find an item that complements their purchases, straight on from the fitting room mirror" (LS Retail 2018). Market analysts believed that these attempts would increase the attractiveness of modern and innovative solutions online which would soon surpass all other luxury sales channels (Luxe Digital 2022).

Luxe Digital in 2022 noticed that global lockdowns in 2020 and 2021 were the perfect times for online luxury sales channels to prove their worth and the possibility to grow and generate profits. Early digital adopters experienced exponential growth, and latecomers were forced to adapt and embrace digital. Even the luxury car category experienced online sales growth. The growing role of luxury e-commerce reshaped marketing tools. Digital marketing and usage of social media became global strategies across multiple platforms and in social media. These trends started before 2019, but during the pandemic their importance became crucial for maintaining brand awareness among customers and their long-term loyalty.

The pandemic has nonetheless changed the global map of luxury and changes had several dimensions. The luxury market noticed the shift from goods experience to experience-based goods (such as fine art, luxury cars, and yachts). As tourism collapsed, consumer spending on personal luxury goods in their home markets increased from 50% to 60% between 2019 and 2021 (D'Arpizio et al. 2021b).

„Luxury went local", most dramatically in mainland China. Dynamic local consumption revived personal luxury goods, particularly in China and the US, which created a dual-engine for this market. "Purchases made locally have grown by 50%–60% since 2019, and tourist purchases declined by 80%–90%" in 2021 versus 2019 (D'Arpizio et al. 2021b). Mainland China experienced remarkable momentum, due to the "repatriation" of Chinese purchases from abroad. Also in the USA secondary cities and suburban areas experienced solid growth. The USA "accounted for €89 billion in annual sales (31% of the global market), while sales in mainland China amount to €60 billion (21% of the global market)" (D'Arpizio et al. 2021b). Despite the growing importance of Asian markets, the headquarters of luxury brands remained in Europe.

The post-pandemic luxury market still evolves and many other trends can be noticed and shown in the future. These described above trends seem to be new but typical for that particular time, and additionally solid, durable, and long-term. The COVID-19 pandemic has not finished yet, and the future epidemic situation is unknown, therefore it is not possible to predict the future of the luxury market.

Conclusions

The main aim of this article was to present and analyse changes in the global luxury goods market that took place at the beginning of the 21st century. Among the major determinants of these changes were the effects of the supply shock caused by the COVID-19 pandemic. However, the process of market transformation started much earlier, in the pre-pandemic period. Among the new market trends which appeared in a pre-pandemic era were: the process of luxury democratisation, processes of brands consolidation around huge conglomerates (through mergers and acquisitions), the emergence of a new, unique generation (so-called *Generation Alpha*), the evolution of *masstige* goods relied on fast-fashion processes, fast development of Chinese market fueled by skyrocketed demand called the "Chinese bulimia", market "retailization" processes, the growing importance of mono-brand stores, e-commerce development along with the rejection of online sales by European luxury brands, and growing environmental awareness both among consumers and producers. The further impact of these trends was sharply stopped by the pandemic and the sudden supply and demand shock it caused.

Despite these unexpected problems, the luxury goods market demonstrated its resilience in the face of widespread pandemic-related disruption and its flexibility to implement changes, which helped to survive and be reborn. Among the main trends that shaped the after-pandemic luxury market were: the emergence of non-fungible tokens (NFTs) and gaming goods (metaverse gaming), the rebirth of the vintage market and secondhand stores, an increase in sales of casual luxury goods, new multi-brand sales platforms along with e-commerce development, and the growing importance of local markets.

All of these trends, both individually and in conjunction with each other, have resulted in the contemporary luxury goods market being even in better economic condition than at the end of the XX century. The prospects for further development are also very op-

timistic. Many well-known brands experienced their sales figures rebounding relatively rapidly to pre-pandemic levels, and in some cases, even surpassing them. The growing young working-class population, rising consumer awareness about the benefits of using quality products, the surge in purchasing power, and the process of market digitalisation are the primary factors driving and determining the future demand for the luxury market.

In 2020 luxury industry analyst Erwan Rambourg interviewed CEOs from the largest luxury brands and groups (including *Kering, Puma, Cartier,* and *Moncler*) and asked them to enlist the major forces and trends that can reshape luxury over the next decade. Rambourg concluded their opinions with some main points:

- the outlook for the luxury market was better than expected;
- local empowerment was crucial for recovering luxury markets, especially in Europe;
- the new customers were mainly young women;
- major brands were still waiting for luxury e-commerce financial results;
- the success of luxury stores relied on great customer experience, and amazing customer experience relied on great experiential retail brought by talented and empowered sales associates (Rambourg 2020).

Many questions arise during the analysis of the luxury goods market. Which of the trends are permanent, and which are only temporary? How do discussed trends influence each other and, as a result, the entire market? Will the luxury market experience its defragmentation as a result of the diversification of luxury goods and their mass production and sales? Will traditional "brick-and-mortar" stores survive? As luxury goes local, will future markets be defragmented, and each will have its specialty and unique group of customers? What is the profile of the future customer of luxury goods? The answers to these questions require further research.

Despite all these challenges and uncertainties, it seems that the luxury goods market managed to survive the most difficult period and build the foundations for stable further development. Luxury goods have gained a new image, they are no longer perceived as just useless extravagance, but have become a symbol of youth, modernity, technology, quality, care for the environment and the planet, and a good investment.

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Dynamics and determinants of Russia's geoeconomic strength in relation to the Central and Eastern European region

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Abstract

The aim of the article is to examine the dynamics and the determinants of the geoeconomic strength of Russia in relation to the Central and Eastern European countries (CEE-11) belonging to the European Union. The article confirms the research hypotheses that: (i) since 2014, the geoeconomic balance of power in Central and Eastern Europe began to change significantly in favor of the CEE-11 region, (ii) the economic sanctions imposed on Russia after 2014 negatively influenced its geoeconomic strength in relation to the CEE-11 region by reducing the export and import flows, as well as FDI net inflows in Russia compared to the CEE-11 countries. Panel regression analysis (ordinary least squares and fully modified ordinary least squares) was used to test the second hypothesis. All data used in the article comes from the World Bank database and covers the period from 2004 to 2020.

Keywords: geoeconomics, Central and Eastern European countries (CEE-11), Russia, economic sanctions, geoeconomic strength

Dynamika i determinanty siły geoekonomicznej Rosji w relacji do regionu Europy Środkowo-Wschodniej

Streszczenie

Celem artykułu jest zbadanie dynamiki i uwarunkowań siły geoekonomicznej Rosji w stosunku do krajów Europy Środkowo-Wschodniej (EŚW-11) należących do Unii Europejskiej. Artykuł potwierdza postawione w nim hipotezy badawcze, że: (i) po 2014 roku geoekonomiczny układ sił w Europie Środkowo-Wschodniej zaczął się istotnie zmieniać na korzyść regionu EŚW-11 oraz (ii) sankcje

gospodarcze nałożone na Rosję po 2014 roku negatywnie wpłynęły na jej siłę geoekonomiczną w stosunku do regionu EŚW poprzez zmniejszenie przepływów eksportowych i importowych oraz napływów netto BIZ do Rosji w porównaniu z krajami EŚW. Do przetestowania drugiej hipotezy wykorzystano analizę regresji panelowej (metodę najmniejszych kwadratów, OLS oraz w pełni zmo- dyfikowaną metodę najmniejszych kwadratów, FMOLS). Wszystkie dane wykorzystane w artykule pochodzą z bazy Banku Światowego i obejmują okres od 2004 do 2020 roku.

Słowa kluczowe: geoekonomia, kraje Europy Środkowo-Wschodniej (EŚW-11), Rosja, sankcje gospodarcze, siła geoekonomiczna

The situation in Ukraine, started in 2014, and especially its escalation in 2022, resulted in greater interest in the region of Central and Eastern Europe among geopoliticians. Geopolitics may be seen as a way for study of foreign policy through the analysis of geographic, military, and economic potential. Geopolitical thinking assumes the exist- ence of asymmetries in international relations. Differences in potential may be used by countries to pursue their interests in their international politics, which include, e.g. the control over the key geographical area and economic rivalry. Various factors contribute to the geopolitical potential. The most important of them are: geographic location, territory, population, military capability, natural resources, size of the economy, and the so-called *soft power*, e.g. the attractiveness of a particular country's culture or the effectiveness of its diplomacy.

Geoeconomics is a state strategy focused on competition between the states, pursued by economic goals, means, and methods (Haliżak 2012)[1]. It relies on the stra- tegic utilisation of national wealth to obtain geostrategic objectives (Olsen 2022). Thus, geoeconomics combines the logic of geopolitics with the tools of economics (Blackwill, Harris 2016). The effectiveness of the geoeconomic policy is highly related to the geo- economic endowments, especially including GDP[2].

GDP measures the market value of all goods and services produced in a country, and it is the most used measure of economic welfare. In the long run, GDP can matter even more than force (Gelb 1991).

The article's aim is to examine the dynamics and the determinants of the geoeco- nomic strength of Russia in relation to Central and Eastern European countries belonging to the European Union (CEE-11)[3]. The geoeconomic potential is measured as the relation between the GDP of Russia and the GDP of the CEE-11 countries treated as one region.

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[1]   The ultimate goal of economic policy is the wealth and development of the country and, consequently, the prosperity of its inhabitants.

[2]   Besides GDP also other economic data can be used to study the geoeconomic comparative strength/ potential: GNI, GDP per capita, and GNI per capita. GDP is based on the location of production and it measures the market value of all goods and services produced within a country. GNI is based on ownership. This measure is based on GDP adjusted for income earned by residents abroad and income earned by non-residents in the country. Per capita measures provide information on the standard of living of citizens, as opposed to values such as GDP or GNI, which provide aggregate information. They are better measures of comparing the personal well-being of the citizens.

[3]   The CEE-11 region includes the next countries: Bulgaria (accessed in 2007), Croatia (2013), Czech Re- public (2004), Estonia (2004), Hungary (2004), Latvia (2004), Lithuania (2004), Poland (2004), Romania (2007), Slovakia (2004), and Slovenia (2004). The dates of joining the EU are presented in brackets.

The **first research hypothesis** is that due to the situation in Ukraine since 2014 Russia has been losing its economic advantage in relation to the CEE-11 region, which until 1989 was in the sphere of its influence. Russia's dynamics of relative geoeconomic power can have a big impact on its geopolitical strength, for example, modernising and increasing its armed forces including weaponry requires investments[4]. The relative economic position of other countries is related also to the possibility of attracting foreign capital or techno-logy, joining international organisations, conducting monetary, fiscal, and exchange rate policy, or to the direction of economic migration.

The **second research hypothesis** is a consequence of the first one and relates to the determinants of the balance of economic power in Central and Eastern Europe mea-sured by the relation of the CEE-11 countries' GDP to Russia's GDP. It is assumed that next to the basic determinants of economic growth, which are commonly mentioned in the scholarly literature (such as e.g. the dynamics of investment and labour force, or changes in institutional factors), geoeconomic tools may be of significant importance. The hy-pothesis assumes that the economic sanctions imposed on Russia after 2014 negatively influenced its geoeconomic strength in relation to the CEE-11 region by reducing the relative export and import flows, and FDI inflows in Russia compared to the CEE-11 countries. Panel regression analysis (ordinary least squares and fully modified ordinary least squares) was used to test the second hypothesis. Russia and the CEE-11 countries belonging to the EU and the period under investigation (2001–2020) were chosen for statistical research due to data availability.

This article is organised into five sections. Following the introduction, section 2 pre-sents the dynamics of Russia's geoeconomic strength in relation to the CEE-11 region and verifies the first research hypothesis. Section 3 is aimed on selection the determinants of changes in Russia's geoeconomic position based on theories of economic growth. It also describes data and empirical methodology to be used in the econometric study to verify the hypothesis on the determinants of Russia's geoeconomic strength in relation to the CEE-11 countries. Section 4 presents and discusses research results, and the last section concludes all the findings.

The dynamics of Russia's geoeconomic strength in relation to the Central and Eastern European region

To measure the geoeconomic potential of Russia in relation to the CEE-11 region, the data on Russia's GDP and GDP per capita were divided respectively by GDP and GDP per capita of the CEE-11 countries[5]. The macroeconomic aggregates were measured both in current U.S. dollars and converted to international dollars using *purchasing power parity* (PPP). Nominal GDP measured in current dollars informs about the possibilities of purchasing goods or services on the foreign market. However, nominal values can be

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[4]   Military power is the most important instrument of action in geopolitics (Haliżak 2012).
[5]   To measure GDP per capita in CEE-11 region, cumulated GDP of CEE-11 region was divided by their total population.

highly influenced by fluctuations in currency exchange rates. On the other hand, GDP calculated according to PPP takes into account the differences in prices between countries and generally informs about the standard of living in a given country. The statistical data for analysis presented in this article were taken from the World Bank database. The definitions of macroeconomic categories used in the analysis of the relative geoeconomic strength are presented in *Table 1*.

**Table 1: The definitions of macroeconomic categories used in the analysis of the relative geoeconomic strength.**

Variable	Definition
GDP (current USD)	GDP at purchaser's prices is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in current U.S. dollars. Dollar figures for GDP are converted from domestic currencies using single-year official exchange rates.
GDP (PPP, constant 2017 international USD)	PPP GDP is gross domestic product converted to international dollars using purchasing power parity rates. An international dollar has the same purchasing power over GDP as the U.S. dollar has in the United States. Data are in constant 2017 international dollars.
GDP per capita (current USD)	GDP per capita is gross domestic product divided by midyear population. Data are in current U.S. dollars.
GDP per capita, PPP (constant 2017 international USD)	PPP GDP is gross domestic product converted to international dollars using purchasing power parity rates. An international dollar has the same purchasing power over GDP as the U.S. dollar has in the United States. Data are in constant 2017 international dollars.

Source: World Bank data, http://databank.worldbank.org/data/download/WDI_excel.zip

When verifying the first hypothesis, the CEE-11 countries were treated as one economic area, but in fact they are not a homogenous group. Among 11 CEE economies, the region was dominated by the Polish economy with a 36.1% share in the region's GDP measured in current USD and 37.7% in the region's GDP converted to international dollars using PPP in 2020 (see: *Figure 1*). The share of the other economies in the CEE-11's GDP is also changing in time. The rising share can be seen in the case of Romania (an increase in the share in the region's GDP measured in current USD from 9.5% in 1995 to 15% in 2020, and in case of PPPconversion – from 14% to 17.9%). The Baltic states achieved a similar success (7.3% in 2020 against 4.6% in 1995 in the case of GDP in current dollars). The impact on the GDP of the Western Balkans region is declining: in Slovenia (e.g. decreasing share in CEE-11 GDP measured in current dollars from 5.4% to 3.2%), in Croatia (decrease

from 5.8% to 3.5%), as well as in Hungary (decrease from 11.8% to 9.4%). Detailed statistics can be found in *Figure 1.*

Figure 1: Share of individual countries in the GDP of the CEE-11 region in 1995 and 2020.
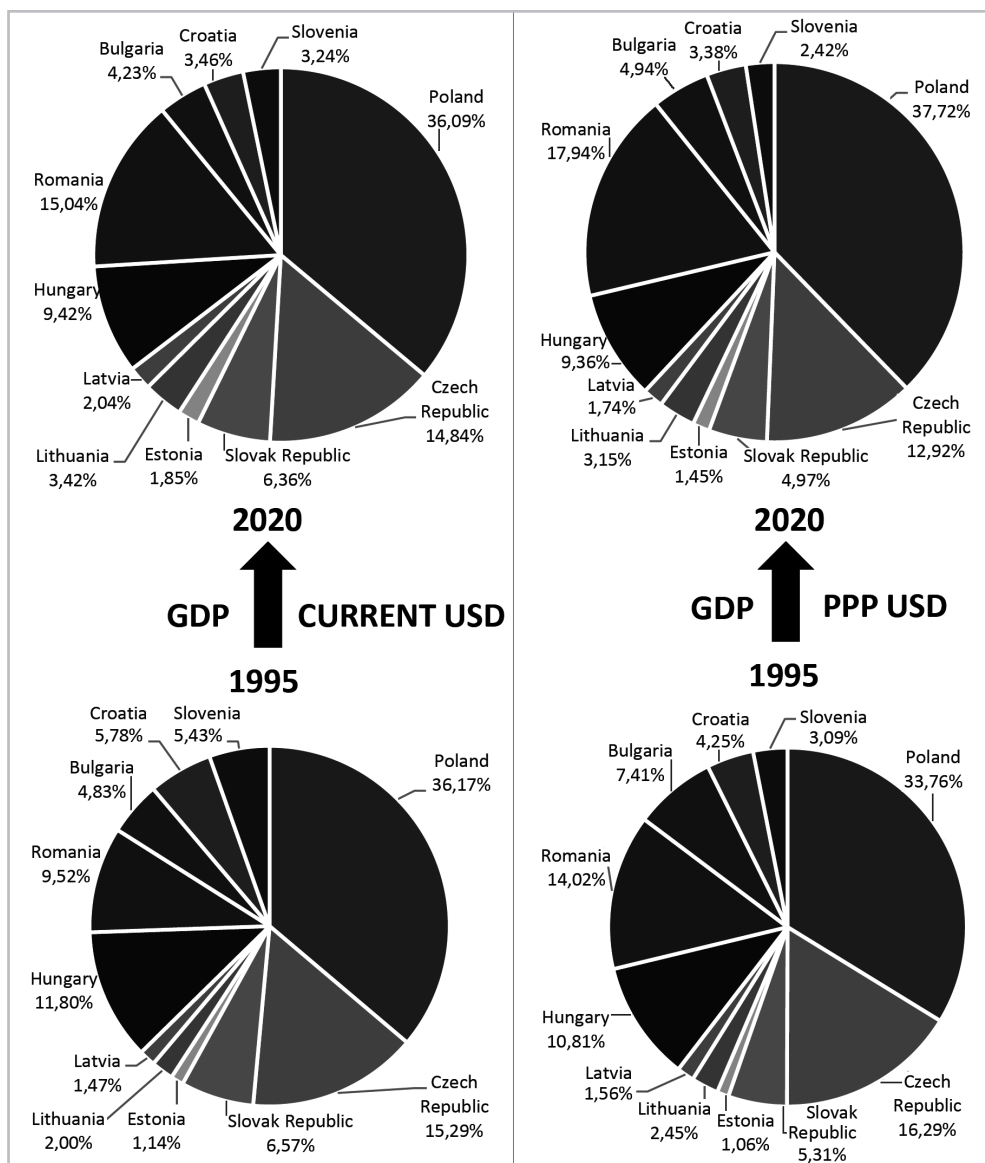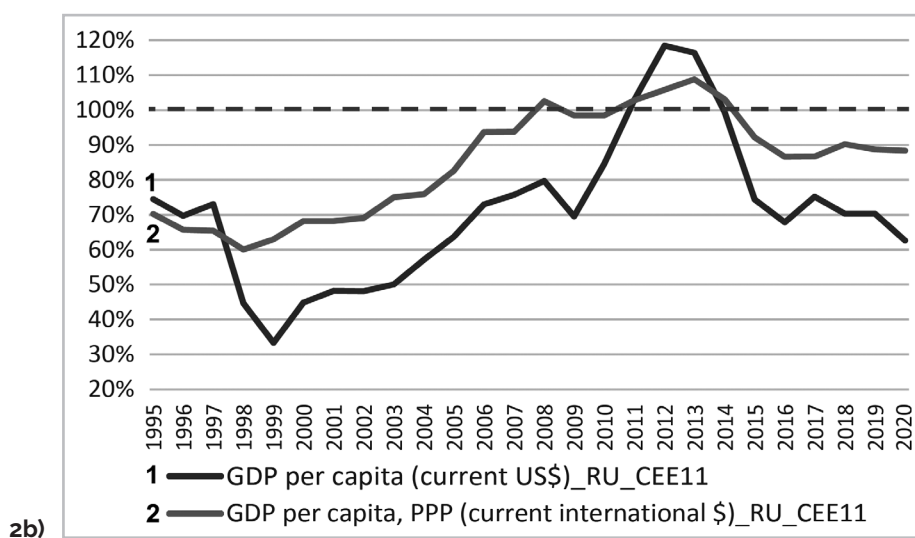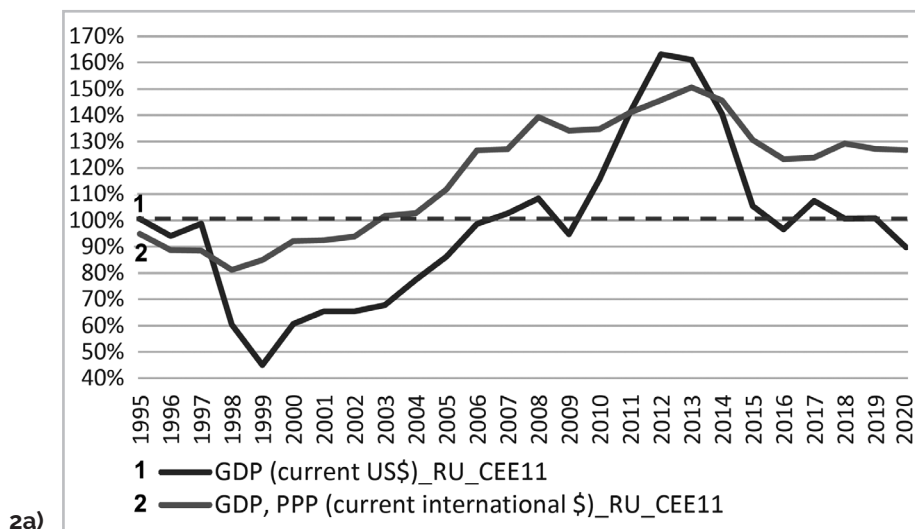

Source: own elaboration based on World Bank data, http://databank.worldbank.org/data/download/WDI_excel.zip

The dynamics of Russia's geoeconomic potential in relation to the CEE-11 region are presented in *Figures 2(a,b)*. It is characterised by three periods: (i) a period of deterioration of Russia's geoeconomic potential: 1995–1999, (ii) a period of strong improvement: 2000–2013, and (iii) a period of renewed geoeconomic strength deterioration: 2014–2020.

i.   **1995–1999:** Russia's GDP (current USD) was equal to 100.6% of the CEE-11 region in 1995, but it plunged to only 45.0% in 1999 as a consequence of negative GDP growth in three out of five years in this period and because of the financial crisis in Russia in 1998. The Russian ruble was significantly devaluating during the whole period, but only in the third quarter of 1998 it lost about two-thirds of its value. GDP per capita measured in current USD fell to an extremely low level in 1999 (33.4%) compared to GDP per capita in the CEE-11 region. In the internal market, which takes into account domestic purchasing power, the situation was better, but also then Russia's economic potential was much lower compared to the CEE-11 region.

ii. **2000–2013:** the Russian economy rebounded fairly quickly after the crisis, which was helped by improving Russian price competitiveness as a consequence of ruble depreciation and the rising crude oil prices. The impressively fast economic growth and the appreciation of the ruble against the dollar meant that already in 2007 the Russian GDP in current dollars was higher than the GDP of the CEE-11 region (index 102.6%). Taking into account PPP, it exceeded the CEE-11 region level already in 2003. Russia achieved its maximum economic advantage over the CEE-11 region in terms of GDP in 2012–2013. Russia's GDP in current dollars was then over 160% of the CEE-11 region's GDP, and when calculated taking into account PPP, it reached its peak in 2013 (150.55%). Russia's economic successes translated into its citizens' well-being. From 2011 to 2013, GDP per capita (current prices in USD) was higher than in the CEE-11 region (the indicator reached its maximum value in 2012 at 118.4%). Taking into account the purchasing power in the domestic market, GDP per capita in Russia from 2008 to 2014 was usually slightly above the corresponding value in the CEE-11 region.

iii. **2014–2020:** the slowdown in economic growth in Russia that already began in 2013 was generally presented throughout the period. Situation in Ukraine in 2014 hampered Russia's investments and GDP growth, hindering economic restructuring and modernisation (Havlik 2014). In 2020, only GDP based on the purchasing power parity was higher than the corresponding value in the CEE-11 region (126.7%). In turn, GDP at current prices amounted to merely 89.7% of the GDP of the CEE-11 region. Apart from slowing the pace of economic growth, this was also due to the progressive depreciation of the ruble. As a consequence, the relative quality of life in Russia, measured by GDP per capita, has deteriorated. At current prices, the indicator for Russia's GDP per capita was only 62.6% of the CEE-11 level, and it went back to the 2005 values. GDP per capita including purchasing power was 88.4% of the corresponding level in CEE-11.

Figures 2 (a, b): The dynamics of the geoeconomic potential of Russia in relation to the CEE-11 region (1995-2020): 2a) – dynamics measured for GDP (in current dollars and converted to international dollars using PPP); 2b) – dynamics measured for GDP per capita (in current dollars and converted to international dollars using PPP).

2a)

2b)

Variables, research data and method

The selection of variables

Positive verification of the hypothesis of the deterioration of Russia's geoeconomic strength towards the CEE-11 region in recent years opens the way to search for the reasons for this state of affairs. Potential determinants of changes in Russia's geoeconomic potential in relation to the CEE-11 region should be sought in the factors responsible for the pace of economic growth. The choice of variables used to verify the second hypothesis refers to the literature on economic growth[6].

The Harrod–Domar model is the starting point for considering the determinants of economic growth. Harrod (1939) and Domar (1947) developed a model based on Keynes' analysis. In their model, the GDP growth rate is determined by the savings rate, which allows greater investment, which in turn increases the existing production capacity of the economy. Thus, capital accumulation and its productivity play a fundamental role in the process of economic growth. The Harrod–Domar concept was refined by Solow (1956) and Swan (1956), whose neoclassical model – using the Cobb–Douglas production function with two production factors: physical capital (fixed assets) and human capital (labour) – was expanded to include the impact of labour productivity and technological progress on economic growth. In contrast to the Solow–Swan model, which treats technical progress and the savings rate as exogenous factors, endogenous growth models recognise technical progress related to investments in human capital (expenditure on education: Lucas 1988) and innovation (research & development: Romer 1986) as a key factors of economic growth.

Proponents of the institutional approach (e.g. Abramovitz 1986; Barro 1991; Hall, Jones 1997; Acemoglu, Robinson 2010) argued that an important condition influencing economic growth, apart from access to physical capital, human capital, and modern technologies, is the existence of institutional solutions that enable a society to make optimal use of human and physical capital, and its technology.

The openness of the economy to foreign trade along with the capital flows, which are associated with the flow of production factors and technologies, contributes also to the increase of economic growth (Srinivasan, Bhagwati 1999). Opening to international trade allows the economy to take advantage of its comparative advantages, ensuring the optimal allocation of domestic factors of production, and opening to foreign capital enables the use of those factors of production that are insufficiently present in the country (Li, Liu 2005). Through openness to the flow of knowledge and technology, the country can benefit from innovations created abroad (Grossman, Helpman 1991; Cotton, Ramachandran 2001). In turn, the role of the real exchange rate in the growth process was analysed by Eichengreen (2008). Another stream of literature is devoted to the issue of natural resources and economic growth (Havranek et al. 2016). Especially energy occupies an important place in countries' economies. The asymmetric effect of energy prices

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6   A broader overview of various theories of economic growth and the results of empirical research on the determinants of economic growth can be found e.g. in publication: Śliwiński (2011).

on economic growth can be shown e.g. in the case of oil-producing and oil-consuming countries (Bozkurt et al. 2015).

Taking into account the above short review of the literature on economic growth, the potential determinants of the dynamics of Russia's geoeconomic power in relation to the CEE-11 region were selected and subjected to further econometric analysis. *Table 2* contains the definitions of determinants that were used in this article to verify the second hypothesis formulated in introduction.

Table 2: Definitions of the determinants of economic growth used in the econometric analysis.

Variable	Definition
Gross capital formation (*I*)	Gross capital formation consists of outlays on additions to the fixed assets of the economy plus net changes in the level of inventories. Fixed assets include land improvements (fences, ditches, drains, and so on); plant, machinery, and equipment purchases; and the construction of roads, railways, and the like, including schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings. Inventories are stocks of goods held by firms to meet temporary or unexpected fluctuations in production or sales, and „work in progress.". Data are in current U.S. dollars.
Labour force (*L*)	Labour force comprises people ages 15 and older who supply labour for the production of goods and services during a specified period. It includes people who are currently employed and people who are unemployed but seeking work as well as first-time job-seekers.
Exports and imports of goods and services (*XM*)	Exports and imports of goods and services comprise all transactions between residents of a country and the rest of the world involving a change of ownership from residents to nonresidents of general merchandise, net exports of goods under merchanting, nonmonetary gold, and services. Data are in current U.S. dollars.
Foreign direct investment, net inflows (*FDI*)	Foreign direct investment refers to direct investment equity flows in the reporting economy. It is the sum of equity capital, reinvestment of earnings, and other capital. Direct investment is a category of cross-border investment associated with a resident in one economy having control or a significant degree of influence on the management of an enterprise that is resident in another economy. Ownership of 10 percent or more of the ordinary shares of voting stock is the criterion for determining the existence of a direct investment relationship. Data are in current U.S. dollars.
Crude oil prices (*CO*)	Crude Oil West Texas Intermediate (WTI) cash prices calculated for each year as the arithmetic mean of prices at the end of each quarter

Sources: api.worldbank.org, stooq.pl

Research data

The research is based on yearly data on the ratios of individual CEE-11 countries' GDP to Russia's GDP measured in current prices. The explanatory variables, except for crude oil prices, are the relations of individual CEE-11 countries' and Russia's potential determi-

nants of their GDP growth presented in *Table 2*. Descriptive statistics of the variables are presented in *Table 3*.[7]

The data set is focused on Russia and individual CEE-11 countries. Annual data from 2001 to 2020 were utilised. It was caused by the availability of the data in the World Bank database. All variables are downloaded from the WDI online database of the World Bank excepting crude oil prices, which were downloaded from https://stooq.pl. As the data on net inflows of foreign direct investments for Hungary are very volatile and fluctuated substantially, Hungary was excluded from the econometric analysis which takes into account this variable.

Table 3: Descriptive statistics of the variables.

	i-th CEE-11 country to Russia GDP in current dollars ratio (GDP_{it})	i-th CEE-11 country to Russia gross capital formation ratio (I_{it})	i-th CEE-11 country to Russia labour force ratio (L_{it})	i-th CEE-11 country to Russia exports and imports of goods and services ratio (XM_{it})	i-th CEE-11 country to Russia foreign direct investment, net inflows ratio (FDI_{it})	Crude oil prices (CO_t)
Mean	9.31%	10.08%	6.00%	18.88%	31.85%	62.59
Median	4.81%	5.45%	3.61%	10.42%	11.74%	60.61
Maximum	62.26%	58.20%	24.75%	92.40%	1782.17%	98.63
Minimum	1.04%	1.20%	0.90%	2.21%	-732.68%	25.30
Std. Dev.	10.45%	10.44%	6.56%	17.80%	137.77%	23.92
Observations	220	220	220	220	220	220

Source: own elaboration based on World Bank, http://databank.worldbank.org/data/download/WDI_excel.zip

The analysis of *Table 3* demonstrates that the CEE-11 region has a relative advantage over Russia in terms of gross capital formation, exports and imports of goods and services, and net inflows of foreign direct investment. The average values of these variables ratios are higher than the ratio showing the relation of individual CEE-11 countries' GDP to Russia's GDP measured in current dollars. In turn, Russia has a relative advantage over the CEE-11 countries in terms of the labour force.

Empirical method

Data used for the *panel data estimation* are cross-sectional data pooled over 20 years' time periods (data for each country plus average yearly crude oil prices). The general form of panel models is written as:

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[7] If the ratio is equal to 100%, it would mean that in a given period the value of e.g. gross capital formation for the *i*-th CEE-11 country is the same as for Russia. If it were, for example, 50%, it would mean that it accounts for half of the Russian investments.

$$GDP_{it} = \beta_0 + \beta_1 I_{it} + \beta_2 L_{it} + \beta_3 XM_{it} + \beta_4 FDI_{it} + \beta_5 CO_t + \varepsilon_{it}$$

where:

GDP_{it} denotes the ratio $\dfrac{gdp\ in\ current\ dollars\ at\ \boldsymbol{t}\ period\ in\ \boldsymbol{i}\ CEE{-}11\ country}{gdp\ in\ current\ dollars\ at\ \boldsymbol{t}\ period\ in\ Russia}$,

$I_{it} = \dfrac{gross\ capital\ formation\ at\ \boldsymbol{t}\ period\ in\ \boldsymbol{i}\ CEE{-}11\ country}{gross\ capital\ formation\ at\ \boldsymbol{t}\ period\ in\ Russia}$,

$L_{it} = \dfrac{labour\ force\ at\ \boldsymbol{t}\ period\ in\ \boldsymbol{i}\ CEE{-}11\ country}{labour\ force\ at\ \boldsymbol{t}\ period\ in\ Russia}$,

$XM_{it} = \dfrac{exports\ and\ imports\ of\ goods\ and\ services\ at\ \boldsymbol{t}\ period\ in\ \boldsymbol{i}\ CEE{-}11\ country}{exports\ and\ imports\ of\ goods\ and\ services\ at\ \boldsymbol{t}\ period\ in\ Russia}$,

$FDI_{it} = \dfrac{FDI,net\ inflows\ at\ \boldsymbol{t}\ period\ in\ \boldsymbol{i}\ CEE{-}11\ country}{FDI,net\ inflows\ at\ \boldsymbol{t}\ period\ in\ Russia}$,

CO_t – crude oil prices at $\boldsymbol{t}$ period, $\boldsymbol{\beta_0}$ stands for the overall constant, $\boldsymbol{\varepsilon}_{it}$ are error terms.

Preliminary regressions for panel data included the pooled *ordinary least squares* (OLS) models performed on all available observations (balanced panels). As panel unit roots tests demonstrated that variables are nonstationary,[8] *fully modified ordinary least square* (FMOLS) model was also applied. It resulted from the cointegration of the heterogeneous panel[9] and assumed endogeneity of variables. In the FMOLS technique heterogeneous first-stage long-run coefficients option was used to capture heterogeneity. Pedroni (2000, 2004) demonstrated that the FMOLS technique should be more powerful than the OLS model when working with a cointegrated panel meaning that it allows researchers to selectively pool the long-run information contained in the panel while permitting the short-run dynamics and fixed effects to be heterogeneous among different members of the panel.

Research results and discussion

The hypothesis on a positive relationship between CEE-11 to Russia GDP ratio (GDP_{it}) and (i) CEE-11 to Russia exports and imports of goods and services ratio (XM_{it}), and (ii) CEE-11 to Russia foreign direct investment net inflows ratio (FDI_{it}) was tested by panel regression models. The control variables chosen for econometric analysis are CEE-11 to Russia gross capital formation ratio (I_{it}), CEE-11 to Russia labour force ratio (L_{it}) and crude oil prices (CO_t). Positive relationship between dependent variable (GDP_{it}) and (i) CEE-11 to

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[8]   Fisher-type test using Augmented Dickey and Fuller – ADF (see: Maddala, Wu 1999; Choi 2001) was applied to test panel unit roots.

[9]   The Pedroni test (see more: Pedroni 2002) was used for co-integration analysis to test for the presence of long-run relationships among integrated variables.

Russia gross capital formation ratio (I_{it}), and (ii) CEE-11 to Russia labour force ratio (L_{it}) are assumed in contrast to the relationship between dependent variable (GDP_{it}) and crude oil prices ratio (CO_t) where negative relationship is expected.

$$GDP_{it} = f[\overbrace{I_{it}}^{+}, \overbrace{L_{it}}^{+}, \overbrace{XM_{it}}^{+}, \overbrace{FDI_{it}}^{+}, \overbrace{CO_t}^{-}]$$

Table 4 summarises the estimation of OLS and FMOLS panel regression models. The I OLS and III FMOLS models contain the data for all CEE-11 countries, the models II and IV omit Hungary and replace the gross capital formation ratio with the net inflow of foreign direct investment ratio.

Table 4: Results of panel regressions.

Dependent variable: CEE-11 to Russia GDP ratio – GDP_{it}				
Variable	OLS (Model I)	OLS (Model II)	FMOLS (Model III)	FMOLS (Model IV)
β_0	-0.00 (-0.44)	0.02 (2.69)***		
I_{it}	0.66 (23.76)***		0.38 (26.53)***	
L_{it}	0.41 (11.00) ***	0.82 (12.71)***	0.85 (2.39)**	-2.25 (2.87)***
XM_{it}	0.06 (3.99) ***	0.22 (8.19)***	0.12 (3.42)***	0.37 (7.01)***
FDI_{it}		0.04 (4.62)***		0.01 (2.74)***
CO_t	-0.00 (-2.23)**	-0.00 (3.87)***	-0.00 (-4.74)***	-0.00 (-9.82)***
R-squared	0.971	0,909		
Cross-section	11	10	11	10
Periods	20	20	19	19
Total panel	220	200	209	190
*** – significant at the 1 percent level; ** – significant at the 5 percent level; * – significant at the 10 percent level				

Source: own elaboration based on World Bank data, http://databank.worldbank.org/data/download/WDI_excel.zip.

The following observations describing the dynamics of CEE-11 to Russia GDP ratio can be derived from the panel regressions presented in Table 4.

i. **Exports and imports**: openness of the economy measured by a sum of exports and imports play a positive role in shaping the geoeconomic balance in Central and Eastern Europe. The analysis demonstrates that the higher the sum of exports and imports in the CEE-11 countries in relation to the value of foreign trade in Russia, the weaker the Russian geo-economic position in relation to the CEE-11 region. In the Figures 3(a,b) we can see correlated behavior of two analysed ratios measured both for the entire region (3a) and for each CEE-11 country (3b). This observation was confirmed in all the regressions from Table 4.

Figures 3 (a, b): The dynamics of CEE-11 region to Russia GDP ratio vs CEE-11 to Russia exports-imports ratio (3a), and individual CEE-11 countries to Russia export-import ratios vs individual CEE-11 countries to Russia GDP ratios (3b).
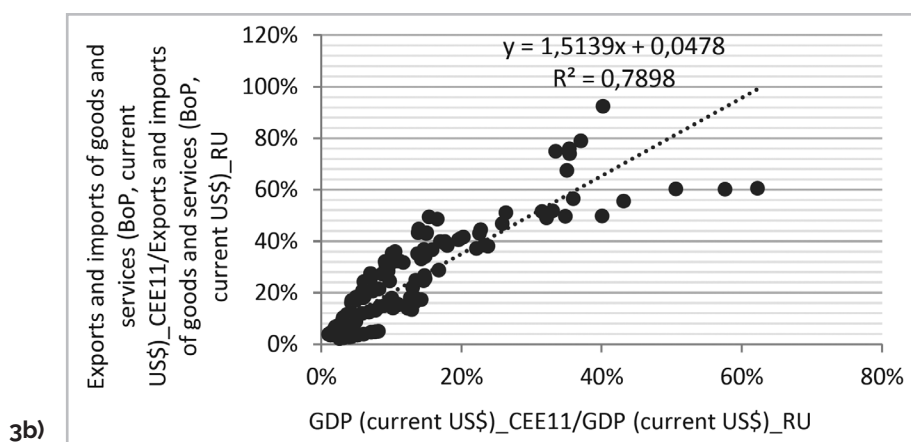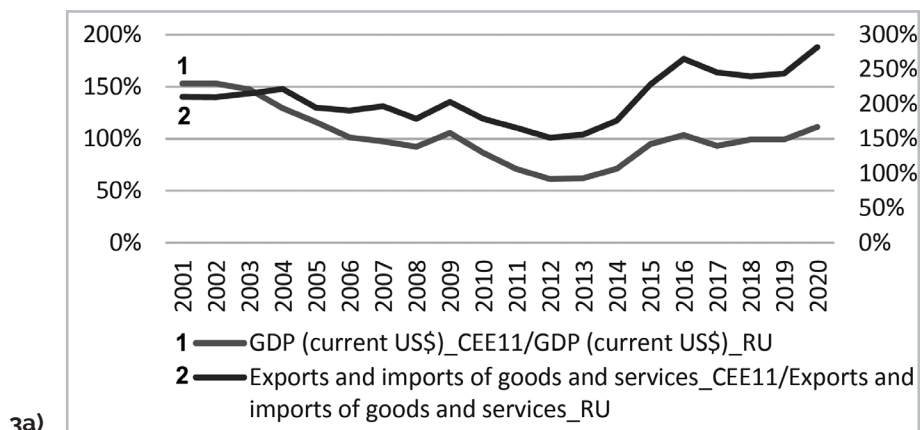
3a)

3b)

Source: own elaboration based on World Bank data, http://databank.worldbank.org/data/download/WDI_excel.zip

ii. **Net inflows of FDI:** a positive relationship was also discovered for the ratio sho-wing the relation of net FDI inflows for CEE-11 and Russia. It is significant in all regressions, which included this ratio as a variable, although the beta coefficient is smaller than in the case of foreign trade CEE-11 to Russia ratio. The charts presented in *Figures 4(a,b)* demonstrate that in the long run the relatively more foreign direct investment inflow to CEE-11 region than to Russia, the worse Rus-sian geoeconomic strength towards the CEE-11 region becomes.

Figures 4 (a, b): The dynamics of CEE-11 region to Russia GDP ratio vs CEE-11 to Russia net inflow of foreign direct investment ratio (4a), and individual CEE-11 countries to Russia net inflow of foreign direct investment ratios vs individual CEE-11 countries to Russia GDP ratios (4b).
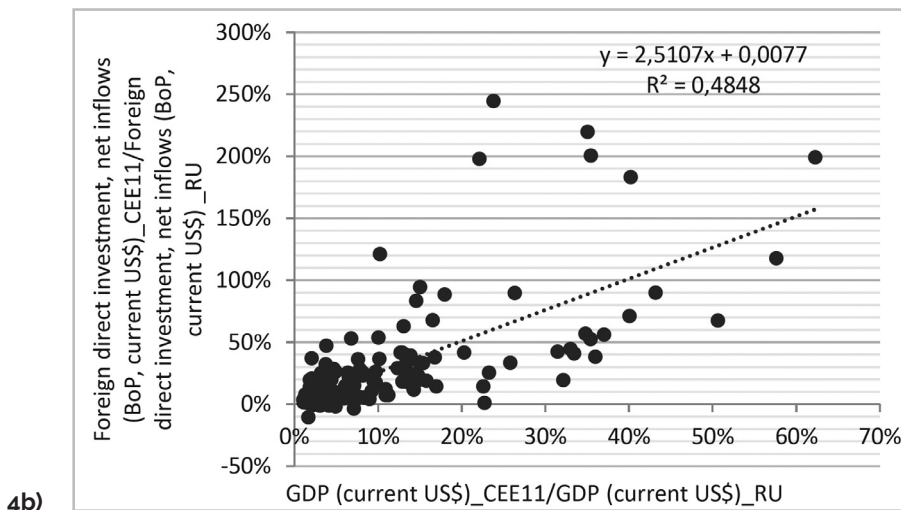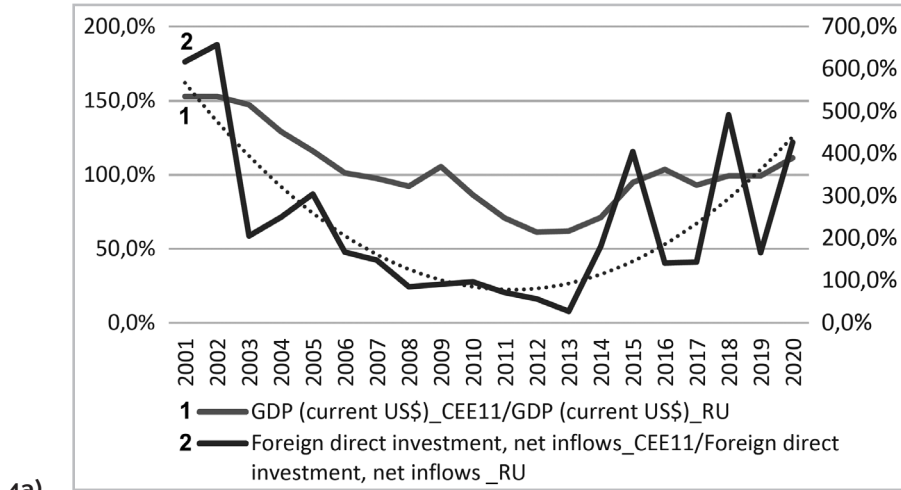
4a)

4b)

Source: own elaboration based on World Bank data, http://databank.worldbank.org/data/download/WDI_excel.zip

    iii.   **Gross capital formation and labour force**: as expected, there are also positive relationships in the case of investment (gross capital formation) and number of the labour force, and the balance of geoeconomic power in Central and Eastern Europe. The higher dynamics of investment and the bigger employment in CEE-11

countries compared with Russia, the better the geoeconomic strength of CEE-11 in relation to Russia is. *Figures 5(a,b)* demonstrate the correlated behavior of CEE-11 to Russia gross capital formation and labour force ratios with CEE-11/Russia GDP ratios. These observations were generally confirmed in panel regressions.

Figures 5 (a, b): The dynamics of CEE-11 to Russia GDP ratio vs CEE-11 to Russia gross capital formation ratio (5a), and the dynamics of CEE-11 region to Russia GDP ratio vs CEE-11 to labour force ratio (5b).
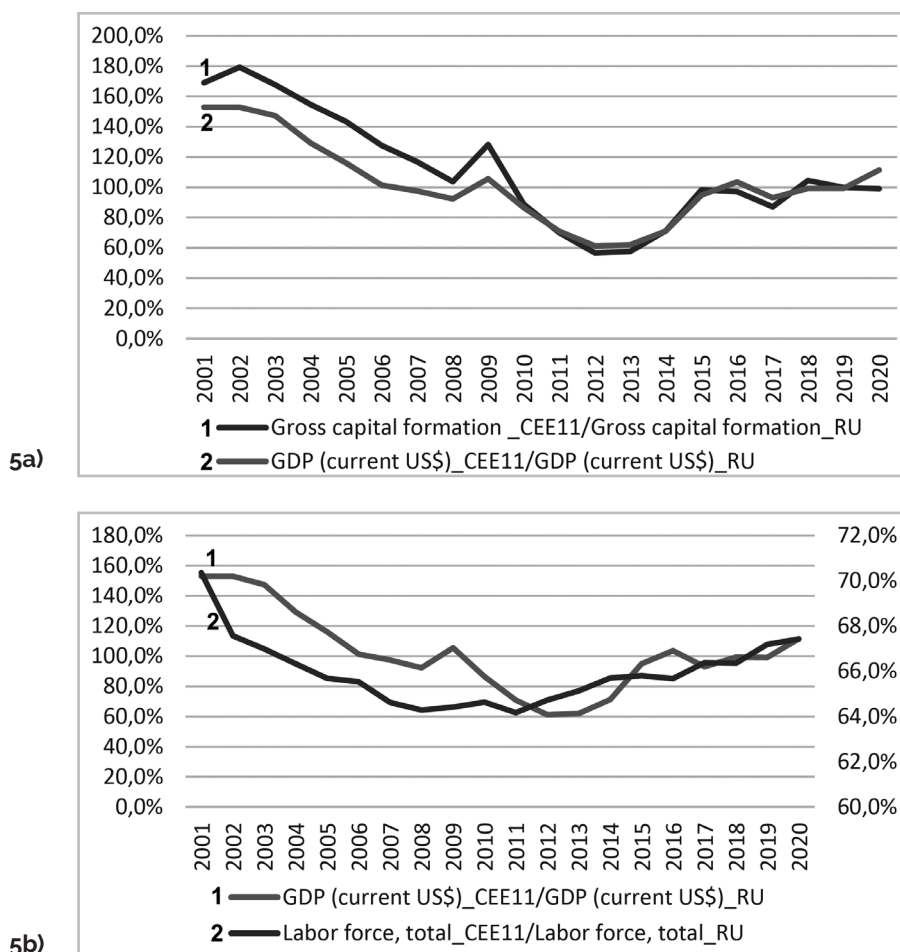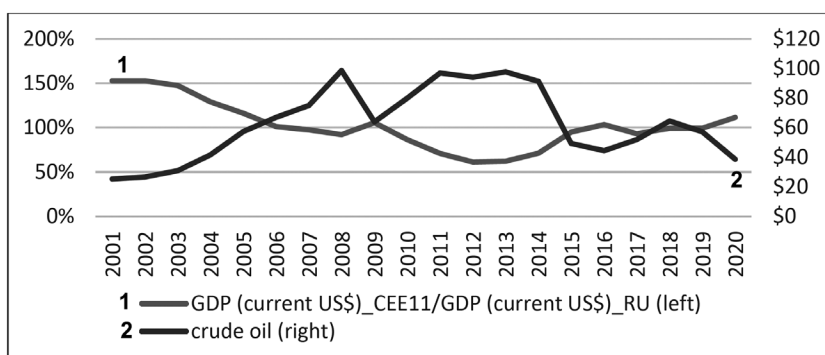

5a)

5b)

Source: own elaboration based on World Bank data, http://databank.worldbank.org/data/download/WDI_excel.zip

iv. **Crude oil prices**: natural resources play a crucial role in the Russian economy. "Russia's role in the global economic system today […] is dominated by the export

of natural resources, particularly oil and gas" (Bradshaw, Connolly 2016: p.700). The volatility of prices in global resource markets has also a big impact on Russia's geo-economic strength in relation to the CEE-11 region. This is confirmed in *Table 4* and *Figure 6,* which demonstrate a negative relationship between the crude oil prices and the economic power of the CEE-11 region. In general, the higher prices of natural resources exported from Russia, the better the economic situation of Russia manife-sted not only internally (e.g. via higher revenues to Russia's federal budget) but also externally improving the economic power in relation to other countries.

Figure 6: The dynamics of CEE-11 to Russia GDP ratio *vs* crude oil prices.

Source: own elaboration based on World Bank data, http://databank.worldbank.org/data/down-load/WDI_excel.zip

Conclusions

The article confirms the research hypotheses that:

i. In the period after the year 2014, Russia's geoeconomic strength in Central and Eastern Europe stopped improving. In 2014, the geoeconomic balance of power in Central and Eastern Europe began to change in favor of the CEE-11 region, both when measured by the ratio of Russia's GDP to the CEE-11 region, measured in current dollars, and international dollars using purchasing power parity.

ii. The economic sanctions imposed on Russia after 2014 have negatively influenced its geoeconomic strength in relation to the CEE-11 region by reducing the relative export and import flows, and FDI net inflows in Russia compared to the CEE-11 countries.

The geoeconomic strength of a state can be defined in terms of wealth and competitive advantage. Its improvement can be achieved based on both domestic and foreign resources in the form of acquiring and attracting foreign production factors to a given economy, primarily technology and capital. The flows of goods and services are also an important element in creating geoeconomic strength. Export enables the expansion of the demand base for goods produced domestically, while import enables the acquisition of resources, sometimes of strategic importance, which are either absent in the country or produced at a high cost.

Economic sanctions on capital and trade flows are an essential component of geoeconomic tools, imposed on Russia. They entail the alteration of economic flows to advance political objectives (Portela 2021). The sanctions imposed on Russia had an impact on foreign direct investment (FDI) and other trade flows to and from Russia. *Figure 7(a)* demonstrates that since 2014 trade flows to and from Russia deteriorated, in contrast to the CEE-11 countries, in which the sum of export and import accelerated. *Figure 7(b)* shows that also since 2014, capital in the form of FDI has been flowing more into the CEE-11 region than into Russia. These observations are also confirmed in econometric studies and provide a positive empirical assessment of the effects of sanctions on Russia's investment and trade flows.

Figures 7 (a, b): The dynamics of the sum of exports and imports of goods and services from and to the CEE-11 region and Russia (7a), and the dynamics of foreign direct investment net inflows to the CEE-11 region to Russia (7b).
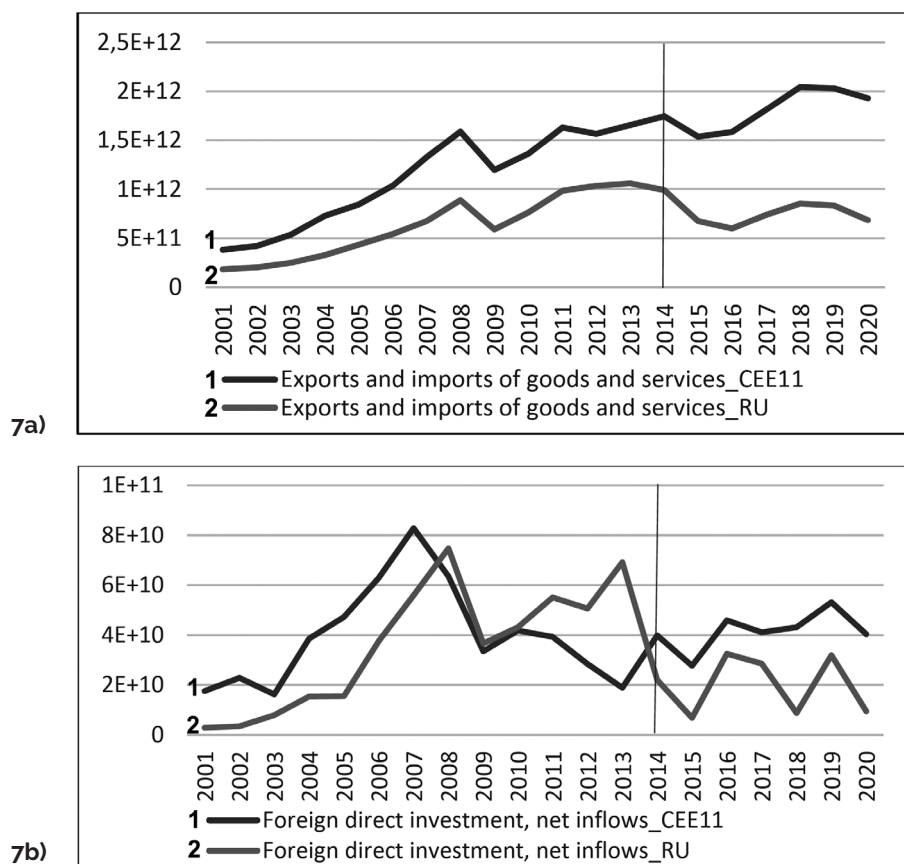
7a)

7b)

Source: own elaboration based on World Bank data, http://databank.worldbank.org/data/download/WDI_excel.zip

Apart from the aspect of economic sanctions as a geoeconomic tool aimed at Russia, an important element influencing the size and direction of investments and trade flows is the attractiveness and competitiveness of Russian economy. In case of Russia, the attractiveness of its economy in relation to the CEE-11 region is falling, which will not be conducive to the improvement of Russia's geoeconomic strength in the nearest future. Let's hope that the deteriorating geoeconomic power of Russia can produce substantial geopolitical returns and will contribute to ending the conflict in Ukraine on the terms accepted by the attacked country.

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Paweł Piotr Śliwiński – dr hab., profesor uczelni i kierownik Katedry Finansów Międzynarodowych na Uniwersytecie Ekonomicznym w Poznaniu. W pracy naukowej specjalizuje się w ekonomii międzynarodowej, finansach międzynarodowych, finansach przedsiębiorstw i rynkach kapitałowych. Jest absolwentem Akademii Ekonomicznej w Poznaniu (ekonomika i organizacja handlu zagranicznego), ale studiował także ekonomię menedżerską na Uniwersytecie w Antwerpii w Belgii oraz makroekonomię na Uniwersytecie w Tilburgu w Holandii.

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EUROPEAN
IMPRESSIONS

Education, innovations and development of local markets in CEE countries: problems and perspectives

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Abstract

This paper presents brief results of the analysis of educational potential dynamics and its relation with development of regional labour markets. The educational potential is described by the structure of the economically active population with different levels of education. The aim of the research was to study the impact of the educational potential of the economically active population on the development of regional markets in Central and Eastern Europe (CEE). Authors used for research the Eurostat data for

the NUTS2 regions of the following CEE countries: Austria, Czechia, Germany, Hungary, Poland, and Slovakia. Analysis of the distribution of educational potential of the economically active population of these CEE countries at the regional level was carried out using the methods of spatial econometrics and statistics. Research results demonstrated: insufficient response of local markets to changes in the structure of educational potential and the level of investment in fixed assets; strong state regulation of the unemployment rate in the former post-socialist countries (Czechia, Poland, Hungary, Slovakia); complex relationships between labour productivity growth rates, average wages, changes in educational potential and unemployment rates; significant influence of the surrounding regional environment on the socio-economic processes taking place in certain regions.

Keywords: Central and Eastern Europe, spatial econometrics, innovations, labour market, educational potential.

Edukacja, innowacje i rozwój rynków lokalnych w krajach Europy Środkowo--Wschodniej: problemy i perspektywy

Streszczenie

Niniejszy tekst skrótowo prezentuje wyniki badań dynamiki potencjału edukacyjnego i jego związku z rozwojem rynku pracy. Potencjał edukacyjny przedstawia struktura ludności aktywnej zawodowo o różnym poziomie wykształcenia. Celem badań była analiza wpływu potencjału edukacyjnego ludności aktywnej zawodowo na rozwój rynków regionalnych w Europie Środkowo-Wschodniej (EŚW). Autorzy wykorzystali do badań dane Eurostatu dla regionów NUTS2 następujących krajów Europy Środkowo-Wschodniej: Austrii, Czech, Niemiec, Węgier, Polski i Słowacji. Analizę rozkładu potencjału edukacyjnego ludności aktywnej zawodowo tych krajów na poziomie regionalnym przeprowadzono z wykorzystaniem metod ekonometrii przestrzennej i statystyki. Wyniki badań wykazały: niewystarczającą reakcję rynków lokalnych na zmiany w strukturze potencjału edukacyjnego i poziomie inwestycji w środki trwałe; silną regulację państwową stopy bezrobocia w byłych krajach postsocjalistycznych (Czechy, Polska, Węgry i Słowacja); złożone zależności między tempem wzrostu wydajności pracy, przeciętnymi płacami, zmianami potencjału edukacyjnego a stopami bezrobocia; znaczący wpływ otaczającego środowiska regionalnego na procesy społeczno-gospodarcze zachodzące w poszczególnych regionach.

Słowa kluczowe: Europa Środkowo-Wschodnia, ekonometria przestrzenna, innowacje, rynek pracy, potencjał edukacyjny.

One of the key problems of the EU countries is to increase the competitiveness of national economies and the employment of the economically active population. These goals were proclaimed in many documents of the European Commission, including the well-known *Lisbon Strategy* (see: Benova et al. 2013; European Commission 2005, 2008). In the same time, in the Member States, the regional disproportions in the distribution of labour potential with different levels of education are observed (see: Benova et al. 2013; Blaskó et al. 2021; Eurydice 2007).

For instance, for many EU countries, there are significant differences in the distribution of labour resources with higher education in different age groups. For example, in Poland,

a higher percentage of the labour force with higher education in the 24-29 and 30-34 age groups has recently been observed. A rather high percentage of labour resources with higher education is noted in the age groups of 24-29 and 30-34 years in Sweden, Denmark, the Netherlands, Ireland, France, and Cyprus. In Germany, Austria and Italy, the labour force with higher education in these age groups is significantly lower than, for example, in the Scandinavian countries, Great Britain or Ireland. Rather low rates of the population with higher education in all age groups are observed in Greece, Spain, Portugal, Bulgaria, Romania (Blaskó et al. 2021; Eurydice 2007; European Commission 2012).

The calculation of the coefficients of variation of the population with higher education in different age groups for the EU countries demonstrated that in the age groups of 24-29 years and 30-34 years the fluctuation rates of the population with higher education are less than 30%, while in other age groups the fluctuation indicators exceed 30% (see: Benova et al. 2013; Blaskó et al. 2021). The indicator of the percentage of the population with higher education is not only the indicator that characterises the level of training of labour resources, their knowledge and competencies. Firstly, in the Member States there are quite strong differences in higher education systems and mechanisms for their financing. Essential peculiarities in the national education systems exist in the content of educational programmes, methods and forms of teaching, admission criteria, etc. (Blaskó et al. 2021; Cedefop 2020; Eurydice 2007; European Commission 2013; Madelin, Ringrose 2016; Rayevneva et al. 2010).

In addition, there is a steady trend of migration of the young and middle-aged population with higher education from countries where the standard of living is lower to countries with higher living standards. Also, recently there has been a flow of graduates from other countries (Eastern Europe, Russia, China), who are striving to get a more prestigious education and work in Western Europe (Blaskó et al. 2021; Cedefop 2020; Eurydice 2007; Madelin, Ringrose 2016). All these factors have an impact not only on the distribution of educational potential in the EU countries, but also in its various characteristics. In most EU countries, the following situation is observed: graduates of the humanities sciences prevail, while the popularity of technical, fundamental and natural sciences, as well as scientific research is low (Eurydice 2007; European Commission 2012). Thus, in Romania, Slovenia, Latvia, Bulgaria, Cyprus, the percentage of graduates who have received higher education in the field of social sciences, business and law is higher than in other EU countries. The highest rates of graduates, who have received higher education in the field of scientific research, mathematics and computer science, were observed in the UK and Germany. As for graduates with higher education in the field of technical sciences, production and construction, the leader here is Finland, where this indicator significantly exceeds the level in other countries. However, relatively high percentages of graduates with higher education in these specialties are observed in Sweden, Austria, Portugal and Romania. With regard to the distribution of graduates with higher education, for all EU countries there is a higher proportion of graduates, who have received diplomas in medical specialties or social protection. The highest rates of graduates with higher education in this area are observed in Sweden and Denmark. The percentage of university gradu-

ates in agriculture and veterinary sciences is traditionally low in all EU countries (Eurydice 2007; European Commission 2012).

Significant differences in the distribution of graduates with higher education in various specialties in the EU countries can be explained by many factors:

- the strengthening of the humanitarian direction of training in secondary schools compared to basic knowledge in the field of natural and exact sciences;
- the prestige of economic, financial and legal specialties due to higher salaries;
- declining interest of young people in scientific research and the career of a scientist.

This situation in the market of educational services is facilitated by the situation in the labour market, especially in countries with relatively low level of incomes and wages. For example, in Slovakia, as well as in other former post-socialist countries, there are significant disparities in the level of wages of specialists with higher education. At the same time, the lowest wages are observed in the field of education, scientific research, pedagogy, culture. And the highest level of wages is in the field of information technology, pharmaceutical industry and management (Eurydice 2007; European Commission 2012; Madelin, Ringrose 2016).

In addition, large disparities in average wages within EU Member States and higher wages in areas, that do not require special skills and higher education in richer EU countries, attract labour migrants with different levels of education. Therefore, in countries with higher incomes, it is much easier to find a fairly well-paid job (by the standards of this country) for a foreign specialist with a higher education and knowledge of foreign languages. For example, the candidates from Asia or Eastern Europe, even if they have good education, can look for simple jobs, which are need in labour markets and are not requiring a high level of education. This situation on the labour markets in Western Europe can be explained both by institutional barriers and methods of protecting domestic labour markets, and their inflexibility to changes associated with various challenges. In particular, the flow of highly skilled labour force, which Western labour markets are not able to effectively use due to for the relatively low growth of jobs in the field of innovative production and services. Significant problem for the effective use of the external influx of highly skilled migrants are bureaucratic barriers, highly regulated labour market, which ultimately leads to a decrease in the competitiveness of Western European markets and a reorientation of both investors and a mobile skilled workforce towards fast-growing and developing Asian markets.

This problem is especially relevant for the countries of Central and Eastern Europe (CEE), where the most acute problems are the issues of border and cross-border migration of the economically active population, especially young people and middle-aged people, with different levels of education and professional skills. The economic and social regional policy in these countries does not sufficiently take into account structural imbalances in labour markets and emerging trends, which is manifested in poor adaptation of labour markets to current and future changes (Cedefop 2020; Eurydice 2007; European Commission 2005, 2012; Madelin, Ringrose 2016).

The aim, research materials and indicators

The aim of our research was to analyse the impact of the educational potential of the economically active population on the development of regional markets in selected CEE countries. The research tasks were:

1) to study the spatial distribution of the educational potential of the NUTS2 regions of selected 6 CEE countries;

2) to analyse changes in the educational potential of the economically active population in the regions of these countries;

3) to analyse the influence of the educational potential of the economically active population on the level of development of regional labour markets, characterised by such indicators as labour productivity, average wages and unemployment.[1]

Eurostat data for the NUTS2 regions of several CEE countries (Austria, Czechia, Germany, Hungary, Poland and Slovakia) was used as research material. The choice of these countries can be explained by the fact that they have common borders, represent a group of countries with both developed social market economies (Germany and Austria) and post-transformation countries (Czechia, Hungary, Poland and Slovakia).

For this research, data from Eurostat was selected to characterise the level of educational potential of the economically active population. We also use the main indicators that determine the level of development of labour markets, such as: labour productivity, average wages and unemployment.

The educational potential is described by the structure of the economically active population with one or another maximum achieved level of education. There are three main levels:

▪ ED02 – the proportion of the economically active population with incomplete and secondary levels of education;

▪ ED34 – the proportion of the economically active population with an education above secondary, but not higher;

▪ ED56 – the proportion of the economically active population with first and second levels of higher education (Benova et al. 2013: p. 25).

Analysis of the distribution of the educational potential of the economically active population of selected CEE countries at the regional level was carried out using the methods of spatial econometrics and statistics. There have been some changes in the spatial distribution of the share of the economically active population with an education level of ED02 in the NUTS2 regions of the studied CEE countries. Based on the analysis of results of the spatial distribution of the shares of the economically active population with education levels ED02, ED34 and ED56, it can be assumed that the distribution of groups of regions with higher or, conversely, lower values of these indicators is not random. To test the assumption about the non-random nature of the distribution of regions with different educational potential we use the values of Moran and Geary statistics (see:

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[1] See more about these indicators in publication: Benova et al. 2013.

Benova et al. 2013; Suchecki 2010). The Moran and Geary coefficients are usually used to estimate the degree of spatial autocorrelation and determine its nature (positive spatial autocorrelation of values or negative). Taking into account the identified spatial effects in the distribution of the educational potential of the economically active population for 84 NUTS2 regions of 6 CEE countries, it is important to analyse the impact of educational potential indicators on the state of regional labour markets and study their changes in connection with changes in educational potential and other factors. Two different specifications of spatial econometrics models, known as the *spatial lag model* and the *spatial error model*, were chosen to investigate causal relationships.

The various specifications of spatial econometric models were built and tested to assess the impact of the educational potential of the economically active population on the state and development of regional labour markets. For the data of 2002 and 2007, a spatial lag model was obtained that explains the dependence of labour productivity in 84 NUTS2 regions of 6 CEE countries on indicators of the structure of educational potential and additional factors, such as the level of investment in R&D per employee and the level of capital-labour ratio.

Brief results and conclusions

The research demonstrated that in addition to the influence of exogenous factors, the indicator of labour productivity is affected by the situation in neighboring regions. Due to the possibility of transferring new technologies and using mobile human resources in regions surrounded by more successful neighboring regions, additional externalities are created and they increase labour productivity. Conversely, less favorable conditions of the economic and social environment give less chances for the development of a certain region. For such regions more internal or external interventions are required to achieve the economic development.

Thus, the calculation with application of methods of spatial statistics demonstrated the non-random nature of the spatial distribution of the educational potential of the economically active population in the NUTS2 regions of the countries of Central and Eastern Europe (namely: Austria, Germany, Hungary, Poland, Czechia, and Slovakia).

Despite significant disproportions in the distribution of indicators of the educational potential of the economically active population, explained by both regional and country specifics, in the spatial distribution of indicators of the educational potential of the economically active population, phenomena of moderate spatial autocorrelation are observed.

This means that regions with higher rates of educational potential of the economically active population are surrounded by regions with higher values of this indicator. The spatial nature of the distribution of key indicators characterising the situation in labour markets and the peculiarities of their development leads to the need to use the apparatus of spatial econometrics. These methods make it possible to take into account both the influence of neighboring regions and the shocks arising in them on the state and development trends of regional markets.

On the basis of the developed models of spatial econometrics, which characterise the situation in regional labour markets and their development trends in the studied CEE countries, the following problems were identified:

- insufficient response of local markets to changes in the structure of educational potential and the level of investment in fixed assets and research and development developments;
- strong state regulation of the unemployment rate in the former post-socialist countries (Czechia, Poland, Hungary, and Slovakia);
- complex relationships between labour productivity growth rates, average wages, changes in educational potential and unemployment rates;
- significant influence of the surrounding regional environment on the socio-economic processes taking place in certain regions.

It should be noted that the study of the prospects for the development of educational potential in the regions of the countries of Central and Eastern Europe is an important task. Recently, due to the flows of migrants and certain demographic trends, the faster development of certain sectors of the economy, the structure of the educational potential has changed in certain regions of the mentioned countries. In this regard, it is necessary to consider various scenarios for the development of educational potential and the prospects for its formation in the medium and long term.

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Book review:
H. Müller, I. Tömmel (eds) (2022),
Women and Leadership in the European Union,
Oxford, 371 pages

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Notwithstanding the positive changes observed in female descriptive representation, women continue to be inadequately represented in the political arena. The rise of female representatives is discernible in the European Union; nonetheless, their representation remains unevenly allocated. Women have several obstacles of individual, societal, and organisational nature, as well as gender-based stereotypes at every step of their career development. Academic research examining women leaders, including the circumstances and routes that lead to their acquisition of leadership roles, as well as their performance and ability to exercise influence in European decision-making and governance, is notably scarce.

Therefore, the book entitled *Women and Leadership in the European Union* edited by H. Müller and I. Tömmel addresses this significant research gap by focusing on the investigation of women's leadership in the EU, especially on women leaders' ascent to high-level positions and their leadership style, not only in the EU institutions but also in the Member States. In this regard, the study is concentrated on three fundamental research questions:

1) How have women accessed leadership positions in EU institutions?
2) How have they performed the official functions of their offices?
3) To what extent have they achieved significant successes and lasting impact?

The book consists of *case studies* from the executive, legislative, judicial, expert, and administrative branches of the Union, taking into consideration a range of Member States and diverse situational contexts. Furthermore, for the purpose of analysis, the authors distinguish positional and behavioural leadership, as well as political, administrative, and expert leadership. Developing a conceptual framework for women's leadership, at the

intersection of three separate academic fields (namely: EU studies, leadership studies, and gender studies) is a unique contribution of this book, because they have not been combined in previous research.

The main idea provided by this monograph is that the examination of women's positional and behavioural leadership in the EU highlights that, despite being a relative newcomer to gender equality, the European polity presents opportunities for women to ascend to power and exercise leadership in their respective roles, both positionally and behaviourally. In this regard, the authors highlight that the intricate institutional framework favours a more collaborative and consensual leadership approach than authoritative one. Moreover, it has been observed that women have encountered less difficulty in attaining political positions in supranational institutions as opposed to intergovernmental bodies. Conversely, when it comes to administrative roles in EU institutions, the progress in women's representation has been slow, with women facing considerable impediments in acquiring expert positions.

The book consists of a table of contents, dedication, acknowledgements, a list of figures and tables, a list of abbreviations, a section about the Contributors, an introduction, 16 chapters, appendix *Women Leaders in the European Union: (as of October 2021)* and an index. The chapters are organised into seven distinct parts that correspond to the main themes explored in the monograph. The authors, who contributed to this book, mostly originate from universities in Western Europe. However, several contributors also hold positions at universities outside of Europe, including the United States, Canada, and the United Arab Emirates.

The first part of the book is devoted to the conceptualisation of women's leadership and a more profound theoretical comprehension of women's agency within the European context. It also sheds light on the numerous challenges that women encounter, while striving for leadership positions and when in power, drawing analytical distinctions between positional and behavioural leadership, as well as political, administrative, and expert leadership. Furthermore, the chapter intends to offer perspectives from integration theories, gender studies, and leadership studies.

The second part is mostly focused on the analysis of positional leadership in the Union, particularly in its two institutions – the European Commission (EC) and the European Parliament (EP). In the case of the EC, there is a significant rise in the share of women among commissioners and directors general. Additionally, the results indicate that women not only access leadership positions through "feminine" portfolios, but they also hold influential and prestigious EU portfolios, such as budget or external affairs. Regarding female leadership at the administrative top, there is no apparent pattern that would explain the women's career development process. In the case of EP, that at first sight seems to be an exceptional success story for the representation of women in elected office, the research results are not so optimistic, especially in terms of the most influential positions such as EP presidents, European party group leaders or committee chairs. Furthermore, observations led to the conclusion that there is a rich variance in the number of female EU parliament members (MEP) that exists between countries

depending on, for instance, cultural context, delegation size, electoral rules or the left-right dimension of political parties.

The next part takes into account the behavioural aspect of leadership. It provides the readers with four *case studies* concerning women-leaders in both EP and EC. One of them is particularly interesting, because there is qualitatively examined the case of Viviane Reding's performance both as commissioner and MEP. The investigation highlights that different institutions demand distinct leadership styles. While Reding's proactive leadership was suitable for the EC's function of proposing policies, in the case of the EP it was less successful, as it requires a more collective leadership approach.

The book also includes the analysis of national-level leaders, examining women's descriptive representation in the post of prime minister and their performance in the example of two cases – Angela Merkel and Theresa May. The study reveals that female prime ministers typically do not complete a full term in office and tend to resign at a relatively young age, with only a few exceptions. Furthermore, EU institutions have not been attractive options for post-prime-ministerial careers for the limited number of women, who have held this position in the Member States. These findings also validate the notion that EU Member States have not made significant progress in promoting women to national political executive roles. Regarding cases, it analyses the female leaders' performance during crises, uncovering their ways of crisis management and the challenges they need to face, such as extremely gendered media assessments.

The next part is dedicated to administrative leadership, including the analysis of Catherine Day's performance as secretary general of the EC and the examination of German EU policy coordination. The single *case study* reveals that Day not only successfully performed her office's multifaceted functions, but also managed to convert the Secretariat General into an office with a central position between the political and administrative levels of the Commission. Simultaneously, this part's next chapter contributes theoretically and empirically to the question of whether EU integration leads to changes in women's leadership in national public administrations by linking the EU's multilevel administration to feminist public administration theory.

The next part is focused on exercising expert leadership in two EU institutions – the European Central Bank (ECB) and The Court of Justice of the European Union (CJEU). In both cases, women remain underrepresented due to the socially constructed stereotypes and performance expectations specific to the fields that those institutions deal with. Additionally, the book's authors emphasise the significance of Member States in the nomination process, revealing their tendency to exclusively designate men to such positions.

The last part of the book is devoted to the case of Ursula von der Leyen and her pathway towards achieving one of the highest positions in the EU – the president of the EC. It uncovers her capabilities such as political drive and determination, ability to remain steadfast during challenging situations, and non-partisan stance, which were essential to both ascending to the presidency and leading the Commission. The chapter also serves as a glimpse into the prospects of women's leadership in the EU.

The book's strengths are definitely an important contribution to the studies on EU integration, leadership studies, and gender studies, as well as the provision of cases not only of political positions, but also administrative and expert ones. It is noteworthy that the title corresponds well with the content, and the concepts presented in the first part are being followed in further chapters, which makes them all fit together. The authors also indicated the research gaps, which may be a worthy hint for scholars working in this research area.

In terms of weaknesses, it is worth noting that the majority of the cases examined in the book originate from Western Europe, with other EU Member States being overlooked. Although this is understandable with regard to positions held within EU institutions, to ensure geographical diversity, it may be advisable to include other cases in the sections on national leaders or administrative leadership.

The book could be recommended to scholars, who are interested in EU studies and gender studies. This monograph book can be an inspiration for further research, particularly in the areas of research gaps that have been clearly defined in individual chapters.

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