THE STATE OF THE CROSS-BORDER ECONOMY IN THE BALTIC SEA REGION IN MODERN CONDITIONS

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Abstract. The current economic crisis has been caused by the constraints of the COVID-19 pandemic, which has weakened the state of the economy. This study aims to identify and describe the status and development of COVID-19 in the Baltic Sea Region and to identify the economic consequences and changes in the economy caused by the pandemic. The situation is exacerbated by the extreme uncertainty of the actions taken by the public administration in the border regions. These include, above all, the lack of concrete and transparent measures to impose quarantine in specific sectors, the forced restriction of the population's economic and commercial activities, the limitation of access to recreational areas for the entire population, the displacement to remote work and education, the closure of childcare and pre-school institutions. The scale and nature of the consequences of all these restrictions in different sectors and industries need to be clarified. All this adds to the complexity of developing specific measures to respond to the crisis in the prevailing conditions. There is an urgent need to recognise crises and new challenges in border regions, which rapidly change in pandemic conditions and affect people on both sides of the border. The well-established principle of a "Europe without borders" has been shaken, and countries that have abruptly closed their national borders have done so unilaterally. A multiple regression study of selected macroeconomic indicators of the COVID-19 pandemic is conducted. The scale and nature of the consequences of sudden border closures on population movement in the Baltic Sea Regions are shown. All these restrictions peaked in 2020; unfortunately, the COVID-19 spread has yet to improve. Government measures applied to overcome the crisis must therefore identify the most effective way to restore lost positions and outline the future development of the border regions.

1. Introduction

The state of the economy and the ongoing crisis showed that the countries in the Baltic Sea Region (BSR) were unprepared and did not understand how to deal with the pandemic at the beginning. In addition, many researchers have tried to make sense of the economic consequences of the COVID-19 pandemic and concluded that the pandemic crisis is a severe, multi-period exogenous shock (Ludvigson et al., 2020). Baker et al. (2020) note that COVID-19 caused a significant uncertainty jump, and no similar scientific study exists. The authors found that the COVID-19 pandemic shock caused an 11-12% year-on-year decline in GDP (Baker et al., 2020; Sforza & Steininger, 2020). Another fascinating study, conducted on a sample of 42 countries (mainly European), shows how coronavirus mortality levels affect GDP growth (König & Winkler, 2020). The researchers note that the severity of enforcement measures is essential for growth. For example, a change in the situation leads to a decline in GDP in the quarter studied but is associated with a positive catch-up effect in the following quarter. The impact of the crisis has enormous implications for the labour market, as the forced closure of enterprises leads to sharp unemployment and will have severe economic consequences in the long run (Adams-Prassl et al., 2020; Béland et al., 2020; Hennig, 2021).

The COVID-19 pandemic has classic and new unique features. Declines in production and international trade, financial turmoil and business tensions are classic features of any crisis. Declines in production and international trade, economic chaos and business tensions are classic features of any crisis. In the border regions, the problems associated with coronaviruses mainly concern the impediments to the movement of people at all levels and their isolation at different levels (country, city, town). Consequently, a large part of the production has been severely affected by the pandemic, and the decline in economic activity dependent on isolation measures is reaching impressive proportions. The pandemic affected almost the entire world economy, and the BSR was forced to impose severe restrictions, which led to a sharp decline in the production and exchange of goods.

2. Review of scientific literature and problem definition

The COVID-19 pandemic caused an economic crisis and had a significantly negative impact on economic activity, GDP growth and unemployment (Subramanian & Betty, 2022; Kip Viscusi, 2021; Kaplan et al., 2022). Research on countries in the Baltic Sea Region supports this conclusion (Ehlert, 2021). The author studied German regions, which showed inter-regional differences in socio-economic, demographic and health variables affecting the economy in the COVID-19 crisis. Marinov (2020) analyses some critical issues related to the country's socio-economic characteristics that affected the Denmark economy during the pandemic. Particular attention is paid to government measures in the labour market, household consumption and entrepreneurship. Hensvik et al. (2020), in their paper, show the changes caused by COVID-19 in the Swedish labour market. They give the example of a 40% decrease in vacancies in the first three months after the COVID-19 outbreak. The resulting tightness in the labour market has resulted in a shift in job search towards occupations less affected by the crisis, regardless of changes in job offers.

The Baltic Sea Region's economy is heavily influenced by micro and macroeconomic factors such as day trips, domestic tourism, and international travel, as well as segments such as air travel, public transport, cruises, hospitality, cafés and restaurants, sporting events, festivals and conferences. These business sectors suffered severe losses across the board, leading to a severe economic downturn in 2020.

The course of the crisis phenomena makes it possible to identify four factors of great importance for developing the BSR economies. The first factor is the decline in consumer behaviour, including for goods and services. This is a very heavy and difficult factor to overcome. The second is the decline in capital market investment and share prices. The next factor is a decline in government spending on all development items with a significant increase in

new credit. The final factor is a decline in exports of domestically produced goods to international markets. Studies of the impact of the pandemic on the world economy confirm these estimates. Again, supply chains are shrinking, demand for goods, in general, is falling sharply and trade with significant exporters is declining (Ajmal et al., 2021; Vidya & Prabheesh, 2020). For countries in the Baltic Sea Region, assessments confirm the above rationale. Again, primary sectors related to the extraction and processing of raw materials and those related to product manufacturing and tertiary sectors representing services have been severely affected.

Another problem is the concept of a "Europe without borders", which lost meaning during the pandemic. The closure of borders and border controls changed the daily lives of many people living in and travelling to border regions overnight. Although the member states of the Schengen Agreement were able to temporarily suspend or reintroduce border control for the majority of the population in the border regions, the complete closure of the borders came as a shock (Jańczak, 2020). They found themselves cut off from their families and friends, education and work on both sides of the border. Many scholars point this out, and some write that COVID-19 brought unexpected and dramatic changes to the established political and economic system and to the tradition of managerial decision-making (Van Dam & Webbink, 2020; Will, 2020; Webb et al., 2022).

Some studies emphasise additional powers of public administration during a pandemic (Humer, 2020). In the countries of the BSR along the Denmark-German border, there was a "return of the state as a single entity, replacing the practice of multi-level cross-border governance" (Klatt, 2020; Henning, 2021). A similar situation developed on the Polish-German border. Germany also closed state borders and rightly questions to what extent territoriality threatened multi-level border management or to what extent state and economic actors could interact in cross-border cooperation under pandemic conditions (Opiłowska, 2020).

Cross-border cooperation on the German-Polish border has always served as an example for other countries, and the closing of the border came as a shock to many, as previously, local authorities and state institutions had always supported the inhabitants of border regions based on the ideology of a "Europe without borders". Cross-border cooperation in an integrated Europe has always been based on the "space of flows" (Castells, 1996). Naturally, borders are the most important objects of a sovereign state and are "organised around the exclusion of other" (Salter, 2021) subjects and populations. At the same time, states use borders not only to permit entry but also to protect other citizens from infection and to limit those who can spread the virus by crossing the border. Many public and state figures, as well as the population, criticised the authorities for closing the borders and demanded the abolition of the ban on border crossings between closed cities and settlements because, for them, before the closure of borders, there was a common space in which people lived and worked, infrastructure and other institutions functioned, which successfully contributed to their unification.

Many EU states, including the Baltic Sea Region, have decided to close their borders unilaterally. However, foreigners with residence or work permits were allowed to cross the borders. Many restrictions made crossing the border and professional activities virtually impossible (mandatory stay in a neighbouring country for 21 days followed by a two-week compulsory quarantine at home; workers had to submit to negative tests daily to cross the border). Most international and cross-border transportation services were interrupted. Cross-border workers, especially those employed in unskilled occupations, were the hardest hit by border restrictions. The remaining categories of cross-border workers were usually able to work from home. The closure of borders had a significant impact on the financial habits of many citizens, as access to some goods sold at a better price in neighbouring countries was suddenly prohibited. Tourism and the event industry were very much affected, as most of the events planned for the summer were cancelled (European Commission, 2021, 2022).

The examples of two Baltic countries, Sweden and Poland, can be cited here. Sweden, unlike many other countries of the Baltic region, did not impose a lockdown at the outset but retained most freedoms and opportunities for population movement. Many researchers and political actors admired Sweden's courage and

cited it as an example. But when the number of cases of infection in Sweden rose sharply and the number of deaths increased, the Swedish political establishment officially declared such a policy wrong.

It was on 18 December 2020 that the government ordered strict quarantine measures, including the use of masks. The effectiveness of these measures was confirmed by the new pandemic wave (Q4 2021). Some Swedish researchers wrote that "the COVID-19 pandemic revealed deficiencies in the management and legal framework of health and social services, including lack of multisectoral coordination, accountability to multiple authorities at different levels (community, regional and central) who share responsibilities, and transparency in policy-making and decision-making processes" (Claeson & Hanson, 2021). As of 20 November 2020, COVID-19 had a mortality rate of more than 80,000, or 787 deaths per million population, dozens of times higher than in neighbouring countries. Following an analysis by the Swedish Academy of Sciences, recommendations were made to the government to introduce stricter quarantine measures. Although on 21 April 2020 deaths were recorded at a higher level than in the BSR, already in the autumn (October 2020), the Swedish government relaxed restrictions, increasing the number of people attending public events from 50 to 300 and allowing people over 70 to mix freely.

In Poland, the situation was somewhat different. The problem with the increase in infections and deaths caused by coronaviruses was that the government centralised the whole issue of the pandemic onto itself, removing local authorities from this vital element. In addition, the government frequently imposed and frequently withdrew, restrictive measures. Finally, migrant workers from other European Union (EU) countries, where the infection was extreme (red zone), gradually began to return to Poland, further increasing the number of coronavirus carriers. G. Kolodko made an excellent point about the mistakes made by governments and state authorities during the development of the pandemic. He writes that all the problems associated with an epidemic force political institutions to develop the capacity to confront challenges and conflicts of interest and to rise to the occasion when a pandemic is raging. "It is thus all the more important not to make mistakes on other fronts. The art is to recognise an error in advance" (Kołodko, 2020, p. 153).

There were other restrictive examples. The Baltic countries (Estonia, Latvia and Lithuania) reacted similarly to the first wave of the COVID-19 pandemic. All three countries took a highly centralised approach and introduced restrictive measures relatively early, with a state of emergency declared in each country after fewer than 30 reported cases. Due to the initially low incidence of COVID-19, the countries built testing capacity, contact tracing and infrastructure without subjecting the health system to a significant stress test in the spring and summer of 2020. However, problems with access to routine health services had already emerged. The countries of the Baltic Sea Region entered the pandemic with an unstable starting position, primarily due to smaller operating budgets and shortages of medical staff, which could have contributed to a more proactive response to prevent transmission during the first wave.

And one more point is vital in developing cross-border cooperation between the BSR. We are talking about seaports and adjacent areas – the hinterlands. Despite stringent restrictive measures, ports in the Baltic Sea Region have lost little in terms of cargo traffic, while hinterland ports have suffered significantly. Quarantine measures have been fully implemented in these areas. Many researchers suggest that the dynamics of Baltic ports in a pandemic will allow them to weather the crisis more calmly than other maritime activities. This fact makes optimistic sense and will encourage economic activity in the innovative and investment development of the coastal regions, increase wages, reduce unemployment and expand international trade (Bilczak et al., 2021).

3. Research methodology

The study is based on an analysis of the causes of the crisis in the BSR. The impact of the crisis on the level of gross domestic product (GDP), exports, imports, unemployment rate, inflation growth and the economic sentiment index was studied. The study applied systemic, structural, factor and comparative analysis methodology, considering standard and available parameters. A multiple regression of selected macroeconomic indicators was developed.

A summary of data for the years 2017-2021 is presented. Individual lists of feature values were subjected to qualitative and quantitative analysis. In the structural analysis, as a reflection of the significant features in the sample structure, the sample structure was summarised and comparisons between samples were made using descriptive parameters. Individual value indices were determined based on classical and positional parameters. The averages describe common statistical characteristics regardless of the differences between the constituent units. They characterise the similarity of the sample due to the assigned variable (Okólski & Timofiejuk, 1981; Buga & Kassyk-Rokicka, 2008; Jóźwiak & Podgórski, 2012).

First, the data were subjected to Pearson correlation analysis and significance tests were performed to determine whether the test statistic fell within the critical area. This allowed us to determine whether the null and alternative hypotheses were rejected or accepted. Correlation analysis determines the strength of the relationship between variables and, in the case of a linear relationship between two variables, also the direction of that relationship. The Pearson correlation coefficient determines the direction and strength of the relationship between two measured variables. It takes values in the range <-1; 1>, with the closer to a value of 1 or -1, the stronger the relationship, and the closer to 0, the weaker the relationship.

4 Analysis of the Baltic Sea Region in crisis

It should be noted that the overall state of the economy and the course of the crisis showed that not only was the economy significantly affected (Susskind D & Vines, 2020; Padhan & Prabheesh, 2021), but also the social life of the population was significantly affected. The BSR pandemic has affected all countries, limiting the usual freedom of movement of goods, persons, services and capital (Medeiros et al., 2021; Opioła & Böhm, 2022; Capello et al, 2022). Exceptionally high costs have occurred in cross-border integration and internationalisation processes. Research shows that in the BSR, the course of the pandemic showed all the contradictions and possible costs that characterise this manufactured crisis (Table 1).

Table 1. Main characteristics of the spread of the epidemic in the Baltic Sea Region of the EU in 2022

Baltic Sea Region	Population at the beginning of 2022	The total number of detected	Number of cases per 100,000 people	Mortality	Mortality per 100,000 people	COVID rate per capita
Germany	83,155,031	26,809,245	32,235.55	139,807	123.33	0.32
Poland	37,840,001	6,010,090	15,833.47	116,371	224.26	0.16
Sweden	10,379,295	2,510,930	24,312.84	19,049	146.83	0.24
Denmark	5,840,045	3,143,392	53,984.54	6,404	50.01	0.54
Lithuania	2,795,680	1,064,064	38,082.67	9,155	267.62	0.38
Latvia	1,893,223	830,698	43,545.05	5,839	221.84	0.44
Estonia	1,330,068	577,655	43,466.17	2,574	136.19	0.43
Finland	5,533,793	1,114,573	20,172.2	4,714	24.54	0.20

Source: author's research based on World Health Organization data

The table shows that Denmark, Latvia and Estonia have the highest number of cases per 100,000 people (53,984.84; 43,545.05 and 43,466.17, respectively), although detected COVID-19 cases are highest in Germany and Poland. However, the most objective indicator that characterises the pandemic's state and course is the mortality rate per 100 thousand people. Therefore, Lithuania and Poland (267.62 and 224.26, respectively) are ahead of other countries in the Baltic Sea Region. This indicator is exceptionally hard for the population and clearly shows that public administration bodies and other state institutions are not fully coping with the epidemic. The development of coronavirus COVID-19 is confirmed by indicators of 2021. For all countries of the Baltic region, mortality rates show that the pandemic is increasing significantly, including through the emergence of new strains.

The economic consequences caused by the artificial reduction and sometimes closure of sectors and individual branches of industry in the countries of the BSR of the European Union have led to severe economic, social and human consequences. The countries of the Baltic region and all EU territories were marked according to the situation, which is related to the number of cases of COVID-19 virus infection. With 50 cases per 100,000 population – red zone; from 25 to 50 cases per 100,000 population – orange zone; below 25 cases per 100,000 population – green zone. The analysis of this marking was considered for 14 days. This approach (right-wrong) influenced public administration decision-making. At the same time, the measures taken to restrict freedom of movement, especially the closure of borders, had a negative impact on economic development. The actions taken to limit freedom of movement, especially the closure of borders, hurt the development of the economy.

It should be noted that during the COVID-19 pandemic, hotel and transportation services were most severely affected in 2020. Hotel accommodation services fell by 85% and air transportation services by 77%. Unfortunately, these industries still face several limitations. By the end of the year, air transportation services were 33% and hotel accommodation services were 57%. Enterprises working in the field of tourism were also significantly affected by the development of the crisis. In 2020, the number of international tourists arriving in the Baltic Sea Region, including the EU, decreased by 87% compared to the previous period. Also, the number of domestic tourists decreased by 81% (Eurostat, 2020).

The overall economic situation in the Baltic Sea Region is significantly influenced by inflation. The inflation growth is closely related to the policies of central banks and governments, as massive measures have been taken to support the economy in the crisis. In the countries of the Baltic Sea Region and the European Union as a whole, an outbreak of infection became a deflationary factor due to the pandemic. However, the emergency measures mitigated deflationary forces, which could lead to excessive inflation.

It has long been noted in the economic literature that the corridor between the deflation trap and the inflation trap is very narrow, and this is due to the low central bank rate, which tends to be close to the reverse rate. In this case, deflation looks like a liquidity trap, with the population increasing savings (in the face of uncertainty) while reducing consumption, which in turn puts downward pressure on prices. In contrast, the inflation trap increases consumption, accelerating the rate of price increases. In addition, the population can invest more in foreign currency, which simultaneously weakens the national currency and fuels inflation.

In the countries of the Baltic region, severe restrictive measures and adverse economic effects contributed to the inability to purchase goods and services related to anti-pandemic restrictions. The growth of inflation in 2020 decreased in all countries, except Poland (Eurostat, 2022). All this is because the reduction in income and the desire of the population to save money has led to the rate of turnover of money in the economy falling.

Here we should remember that the population will eventually return to restaurants, stores, movies and theatres, resume travel, and the unemployed will find new jobs. In the long run, it can be expected that pent-up demand in the Baltic region will lead to a surge in spending and inflation after the pandemic. However, the measures taken to

support the main sectors of the economy, as well as the state of the labor market, prices for raw materials and food, and high unemployment (there will not be a strong increase in wages), the impression is that after the pandemic a surge in inflation is likely to be short and not very large (Fig. 1).
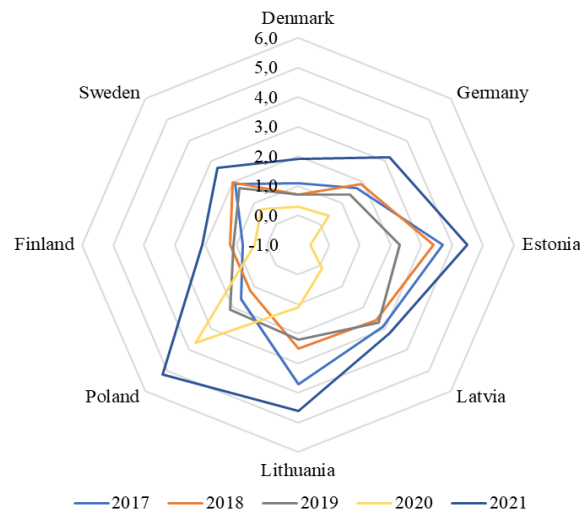

Figure 1. Inflation rates of the Baltic Sea Region in 2017-2021, %
Source: author's research based on Eurostat data

It should be noted that the highest annual inflation rates in 2021 were in Poland (5.2%), Lithuania (4.6) and Estonia (4.5). The lowest rates were in Denmark (1.9), Finland (2.1), Sweden (2.7), Lithuania (3.2) and Germany (3.2).

The course of COVID-19 pandemic has seriously affected the mood of economic actors. The study analysed economic sentiment indicators in the Baltic region's countries. At the beginning of the pandemic, the economic sentiment indicator (which shows the economic climate in the European Union) fell to 50 points. This was the sharpest drop since 1985, and since then the BSR has shown signs of recovery (Fig. 2).
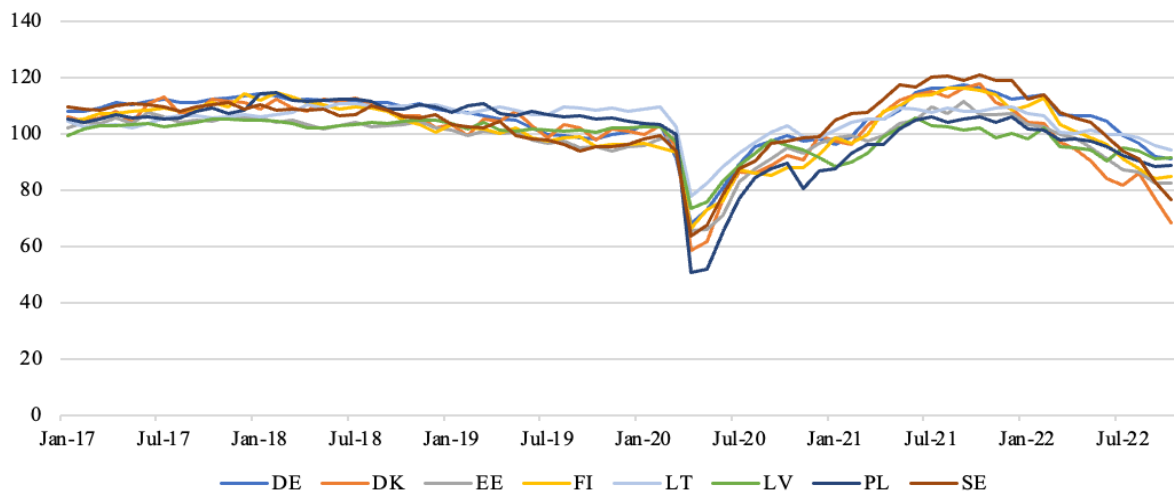

Figure 2. Economic sentiment indicator of the Baltic Sea Region 2017-2021
Source: author's research based on Eurostat data

The economic situation in some industries is assessed as difficult. The most pessimistic assessments are presented by companies operating in accommodation and catering, construction, and transport. At the beginning of the 2020 pandemic, the economic climate in these sectors was assessed worse than in other sectors of the economy. At the end of the year, all sectors had improved, although the overall economic climate was still negative compared to 2019.

A survey of selected macroeconomic indicators was conducted to more accurately assess the state of the crisis caused by the pandemic (Table 2).

Table 2. Pearson correlation coefficient and significance tests for selected macroeconomic indicators in the BSR in 2020

Baltic Sea Region	GDP, million euros	Exports, million euros	Imports, million euros	Trade balance	Unemployment rate, %
Germany	3,367,560.00	1,462,090.00	1,269,289.00	206,966.16	3.7
Poland	526,445.20	294,182.30	258,641.50	13,713.28	3.2
Sweden	475,666.10	212,050.30	190,001.40	5,351.88	8.5
Denmark	312,516.60	171,513.90	151,354.00	10,223.83	5.6
Lithuania	49,507.20	36,388.50	31,791.40	-507.89	8.5
Latvia	29,456.80	17,803.20	17,457.10	-2,125.76	8.1
Estonia	26,834.50	19,099.70	18,970.30	-982.21	6.9
Finland	237,995.00	85,104.00	84,537.00	-2,545.48	7.7
n	**α**	$\rho_{XY} = \dfrac{\sum_{i=1}^{n}(x_i - \bar{x})(y_i - \bar{y})}{n\sigma_X \sigma_Y}$			
8	0,05	0,9986	0,9988	0,9931	-0,6080
$T_{1-\frac{\alpha}{2}, n-2}$	**c**	$t = \dfrac{r_s\sqrt{n-2}}{\sqrt{1-r_s^2}}$			
2,45	(-∞;-2,45)∪(2,45;∞)	46,90	49,44	20,75	-1,88

Source: author's research

Analysing the data, it can be determined that the correlation of exports, and imports, as well as the trade balance in correlation with GDP has a similar course and strength. There is a strong monotonic relationship with a positive direction between GDP and the aforementioned indicators, which means that as they increase in a country, the value of GDP also increases. In these three cases, the determined test statistic also falls within the critical area, which allows the rejection of the null hypothesis. The unemployment rate, expressed as a percentage, had the lowest, moderate monotonic relationship, and the determined test statistic was outside the critical area, resulting in acceptance of the null hypothesis and rejection of the alternative hypothesis. From the data, too, one can see the disparity between the level of development of economies during the pandemic.

The lowest unemployment rate in 2020 was recorded in Poland and Germany, while the highest was in Sweden, Lithuania and Latvia. The author compiled a detailed comparison of the mentioned countries in the following section. The study of the shape, direction and strength of the stochastic relationship between variables for which we assume a linear relationship can be carried out using a regression module for this purpose. The multivariate regression module was created in the study, using selected macroeconomic indicators that describe and affect GDP (Table 3).

Table 3. Multiple regression of selected macroeconomic indicators during the COVID-19 pandemic

Regression statistics						
The multiple of R	0,999987					
R square	0,999973					
Fitted R square	0,999938					
Standard error	8841,003					
Observations	8					

Analysis of variance

	df	SS	MS	F	Relevance F	
Regression	4	8,84E+12	2,2111E+12	28288,25	3,41E-07	
Residual	3	2,34E+08	78163331,56			
Total	7	8,84E+12				

	Coefficients	Standard error	t Stat	Value-p	Bottom 95%	Top 95%
Intersection	-171535	20414,06	-8,402809758	0,003536	-236502	-106569
Export	-7,72333	1,115393	-6,924318246	0,006175	-11,273	-4,17366
Imports	11,06535	1,2406	8,919350213	0,002973	7,117206	15,01349
Unemployment rate	18711,97	2447,866	7,644194656	0,004649	10921,76	26502,17
Hadl balance	3,463434	0,454159	7,626040201	0,004681	2,018098	4,90877

Source: author's research

The error of estimates of the free expression and the regression coefficient is Sa= 20414.06%, Sb=1.12%, Sc=1.24%, Sd=2447.87%, Se=0.45%, respectively. The calculated multiple regression function is a good fit to the empirical data, the coefficient ϕ^2=1-0.999973=0.000027. The value of the *F statistic* and the corresponding test probability level *p* confirm a statistically significant linear relationship. In addition, the *t* statistic values indicate that the free expression and regression coefficients are significantly different from zero. Rejecting the null hypothesis H₀ that there is no relationship between the variables under study will commit an error with a probability of 0.00035.

Interpreting the estimated value of assessments of individual parameters, we can conclude that an increase in exports by one unit during the pandemic will cause a decrease in GDP by 7.7% on average, with the values of the other independent variables unchanged, the *ceteris paribus* rule. In contrast, an increase in imports by one unit will increase GDP by 11.1% (also with the values of the other variables fixed), and an increase in the trade balance by 1 unit will increase GDP by 3.7% (also with the values of the other variables fixed).

The unemployment rate, defined as the percentage of the working-age population without a job, fell from 6.3% in 2017-2019 to 5.2 the year before the pandemic. In 2020, due to economic uncertainty, or a production constraint, the average unemployment rate rose to 6.4% and gently declined by 0.2% the following year. The highest value in the year of the pandemic outbreak was in Lithuania and Sweden, where the unemployment rate was 8.5% and 8.3%, respectively. In Sweden, by contrast, there is no downward trend. The unemployment rate in 2021, relative to the previous year, increased by 0.5%.

The most significant increase in the unemployment rate is in Poland, where the downward trend continued until 2020, only to increase by 58% in 2021. This is the only such case among the countries analysed. The distribution of the unemployment rate in the year of the COVID-19 pandemic outbreak among all nine countries studied is characterised by a solid leftward asymmetry negative to the average unemployment rate, as Vs=-0.66.

In the other periods studied, the asymmetry has different directions. In 2017 it was weak right-handed, while in the other years, it was left-handed negative. The difference in the negative periods is only in its strength. In the year of the pandemic, it is strong, while in the other years, it is moderate. The highest value of the coefficient of

variation was recorded in 2020, with a coefficient equal to 31%, indicating that the moderate trend of variation in terms of the unemployment rate was sustained. In 2021, the 25% of states with the lowest unemployment rate achieved a score of 5.2%, and the 25% of states with the highest rate received a score of 7.6%.

Real GDP is a good measure of a society's standard of living. Countries with high GDP per capita have better education and health systems, more educated citizens, better housing, better nutrition, longer life expectancy, etc., so a higher GDP per capita generally means a higher level of per capita consumption (Fig. 3).
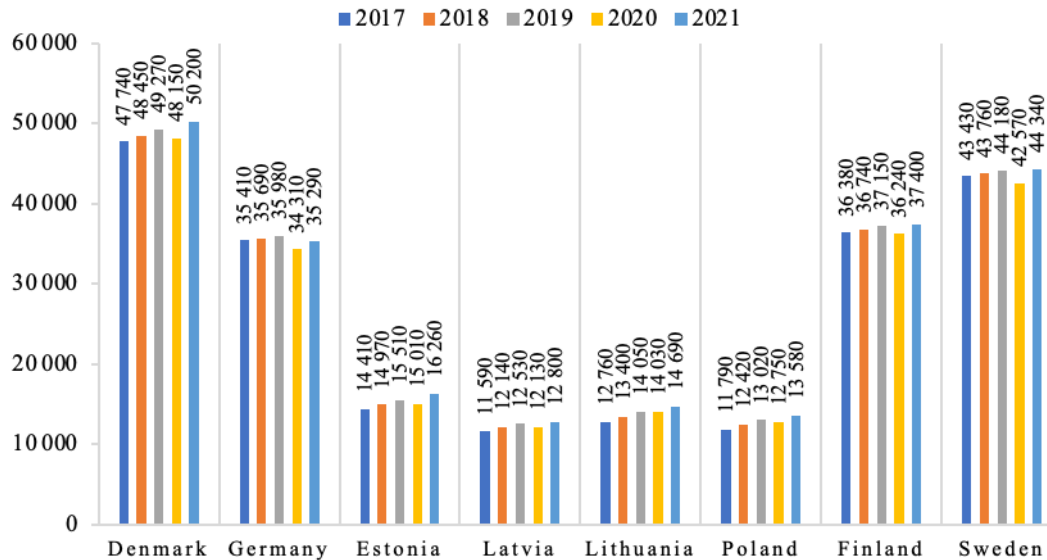

Figure. 3 Real GDP per capita of the Baltic Sea Region 2017-2021, euros
Source: author's research based on Eurostat data

However, this indicator needs to inform us about at least the value of leisure time, the quality of the environment, and the value of goods and services produced by households for personal use and not sold on the market. Analysing the statistics, it can be seen that real GDP among the surveyed countries year-on-year recorded a decline in 2020 to 46%. Referring to individual countries, the most significant decrease was recorded in Germany, Lithuania and Sweden.

In the following year, all countries experienced recovery, so real GDP increased. The worst performance was in Lithuania, where there were no significant differences. There was a slight variation in real GDP among countries in general. The differentiation against all countries was strong in the nominal GDP. In the case of a country-by-country analysis over the years, the greatest differentiation in terms of the studied characteristic was noted in Lithuania and Estonia. If we notice an increase in real GDP, we are sure that goods and services have increased since they are measured based on prices occurring in the selected base year. Thus, real GDP is a better measure of an economy's output than nominal GDP.

The countries of the BSR are heterogeneous in terms of the number of exports. Among the studied Baltic Sea Region, the average exports in these countries in 2017 amounted to 314,799.14 million euros and successively increased. The highest export values in the period under study were in Germany, where the average export amounted to 1,708,564.54 million euros. In last place is Latvia, with exports in 2017-2021 at 19,815.39 million euros. A noticeable decline in average exports in all countries was recorded in 2020. The following year, average

exports increased by 61,252.06 million euros compared to the previous year. The average deviation in 2020 from average exports equal to 310,523.65 million euros was 490,130.28 million euros, with a coefficient of variation equal to 158%, indicating strong export differentiation among the surveyed collective.

The difference in the number of exports between the best and worst exporting countries was 1,559,829.74 million euros, and the interquartile deviation value of 273,282.97 million euros shows the largest export difference between 50% of the BSR. The distribution of exports in the year of the outbreak of the COVID-19 pandemic among all nine countries studied is characterised by a strong rightward asymmetry concerning average exports, as $V_s=2.83$. In the other periods studied, the asymmetry also has a strong rightward positive distribution. The lowest value of the coefficient of variation was recorded in 2021, with a coefficient equal to 153%, indicating that the trend of strong differentiation in terms of exports was sustained. The typical export in this group in 2021 is an export in the range of -196,753.30 million euros to 940,304.70 million euros, so relative to previous years, the typical area of variation is more significant due to the recovery in this sector.

Analysing imports, a similar trend can be observed. The average imports in 2017-2019 were increasing. With the advent of the pandemic, it was recorded as declining. Average imports in 2020 amounted to 266,649.50 million euros, to increase significantly in the following year, even above the state of the years before Covid-19. In 2021, average imports increased by 52,541.41 million euros and amounted to 319,190.90 million euros. Half of the countries surveyed in 2020 imported 163,462.32 million euros, and the other half at least 163,462.32 million euros. In the following year, half of the countries imported at most 191,647.73 million euros, and a half at least 191647.73 million euros, which, in about previous years, indicates an economic recovery in this area. Typical imports in this group range from -158,068.25 million euros to 691,367.24 million euros.

The distribution of imports in the year of the outbreak of the COVID-19 pandemic among all nine countries studied is characterised by a strong right-handed asymmetry concerning average imports, as $V_s=2.72$. The asymmetry also has a strong right-handed positive distribution in the other periods studied. The lowest value of the coefficient of variation was recorded in 2021, with a coefficient equal to 157%, indicating the continuation of the trend of solid differentiation in terms of imports. There needs to be the unification of export and import performance, and the situation of the BSR continues to diversify. The directions of change, on the other hand, are the same. The determined Pearson linear correlation coefficient of exports and imports at a level close to 1 indicates a solid positive relationship. Changes in the value of exports are 99.7% determined by changes in imports and 0.3% by changes in other random or non-random factors. With an increase in imports of $1 million, one can expect an increase in the value of exports of 0.8489 million on average.

5. Conclusions

Our research confirmed that the economy and social life of the population were significantly affected during the pandemic. A review of the scientific literature has shown that researchers are seriously concerned about the measures taken to eliminate the costs of the pandemic on economic sectors and industries. The article's empirical part describes the pandemic's main features in the countries of the BSR. The impact of the crisis on GDP, an indicator of the general business climate under crisis conditions, is shown. Special attention is paid to unemployment and the decline in economic activity. Unfortunately, measures taken to reduce employment have not been as effective as predicted in all forecasts.

The pandemic has led to significant changes that have resulted in corresponding restrictions and quarantines. However, this is only part of the problem, which has affected people on both sides of the border and many sectors of the economy—most notably transport and tourism, accommodation and catering. There is much to be done to eliminate these distortions. A system of economic and economic continuity will need to be established, and those in power will need to focus on preventive measures to restore normality in health facilities quickly.

In addition, the pandemic in the Baltic Sea Region poses a real threat to socio-economic development. There are countries where the coronavirus has had the most damaging consequences. This is particularly true in Sweden, where initially no restrictive measures were introduced, but after a dramatic increase in infections and deaths, the political institutions recognised their mistake and the government introduced quarantine measures and closed the border. In Poland, the situation also changed in the stages of the spread of the coronavirus. The government introduced prohibition measures, lifted them, and loosened controls on compatriots arriving from red zone countries.

The closure of state borders led to the cancellation of many planned projects, events and meetings. As a result, most organisers and institutions supporting the development of projects, scientific progress and cross-border exchanges were forced to change their planning and funding conditions, as well as to use digital technologies and organise important meetings and events online. Undoubtedly, this has had some impact on cross-border cooperation, which in the pre-pandemic era functioned successfully and had the desired effect. Above all, however, the article shows that the unshakeable thesis of a "Europe without borders" has lost its relevance. In our view, there is much work to be done on both sides of the border to address the consequences of border closures and quarantine restrictions.

Currently, the countries of the Baltic Sea region are facing new challenges that test the basic mechanisms of functioning in a crisis. It is essential to note that the lessons of the pandemic have contributed to the unity and integration of the BSR and the EU as a whole. There is reason to believe that the ongoing pandemic processes will be effectively eliminated. However, industries and sectors disrupted by the pandemic (due to the emergence of new virus strains) will need to be rebuilt at an accelerated pace. Public administrations can use the study to diagnose cross-border cooperation processes during the recovery from a post-pandemic crisis.

References

Adams-Prassl, A., Boneva, T., Golin, M., & Rauh, C. (2020). Inequality in the impact of the coronavirus shock: evidence from real time surveys, CESifo Working Paper No. 8265. https://doi.org/10.2139/ssrn.3594017

Ajmal, M.M., Khan, M., & Shad, M.K. (2021). The global economic cost of coronavirus pandemic: current and future implications. *Public Administration and Policy: An Asia-Pacific Journal*, 24(3), 290-305. https://doi.org/10.1108/PAP-10-2021-0054

Baker, S.R., Bloom, N., Davis, S.J., Terry, S.J. (2020). COVID-Induced Economic Uncertainty. NBER Working Paper Series https://doi.org/10.3386/w26983

Béland, L.-P., Brodeur, A., & Wright, T. (2020). The Short-Term Economic Consequences of Covid-19: Exposure to Disease, Remote Work and Government Response. IZA Discussion Paper No. 13159 https://doi.org/10.2139/ssrn.3584922

Bilczak, W., Gornowicz, M., & Bilczak, M. (2020). Regiony nadmorski: integracja, działalność morska, konkurencja. Olsztyn, Wydawnictwo UWM w Olsztynie.

Buga, J., & Kassyk-Rokicka, H. (2008). Podstawy statystyki opisowej. Warszawa.

Capello, R., Caragliu, A., & Panzera, E. (2022). Economic costs of COVID-19 for cross-border regions. *Regional Science Policy & Practice* https://doi.org/10.1111/rsp3.12590

Castells, M. (1996). The Rise of the Network Society, Vol. 1 of The Network Society. Oxford: Blackwell.

Claeson, M., & Hanson, S. (2021). COVID-19 and the Swedish enigma. *The Lancet*, 397(10271), 259-261. https://doi.org/10.1016/S0140-6736(20)32750-1

Ehlert, A. (2021). The socio-economic determinants of COVID-19: A spatial analysis of German county level data. *Socio-Economic Planning Sciences*, 78. https://doi.org/10.1016/j.seps.2021.101083

European Commission, Directorate-General for Regional and Urban Policy, Peyrony, J., Rubio, J., Viaggi, R. (2021) *The effects of COVID-19 induced border closures on cross-border regions: 20 case studies covering the period March to June 2020*, Publications Office https://data.europa.eu/doi/10.2776/085716

European Commission, Directorate-General for Regional and Urban Policy, Peyrony, J., Devillard, T., Rubió, J., et al. (2022). *Analysis of the impact of border-related measures taken by Member States in the fight against COVID-19*, Publications Office of the European Union, 2022, https://data.europa.eu/doi/10.2776/665309

Eurostat. Retrieved October 7, 2020, from https://ec.europa.eu/eurostat/web/products-key-figures/-/ks-01-20-363

Eurostat. Retrieved October 10, 2020, from https://ec.europa.eu/eurostat

Hensvik, L., Le Barbanchon, T., & Rathelot, R. (2021). Job search during the COVID-19 crisis. *Journal of Public Economics*, 194. https://doi.org/10.1016/j.jpubeco.2020.104349

Hennig, A. (2021). The spatial dimension of coronavirus crisis management and the role of subnational actors in the German-Polish border region. *European Societies*, 23(1). https://doi.org/10.1080/14616696.2020.1846065

Humer, A. (2020). The Corona pandemic is probing our societal basis: the functioning of Service of General Interest in cities and regions, ERSA. https://ersa.org/wp-content/uploads/2020/03/ERSA_coronaforum_Humer_final-upload.pdf

Jańczak, J. (2020). The German-Polish border, re-bordering and the pandemic: centers vs. peripheries? Working Paper Series B/Orders in Motion, 8, 17-19. https://doi.org/10.11584/b-orders.8

Jóźwiak, J., & Podgórski, J. (2012). Statystyka od podstaw. PWE, Warszawa.

Kaplan, S., Lefler., & J, Zilberman, D. (2022). The political economy of COVID-19. *Appl Econ Perspect Policy*, 44, 477-488. https://doi.org/10.1002/aepp.13164

Kip Viscusi, W. (2021). Economic lessons for COVID-19 pandemic Policies. *Southern Economic Association*, 87(4), 1064-1089. https://doi.org/10.1002/soej.12492

Klatt, M. (2020). What has happened to our cross-border regions? Corona, unfamiliarity and transnational borderland activism in the Danish-German border region. *Borders in Perspective*, 4, 43-47. https://doi.org/10.25353/ubtr-xxxx-b825-a20b

Kołodko, G. (2020). After the Calamity: Economics and Politics in the Post-Pandemic World. *Pol. Soc. Rev.*, 210(2), 137-155. https://doi.org/10.26412/psr210.01

König, M., & Winkler, A. (2021). COVID-19: Lockdowns, Fatality Rates and GDP Growth. *Intereconomics*, 56, 32-39. https://doi.org/10.1007/s10272-021-0948-y

Ludvigson, S.C., Ma, S., & Ng, S. (2020). COVID-19 and the Macroeconomic Effects of Costly Disasters. *NBER* Working Paper Series. https://doi.org/10.3386/w26987

Marinov, M. (2020). Denmark and COVID-19, BSR Policy Briefing series, 5. https://www.centrumbalticum.org/files/4909/BSR_Policy_Briefing_5_2020.pdf

Medeiros, E., Ramírez, M.G., Ocskay, G., & Peyrony, J. (2021). Covidfencing effects on cross-border deterritorialism: the case of Europe. *European Planning Studies*, 29(5), 962 -982. https://doi.org/10.1080/09654313.2020.1818185

Opioła, W., & Böhm, H. (2022) Euroregions as political actors: managing border policies in the time of COVID-19 in Polish borderlands. *Territory, Politics, Governance,* 10(6), 896-916. https://doi.org/10.1080/21622671.2021.2017339

Opiłowska, E. (2020). The COVID-19 crisis: the end of a borderless Europe? *European Societies*, 23(1), 589-600. https://doi.org/10.1080/14616696.2020.1833065

Okólski, M., & Timofiejuk, I. (1981). Statystyka ekonomiczna. Elementy teorii. PWE, Warszawa.

Salter, M.B. (2010). 'Borders, passports, and the global mobility' in B. S. Turner (ed) The Routledge International Handbook of Globalization Studies, Abingdon: Routledge, 514-530.

Padhan, R., Prabheesh, K.P. (2021). The economics of COVID-19 pandemic: A survey. *Econ Anal Policy*, 70, 220-237. https://doi.org/10.1016/j.eap.2021.02.012

Sforza, A., & Steininger, M. (2020). Globalisation in the Time of Covid-19, Cesifo, Working Paper No. 8184. https://doi.org/10.2139/ssrn.3567558

Subramanian, R. I., & Betty, J.S. (2022). COVID-19 and the Economy: Summary of research and future directions. *Finance Research Letters*, 47(B). https://doi.org/10.1016/j.frl.2022.102801

Susskind, D., & Vines, D. (2020). The economics of the COVID-19 pandemic: an assessment. *Oxford Review of Economic Policy*, 36(1), 1-13. https://doi.org/10.1093/oxrep/graa036

Van Dam, Y.K., & Webbink, J.F. (2020). Reflecting on reflections on CoViD-19. *CEREM*, 4(2), 7-19. https://doi.org/10.29015/cerem.876

Vidya, C.T., & Prabheesh, K.P. (2020). Implications of COVID-19 Pandemic on the Global Trade Networks. *Emerging Markets Finance and Trade*, 56 (10), 2408-2421. https://doi.org/10.1080/1540496X.2020.1785426

Webb, E., Winkelmann, J., Scarpetti, G., Behmane, D., Habicht, T., Kahur, K., Kasekamp, K., Köhler, K., Miščikienė, L., Misins, J., Reinap, M., Slapšinskaitė-Dackevičienė, A., Võrk, A., & Karanikolos, M. (2022). Lessons learned from the Baltic countries' response to the first wave of COVID-19. *Health Policy*, 126(5), 438-445. https://doi.org/10.1016/j.healthpol.2021.12.003

Will, M. (2020). The CoViD-19 Pandemic and the End of Corporate Risk Management as we know it. *CEREM*, 4(3), 89-115. https://doi.org/10.29015/cerem.888

World Health Organization. (2022). Retrieved November 16, 2020, from https://covid19.who.int/table

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