



ANALYSIS OF THE SIMILARITY OF THE MACROECONOMIC SITUATION AND THE LEVEL OF INVESTMENT IN THE EUROPEAN UNION IN 2018-2020 IN THE CONTEXT OF THE COVID-19

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Abstract

The purpose of this article was to determine the macroeconomic and investment situation in 2018-2020 in the Member States of the European Union. The work also deals with the division of the European Union into three parts: the core, the periphery, and Central and Eastern Europe. A critical analysis of the scientific literature was used to present the economic consequences of the pandemic. Ward's method was used to create a few clusters of European Union Member States that are most similar to each other in terms of macroeconomic situation and investments. During the pandemic, the macroeconomic and investment situation worsened. Moreover, there are three groups of member states in the European Union, which indicates that there are still significant development and economic disproportions between the groups in the EU.

**ANALIZA PODOBIENSTWA SYTUACJI MAKROEKONOMICZNEJ
I POZIOMU INWESTYCJI W UNII EUROPEJSKIEJ W LATACH 2018-2020
W KONTEKŚCIE PANDEMII COVID-19**

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Słowa kluczowe: Unia Europejska, pandemia COVID, sytuacja makroekonomiczna, inwestycje.

Abstrakt

Celem artykułu było określenie sytuacji makroekonomicznej i inwestycyjnej w latach 2018-2020 w państwach członkowskich Unii Europejskiej. Praca dotyczy również podziału Unii Europejskiej na trzy części: rdzeń, peryferia oraz Europę Środkowo-Wschodnią. Do przedstawienia ekonomicznych skutków pandemii wykorzystano krytyczną analizę literatury naukowej. Metodę Warda wykorzystano do utworzenia kilku klastrów państw członkowskich Unii Europejskiej najbardziej do siebie podobnych pod względem sytuacji makroekonomicznej i inwestycji. W czasie pandemii pogorszyła się sytuacja makroekonomiczna i inwestycyjna. Ponadto w Unii Europejskiej istnieją trzy grupy państw członkowskich, co wskazuje, że nadal istnieją znaczne dysproporcje rozwojowe i gospodarcze między grupami w UE.

Introduction

The COVID-19 pandemic is not only treated as a health threat, but also as a global economic challenge. In countries that decided to introduce restrictions, an economic slowdown and even deterioration of the micro-and macroeconomic situation, as well as in the investment market, could be noticed very quickly (Wielen & Barrios, 2021, p. 1). Economists introduced the phrase LONG COVID to describe the long-term effects of the COVID-19 pandemic, which is a significant threat to society and the global economy (Rabiej & Kaliszczak, 2022, p. 356). It can be assumed that the impact of COVID-19 in individual sectors of the economy and the Member States of the European Union is diversified, even though the competitiveness of a significant part of the EU economy has decreased (Lakhani & Puranam, 2020, p. 1757).

In addition to the impact of COVID-19 on the economy, the article also addresses the issues of the diversification of the macroeconomic situation and

investments in the Member States, taking into account the two divisions of the European Union Member States. The first takes into account participation in the euro area, while the second takes into account the socio-economic conditions, which made it possible to create three groups of countries with a similar macroeconomic situation and level of investment: highly developed countries, peripheral (southern) countries, and Central and Eastern Europe.

Research Methodology

The purpose of this article was to determine the macroeconomic and investment situation in 2018-2020 in the Member States of the European Union. Additionally, the study partially covered the European Commission's forecast for 2021. The work also deals with the issue of the division of the European Union into euro area countries and countries outside the monetary union and the division into the following three parts: the core (highly developed countries), the periphery (southern countries), and the countries of Central and Eastern Europe. In line with the above, the scientific hypothesis is: In the analyzed period three groups could be distinguished, characterized by a different macroeconomic situation and the level of investments in the European Union. In this analysis were used 4 variables: the percentage change in GDP per capita, inflation rate, unemployment rate, and percentage change in investment level.

Several research methods were used in the work: a critical analysis of the literature on the subject, which made it possible to present an outline of the historical division of the European Union into several groups, and quantitative methods – multidimensional statistical analysis. In the case of multivariate studies, in addition to the correlation analysis, Ward's method was used as one of the most generalized hierarchical cluster analyses, especially for relatively small sets of objects. This method is also one of the most effective ways of extracting the hierarchical structure of a set of objects with decreasing similarity between them (Gatnar & Walesiak, 2004). The highlighted clusters confirm the heterogeneity of the data used in the study. Ward's method is an agglomeration procedure consisting in combining clusters that minimize the sum of squares of distances from the center of gravity of the resulting cluster. Using the so-called dendrogram, this method made it possible to present the created clusters of European Union Member States, which are the most similar in the given clusters in terms of the macroeconomic situation and the level of investments. In addition, cluster analyses make it possible to create recommendations for politicians based on a comparison of the examined features and indicate in which areas actions should be taken to improve the economic situation (Janulewicz, Kamińska & Białoskurski, 2017, p. 92). It should be noted that the study carried out a variable normalization procedure using standardization. The correlation analysis was used, inter alia,

to determine the degree of collinearity of the proposed variables. A high correlation of diagnostic features can build an unbelievable cluster structure about the macroeconomic situation and the level of investment in the analyzed period 2018-2020.

Economic and Financial Consequences of the COVID-19 Pandemic

The first case of COVID-19 was recorded in Wuhan (China) in November 2019 (Platto, Xue & Carafoli, 2020, s. 9). Over the next month, more cases of COVID-19 were discovered in Europe and the United States, while the WHO decided in March 2020 to officially call COVID-19 a global pandemic (Pappas, 2021, p. 1).

The pandemic is not only a health threat but also undoubtedly has a significant impact on the economy, politics, education as well as society, and the psyche of individual people (Ayipey, 2020, p. 26). An increasingly widespread thesis indicates that the COVID-19 pandemic is a period of another economic crisis, because it has such features as increased risk and uncertainty in running a business, and is an economic challenge that cannot be solved with existing solutions (Ignacio & Novoa, 2021, p. 334). One of the solutions was to introduce restrictions. The restrictions had an ambivalent impact on the economy (Ancyparowicz, 2022, p. 41).

The pandemic undoubtedly has a significant impact on the situation of the private sector – both households and enterprises – and the public sector. Much of the impact of COVID-19 on this sector includes negative consequences, such as supply disruptions, limited demand, and reduction of corporate revenues from operating activities, which may increase unemployment and impoverishment of some households (Pukin-Sowul & Ostrowska, 2021, p. 49). COVID-19 also contributed to the organizational and financial challenges of local governments. In addition, during the pandemic, the revenues of local government units decreased and their expenses increased, as a result of which the situation of public finances deteriorated. The above-mentioned division has micro, meso, and macroeconomic consequences. Microeconomic effects include the previously mentioned reduction in household and corporate incomes due to government restrictions, while mesoeconomic effects focus on the impact of COVID-19 on individual industries (Kostyk-Siekierska, 2021, p. 43).

The macroeconomic consequences of the pandemic are related to, inter alia, the most important macroeconomic indicators, such as GDP (decrease), GDP per capita (decrease), unemployment rate (increase), and inflation rate (increase). The reduction in production contributed to a reduction in production, a reduction in the sale of goods and services, and the dismissal of workers. The pandemic also saw significant increases in prices in many countries around the world (Ataguba, 2020, p. 327).

The COVID-19 pandemic is also having an impact on the financial market (both domestic, international, and global). The increase in risk and uncertainty contributes to negative consequences making it difficult to run a business (Mishra, Rath & Dash, 2020, p. 2162). As the incidence increases, the profitability of a significant proportion of investments and securities decreases. Moreover, investors are less prone to risk, often increasing sales of financial assets, and therefore financial markets become more unpredictable than before the spread of the virus. However, the diversified impact of the COVID-19 pandemic on the financial market can be noticed, both due to the epidemiological situation, monetary and fiscal policy, and the economic situation of individual countries in the world (Haldar & Sethi, 2021, p. 34).

The COVID-19 pandemic has highlighted important links between economic and financial performance, the private and public sectors, the micro and macroeconomic situation, and the national, international, and global economy. It is not possible to improve the economic situation if decision-makers focus on only one economic aspect. Restoring economic equilibrium requires both interdisciplinary research and multi-faceted solutions.

Analysis of the Clusters of the European Union in Terms of the Macroeconomic Situation and the Level of Investments

The European Union member states' grouping, in terms of the macroeconomic situation, was carried out by Ward's method. The grouping results were supported by classification trees for each year, presented in Figures 1-3.

According to the dendrograms, 3 key groups of countries can be distinguished: core (highly developed countries), peripheral countries (southern countries), and Central and Eastern Europe (Tab. 1).

It should be noted that some European Union Member States can be classified, based on selected variables, into three groups, i.e. the core (highly developed countries), the periphery (less developed countries, mostly southern countries), and the countries of Central and Eastern Europe. Nevertheless, a few countries have different macroeconomic and investment situations. An example of such a country is Ireland, which is characterized by high amplitudes of macroeconomic indicators and the level of investments. In the selected period, it was also noticeable that there is a variation in the distance of links, therefore it is possible to create several additional groups or subgroups. Examples of a very high level of similarity in the macroeconomic situation and investments are Greece and Spain, while in Central and Eastern Europe one could distinguish Poland, the Czech Republic, and Hungary, which are characterized by a slightly different situation than the Baltic countries.

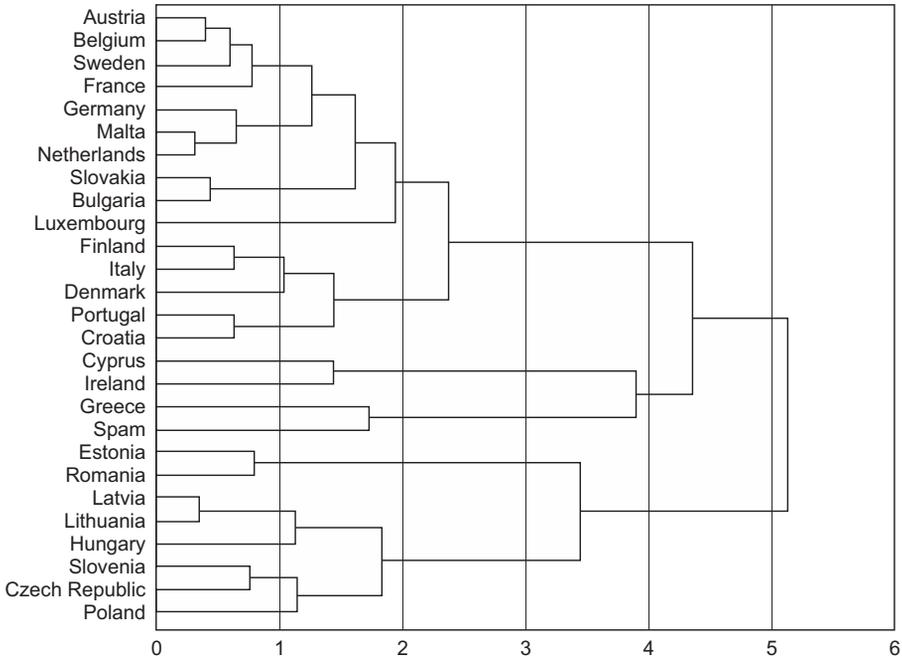


Fig. 1. Classification tree (dendrogram) for 2018 obtained using the Ward method
 Source: own study based on: *Autumn 2021 Economic Forecast...* (2021).

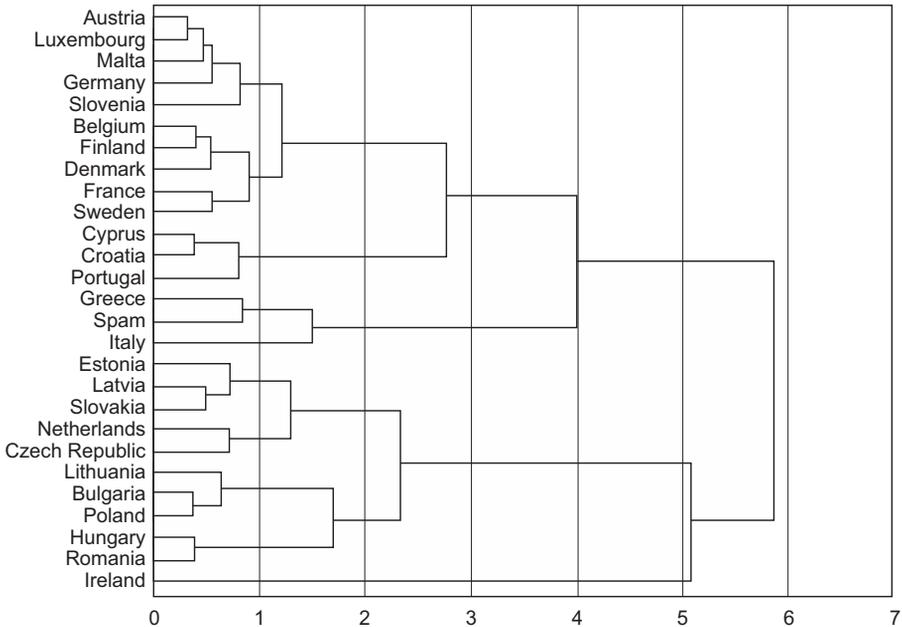


Fig. 2. Classification tree (dendrogram) for 2019 obtained using the Ward method
 Source: own study based on: *Autumn 2021 Economic Forecast...* (2021).

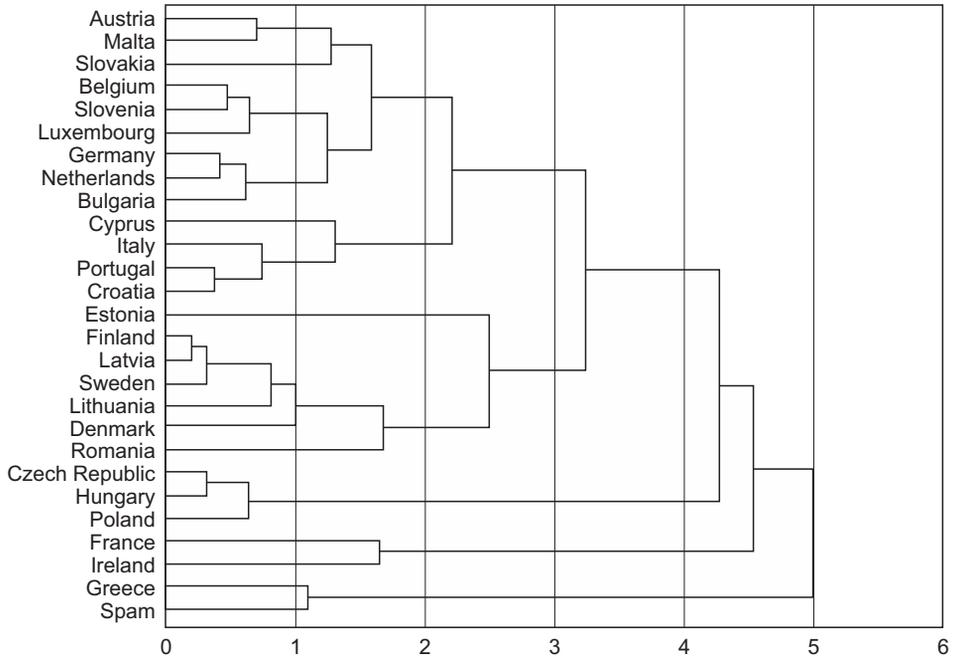


Fig. 3. Classification tree (dendrogram) for 2020 obtained using the Ward method
 Source: own study based on: *Autumn 2021 Economic Forecast...* (2021).

Table 1

The division of the European Union into groups according to the Ward method

Groups	2018	2019	2020	Established groups
1	2	3	4	5
Group 1 – highly developed countries	Belgium, Austria, Sweden, France, Germany, Malta, the Netherlands, Slovakia Luxembourg + Bulgaria	Belgium, Finland, Denmark, France, Sweden, Germany, Luxembourg, Austria, Malta, Slovenia	Belgium, Slovenia, Luxembourg, Germany, the Netherlands, Bulgaria, Malta, Austria, Slovakia	Belgium, Luxembourg, Austria, Germany, Malta
Group 2 – peripheral countries	Italy, Finland, Denmark, Croatia, Portugal + Greece, Spain	Greece, Spain, Italy	Italy, Portugal, Croatia +Greece, Spain	Greece, Spain, Italy

cont. Table 1

1	2	3	4	5
Group 3 – Central and Eastern Europe	Estonia Latvia, Lithuania, Hungary, Slovenia, Czech Republic, Poland, Romania	Estonia, Latvia, Slovakia, Czech Republic + the Netherlands; Lithuania, Bulgaria, Poland, Hungary, Romania	Estonia, Latvia, Finland, Sweden, Lithuania, Romania + Czech Republic, Poland, Hungary	Estonia, Lithuania, Latvia, Hungary, Poland, Czech Republic, Romania
Countries for which no groups have been selected	Cyprus, Ireland	Cyprus, Croatia, Ireland	Cyprus, Ireland	

Source: own study based on: *Autumn 2021 Economic Forecast...* (2021).

The final division of the Member States indicates a partial invariability of individual groups (the choice of countries was determined by the fact that a given country was classified to a given group throughout the period), which may indicate club convergence in the European Union. It is worth noting that the EU-12 countries belong to two groups, while the current composition of the euro area belongs to three groups, which may make it difficult to conduct a common monetary policy (the so-called problem one size does not fit for all) and to counteract macroeconomic shocks in the monetary union.

The COVID-19 pandemic could have had a negative impact on the macroeconomic situation and investments, and contributed to minor changes in the division of European Union Member States. For example, France lost its high level of connection with the most developed countries, and the macroeconomic situation and the level of investments of Finland and Sweden, countries also considered highly developed, were similar to the results of Central and Eastern European countries. The increase in macroeconomic similarity and investments of the Scandinavian countries with the Baltic countries indicates an increase in economic convergence and strong economic ties.

Macroeconomic Results and the Level of Investments in Three Groups of European Union Countries

The macroeconomic situation and the level of investments differ in the three groups of the European Union. The results of the average values of the analyzed variables in the selected groups of EU countries are presented in Table 2.

Table 2

Average levels of macroeconomic performance and investments

Group	Variable	2018	2019	2020	2021
Core	percentage change in GDP per capita	1.27	1.24	-3.80	4.04
	inflation rate	2.01	1.46	0.60	2.44
	unemployment rate	5.57	5.33	6.03	5.73
	percentage change in investment level	2.00	4.67	-4.81	8.17
Periphery	percentage change in GDP per capita	1.63	1.30	-9.60	5.90
	inflation rate	1.23	0.63	-0.57	1.57
	unemployment rate	15.07	13.8	13.67	13.43
	percentage change in investment level	1.70	0.63	-6.33	11.60
Central and Eastern Europe	percentage change in GDP per capita	4.77	4.13	-3.30	5.62
	inflation rate	2.55	2.82	2.32	4.05
	unemployment rate	4.60	4.20	5.10	4.92
	percentage change in investment level	9.40	8.53	-2.98	8.30

Source: own study based on: *Autumn 2021 Economic Forecast...* (2021).

The highest average investment growth in 2018-2019 took place in Central and Eastern Europe (in 2018 -9.4%, and 2019 – 8.53%), while the lowest was in peripheral countries (1.7% in 2018, and 0.63% in 2019). In 2020, it was noticed that in the group with the lowest level of economic growth, the highest decrease in investment was recorded (6.33%), then in the core countries of the European Union (4.81%), while in Central and Eastern Europe the decrease in investment was 2, 93%. However, representatives of the European Commission point to a major increase in investment in 2021: in the peripheral countries it should amount to 11.6%, and in the other two groups it should be slightly above 8.15%.

Similar trends can be seen in the case of another variable, the unemployment rate. In the CEE countries, it was the lowest (4.6% in 2018, and 4.2% in 2019). The highest unemployment rate was recorded in the group of peripheral countries (in 2018, 15.07%, compared to 13.8%). Moreover, in the indigenous countries also in 2019, the selected variable was lower in 2018. In this group and in Central and Eastern Europe in 2020 unemployment increased (in highly developed countries to 6.03%, and in CEE to 5.10%, which means that in the second group, the increase was greater, both in terms of percentage and quantity. In peripheral countries, the unemployment rate fell slightly (to 13.67%). All countries should

decline in 2021, with minor changes, and unemployment in the peripheral countries, unemployment will remain a significant problem.

According to the data, inflation in all groups is similar, with the highest in Central and Eastern European countries and the lowest in peripheral countries. The representatives of the European Commission emphasized that inflation in all groups should be higher in 2021 than in 2020

Central and Eastern Europe is characterized by the highest GDP growth per capita. It is more than twice as high as in “the core” countries and about three times as high as in the peripheral countries (it was 4.77% in 2018 and 4.13% in 2019). In 2019, GDP per capita decreased in all groups (in the core countries from 1.27% to 1.24%, and in the peripheral countries (from 1.63 to 1.3%). The value of GDP per capita declined in indigenous countries (by 3.8%), and in the countries of Central and Eastern Europe by 3.3%. A three-fold higher percentage decrease was recorded in peripheral countries (9.6%) that GDP per capita growth in all groups will be relatively similar – the lowest in “the core” countries (4.04%), and the highest in the peripheral countries (5.9%).

Central and Eastern European countries are relatively less vulnerable to economic shocks. This may be due to the possibility of using autonomous monetary policy and less dependence on other economies of European countries.

Conclusions

A significant part of the analysis by representatives of EU institutions divides the EU Member States into two groups in terms of their participation in the euro area. According to the research, the EU Member States can be divided into three groups: highly developed countries (the core), southern countries (the periphery), and Central and Eastern Europe, which may mean that there are still significant development and economic disproportions between the above-mentioned groups. This is in line with the research of other economists. Economists in the 1990s emphasized that there are two groups of countries in the European Union: the core (highly developed countries) and the periphery (less developed countries) (Oman 2019, s. 330). The European Union is a union of 27 countries characterized by a different social and economic situation (Pukin, 2020, p. 166). Each successive enlargement of the EU increased doubts as to the integration of diversified European countries. Therefore, since the group’s inception, the coexistence of at least two groups of countries has been mentioned many times: the core (Germany, France, Belgium, the Netherlands, and Denmark) and the periphery (Greece, Ireland, Italy, Portugal, Spain). On the other hand, the participation of Central and Eastern European (CEE) countries forced the updating of the division of the European Union into three parts: the two previously mentioned and the new EU countries (Beck & Grodzicki, 2014, p. 152).

Therefore, the adopted research hypothesis was positively verified. The CEE countries are still developing the fastest, peripheral countries struggle with economic and financial problems, while the core of the EU is characterized by relatively stable economic development. Such tendencies can be observed using both simple statistical analysis and Ward's method. However, the analysis of clusters showed that some countries are characterized by different macroeconomic and investment situations. Therefore, actions are needed to reduce disparities and increase the convergence of the European Union Member States.

In addition, the deterioration of the macroeconomic situation and the level of investment during the COVID-19 pandemic should, as mentioned before, be seen as a stimulus for joint action to restore the economic balance of the European Union and its members as soon as possible.

Translated by Authors

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