

## IMPACT OF UNEMPLOYMENT ON SOCIO-ECONOMIC DEVELOPMENT OF POLAND AND UKRAINE: GOVERNANCE ASPECTS

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**Abstract:** The significance of this study lies in proving the validity of the Okun effect by indicators of socio-economic development in Poland, Ukraine, the EU, and the world, which are: economic growth leads to a decrease in unemployment, while economic recession leads to an increase in unemployment; an increase in unemployment is accompanied by an economic recession, while a decrease in unemployment is accompanied by economic growth. The article is exploratory and based on comparative analysis, regression analysis, ANOVA, the graphical method, logical generalization, synthesis, induction, and deduction.

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It substantiates the expediency of comparative evaluation of the impact of unemployment on the socio-economic development of neighbouring countries: the Republic of Poland (a member of the European Union) and Ukraine (a candidate for the European Union) supplemented with a comparison of the average European and average world data. It shows that the sensitivity of real GDP to changes in the unemployment rate, as well as the sensitivity of the unemployment rate to changes in real GDP in Poland, is the lowest. In contrast, Ukraine has the highest relative to the EU and global averages. It was established that state anti-crisis management in the social sphere should be focused both on financial support for employers and employees and on the creation of new vacancies in the implementation of infrastructure projects.

**Keywords:** development, Okun effect, Okun's law, real GDP, unemployment

**JEL Classification:** E24, F63, H53, I38, J64

## Introduction

The Republic of Poland and Ukraine are two neighbouring countries that started moving simultaneously from an administrative-command to a market economy after the collapse of the Soviet Union by liberalizing economic relations and implementing necessary reforms. However, the Polish government chose the path of so-called "shock therapy", when in 1990 it launched within a few months a radical reform of the state's entire economic system, financed by international financial institutions, and on December 16, 1991, under the "Europe Agreement establishing an association between the European Communities and their Member States, of the one part, and the Republic of Poland, of the other part" (31 December 1993) an organic movement towards European integration was launched, which ended with EU membership on 1 May 2004. Poland's march from association to full EU membership lasted about 12 and a half years, but it was made possible mainly by the rapid and effective economic reform of the national economy.

The economic reform of Ukraine's national economy began in the second half of 1991. It has been much slower, more dramatic and prolonged than in Poland and is still ongoing. The real European integration of Ukraine began on 16 September 2014 with the ratification of the Association Agreement between Ukraine and the European Union, and since 23 June 2022 Ukraine has only been a candidate for EU membership. Ukraine's European integration movement is very difficult and dramatic because the catalyst for European integration processes from early 2014 onwards is the Russian-Ukrainian war, which since 24 February 2022, has moved into a phase of large-scale Russian invasion, occupation of about 20% of Ukraine's sovereign territory and genocide of the Ukrainian people.

It is clear that the socio-economic development of Ukraine's immediate neighbour is much higher, but on the path to European integration, Poland's experience is important to analyse and adapt to Ukrainian realities (Gylfason et al., 2022). Also, during 2020-2021, the dynamics of the COVID-19 pandemic in Poland and Ukraine were very similar as these countries had populations of 37.8 and 43.8 million respectively (World Bank, 2023). Moreover, during the coronavirus pandemic, unemployment and socio-economic development were the priority issues, the relationship between which was first mathematically substantiated by Okun (1962).

## Literature Review

Okun's methodology became very popular and is still called "Okun's law" today. In his paper, based on statistics for 55 quarters of 1947-1960, Okun demonstrated that a quarterly increase in the actual unemployment rate that exceeded the natural rate of unemployment (about 4%) by 1% caused real GDP to decrease by 3.3% during the same period of time. A 1% rise in real GDP was accompanied by a 0.3% fall in the unemployment rate.

The methodological and applied aspects of Okun's law have been used and developed by many academic economists. Among the most recent studies is an article by Grant (2018), which estimates the time-varying Okun parameter with two states – the potential public output and the natural rate of unemployment in the United States based on quarterly statistical data during 1948-2016, with a focus on the global financial crisis of 2008-2009. Grant's findings were confirmed by Mutascu, and Sokic (2021) on the basis of quarterly data on unemployment and output in the US for 1948-2020, which also proved that the so-called "Okun effect" only holds true during economic shocks and in the long run. Bod'a, and Považanová (2021) substantiated the amplification of the Okun effect in periods of declining output using 21 OECD countries as an example based on 1989-2019 statistics, also taking into account the gender distribution of the labour market.

Goto, and Bürgi (2021) assessed Okun's Law at the sectoral level for the US, UK, Switzerland and Japan, justifying the difference in the Okun parameter by country as well as by economic sector, with sector composition having no effect on the variation in the aggregate Okun parameters and labour market policies being the driving force behind the differences. Gelfer (2020) investigated the relationship between GDP growth, unemployment and employment by deriving the Okun parameter for sectors of the national economy and found that investment and financial shocks have a stronger influence on GDP contraction and unemployment growth than productivity and other shocks. Mura, Zsigmond, Kovács, and Baloghová (2020) analysed annual changes in real GDP in the Visegrad 4 countries, comparing them with the unemployment rate using linear regression based on 2008-2019 statistics and concluded that the Okun effect is weak in the Czech Republic, Hungary, Poland and Slovakia.

Studies of the effect of Okun's Law at the regional level have been carried out; Bande, and Ángel (2018) proved an inverse relationship between unemployment rates and social production growth in Spanish regions, but found considerable regional variation in the values of the Okun parameter for both the short and long term. Bonaventura, Cellini, and Sambataro (2020) estimated a baseline model of Okun's law in Italian regions, dividing unemployment rates by gender, while Daňová, and Kravčáková Vozárová (2020) justified differences in the relationship between economic growth rates and changes in unemployment rates in Slovak regions over the period 1999-2018.

The theoretical and methodological foundations of the natural (or equilibrium) unemployment rate were developed by Hall (1979), who applied the duration of employment model, which is based on the postulate that employment conditions are an

effective result of balancing the interests of workers and employers in terms of the duration of employment.

Thus, the vast majority of academic sources on the impact of unemployment on socio-economic development compare individual countries, groups of countries, regions, or sectors of the national economy in terms of the presence or absence of the Okun effect in the short and long term, while no works on the impact of unemployment on socio-economic development worldwide, i.e. at the global level, have been found. It can also be concluded that little attention has been paid to comparative analysis of Okun's law at the global and cross-national levels.

The aim of the article is to conduct a comparative analysis of the impact of unemployment on the socio-economic development of two neighbouring countries: the Republic of Poland as an EU member and Ukraine as an EU membership candidate, especially during the period of the coronavirus pandemic.

## Research Methodology

The impact of unemployment on socio-economic development according to Okun's law is determined by a linear equation (basic model):

$$\Delta U = \alpha + \beta \Delta Y \quad (1)$$

where:

$\Delta U$  is the growth rate of unemployment compared to the previous year, %

$\Delta Y$  is the chain growth rate (% of the previous year) of real GDP

$\beta$  is the empirical coefficient of the sensitivity of unemployment to real GDP, showing by how much the unemployment rate decreases when the real GDP rises by 1%, has a negative value, indicating the presence of the Okun effect

$\alpha$  is the percentage increase in the unemployment rate when  $\Delta Y = 0$ , i.e. what would be the increase in the unemployment rate assuming constant real GDP (Okun, 1962).

Using Formula (1), it is possible to quantify the impact of cyclicity of the national economy on the unemployment rate as the independent variable here is the growth of real GDP and the dependent variable is the growth of the unemployment rate. Nevertheless, unemployment also affects socio-economic development and the increase in the unemployment rate can be taken as an independent variable, while the increase in real GDP can be taken as a dependent variable; then Formula (1) takes the form:

$$\Delta Y = \alpha_1 + \beta_1 \Delta U \quad (2)$$

where:

$\Delta Y$  is the chain growth rate (% of the previous year) of real GDP

$\Delta U$  is the growth rate of unemployment compared to the previous year, %

$\beta_1$  is the empirical coefficient of the sensitivity of real GDP to unemployment, showing by how much real GDP decreases when the unemployment rate rises by 1%, has a negative value, indicating the presence of the Okun effect

$\alpha_1$  is the percentage increase in real GDP when  $\Delta U = 0$ , i.e. the unemployment rate remains unchanged, which can indicate relatively full employment or achievement of the natural rate of unemployment.

Consequently, the use of Formula (2) makes it possible to quantify the impact of unemployment on the cyclical nature of the national economy. Hence, the relationship between the unemployment rate and output in Poland at the national level using Formula (1) was investigated by Bartosik (2020) based on statistical data from 1996-2018, and at the regional level by Kliber (2017).

There is also a gap model of Okun's law formalised by means of an equation:

$$\frac{Y - Y^*}{Y^*} = \alpha_1 + \beta_1(U - U^*), \quad (3)$$

where:

$Y$  is the actual volume of social production (nominal GDP)

$Y^*$  is the potential GDP, i.e. the volume of social production at full employment or when the natural rate of unemployment is reached

$U$  is the actual unemployment rate

$U^*$  is the natural rate of unemployment, i.e. unemployment in full employment conditions, not related to the dynamics of economic growth, but depending on the constantly existing staff turnover, labour migration, demographic factors (Mankiw, 2010, p. 389).

In Formula (3), expression  $U - U^*$  should be understood as the unemployment gap, which corresponds to the cyclical level of unemployment, and expression  $Y - Y^*$  is the GDP gap, i.e. the GDP loss due to the cyclical development of social production. The theoretical and methodological basis of the natural (or equilibrium) level of unemployment was developed by Hall (1979), who applied the model of the duration of employment, which is based on the postulate that employment conditions are the effective result of the balance of interests of employees and employers on the duration of work. The level of natural unemployment in Ukraine was estimated by Vasyliiev (2012) in 2010, and Mudrak et al. (2018) in 2017.

It should also be noted that parameters  $\alpha_1$  and  $\beta_2$  can be considered the same for Formulas (2) and (3); it is those parameters that should be found during the construction of a linear equation of the dependence of social production on unemployment.

From Formula (1) we form Hypothesis 1: economic growth leads to a reduction in the unemployment rate, while economic recession leads to an increase in the unemployment rate.

Based on Formulas (2) and (3) we form Hypothesis 2: an increase in the unemployment rate is accompanied by an economic recession, and a decrease in the unemployment rate accompanies economic growth.

Another aspect of the study is the formation of indicators and sources of official statistics. In a comparative analysis, the indicators should be the same; thus it is appropriate to take the GDP volume index (in 2015 prices) as the real GDP. The use of this particular indicator, which reflects the level of socio-economic development of the country, is important because it neglects price dynamics (inflation) as well as

the devaluation of the national monetary unit as it is calculated in the main reserve currency (USD). As for the unemployment rate, the unemployment rate calculated according to the International Labour Organisation (ILO) methodology as the ratio of all unemployed persons (both those officially registered and those looking for work but who have not applied for help from public employment agencies) to the size of the labour force, should be used here. It is well known that a reliable source of statistical information is the World Bank (World Bank, 2023).

Therefore, the research information base consists of official World Bank materials, scientific periodicals, and personal research results.

The investigation period is 2007-2021, which includes 2 recent global financial and economic crises: The Great Recession (2007-2009), the coronavirus pandemic (2019 – still ongoing), and a local crisis, namely the Russian-Ukrainian war, which started in 2014 and turned into a large-scale invasion phase on 24 February 2022. All of these crises have had a direct impact on employment and the socio-economic development of the countries; hence the Okun effect modelling on 2007-2021 data will allow us to prove or disprove the validity of Okun's law in the current conditions according to the two hypotheses.

## Results and Discussion

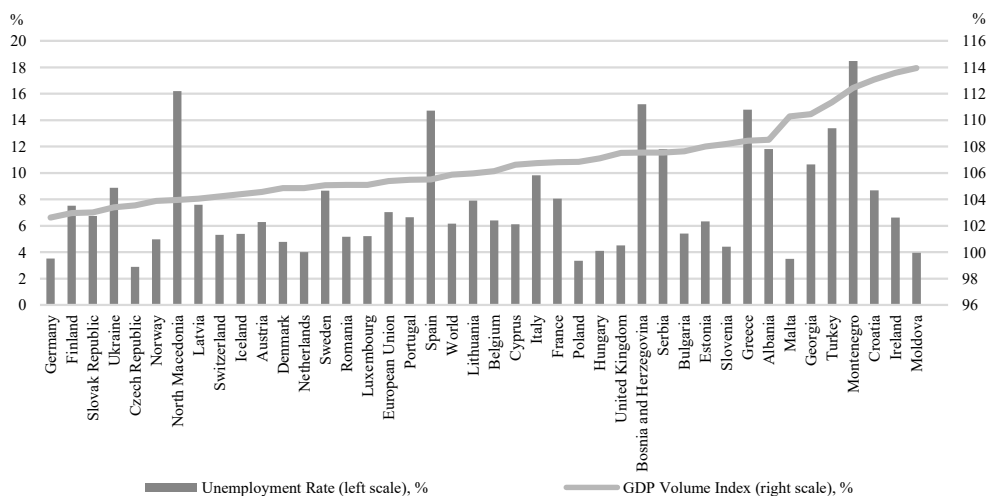
Based on the foundations of social economy and cyclical economic development, the analysis of the impact of unemployment on socio-economic development is relevant in the context of investigating the existence of an inverse relationship between these phenomena (the so-called Okun effect). In other words, it is necessary to establish whether unemployment decreases during economic growth and whether an economic crisis is accompanied by an increase in the number of unemployed people.

Analysis of the relationship between socio-economic development and unemployment on the example of Poland and Ukraine should be started in the context of 40 European countries (with the exception of Liechtenstein and Kosovo, for which the World Bank does not have statistics): members of the European Union (27 countries), a former member (Great Britain), candidates for membership (8 countries), a potential candidate (Georgia), and non-members with agreements with the EU (3 countries). In addition, the averages for the European Union and all countries of the world are compared (Figure 1).

Figure 1 shows that by the end of 2021, Poland's unemployment rate was 3.4%, the second lowest in Europe after the Czech Republic. Nonetheless, the unemployment rate in Poland is 2.8% below the global average and 3.7% below the EU average. The level of social and economic development in Poland corresponded to 106.8% of the GDP volume index, which is 1% higher than the world average and 1.5% higher than the EU average.

Ukraine's unemployment rate at the end of 2021 was 8.9%, the second lowest among the EU candidate countries, below only Moldova's at 4.9%. However, Ukraine's unemployment rate is 1.8% higher than the global average and 2.7% higher than the EU average. In terms of the GDP volume index, Ukraine is one of the outsiders in Europe with the fourth worst result at 103.4%, worse only for the

Slovak Republic (103.01%), Finland (102.97%), and Germany (102.63%). At the same time, Ukraine's socio-economic development lags behind the global average by 2% and the EU average by 2.5%.

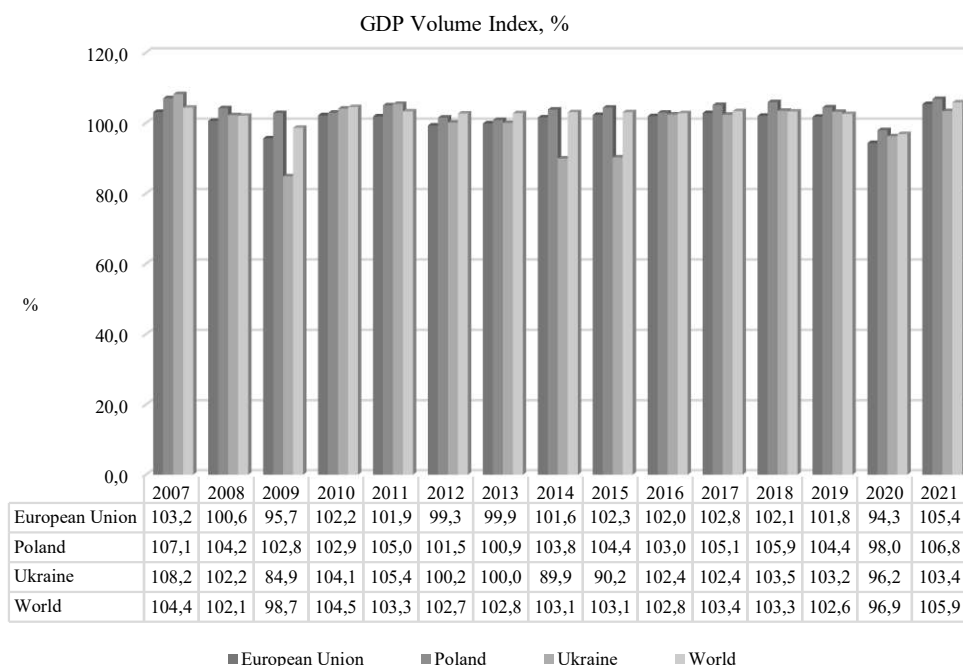


**Figure 1. Comparison of unemployment rates and GDP volume indexes of European countries**

Source: Authors' compilation based on data from (Word Bank, 2023)

Consequently, the results of the comparative analysis of socio-economic development indicators give grounds to consider Poland as one of the flagships and Ukraine as one of the outsiders in Europe. Therefore, a study of the relationship between unemployment and socio-economic development in these countries, using Formulas (1) and (2), will reveal the main trends, peculiarities, and effectiveness of public policies.

Firstly, we summarise the GDP volume index of Poland, Ukraine, the EU and the world over the last 15 years, from 2007 to 2021 (Figure 2). A comparison of the two extreme countries in terms of socio-economic development and unemployment in Europe is useful to combine with a comparison with EU and global averages. Thus, between 2007-2021, the real GDP in the EU grew by 115.6%, with an annual average growth rate of +1%; the total real GDP growth in the world was 147.1%, with an annual average growth rate of +2.6%. Nevertheless, the real economic growth in Poland amounted to 172.7%, with an annual average increase of +6.8% – considerably higher than in the EU and the world. Another peculiarity of the socio-economic development of Poland is that it is one of few countries in Europe that showed real economic growth during the Great Recession of 2008-2009, and in the analysed period had only once, in the year 2020 of the coronavirus pandemic, -2% real GDP. This means that Poland's socio-economic development is better compared to most EU and world countries; thus it can be concluded that the welfare state policy is highly effective.



**Figure 2. Comparative dynamics of GDP volume indexes of Poland and Ukraine with EU and the world**

Source: Authors' compilation based on data from (World Bank, 2023)

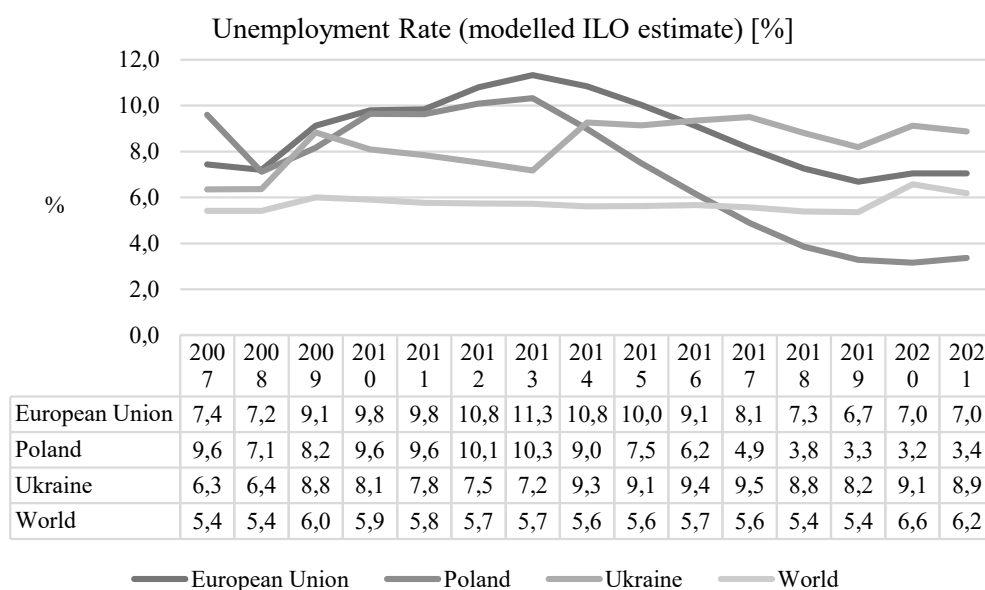
The dynamics of Ukraine's socio-economic development have a downward trend as the GDP volume index grew by 93.4% during 2007-2021, with an annual average negative growth rate of  $-0.46\%$ . The overall negative trend in Ukraine's socio-economic development throughout 2007-2021 is primarily the result of external threats and the lack of effective management tools to counter them. For example, in 2009, when the world was threatened by the Great Recession, Ukraine was the country with the largest drop in GDP of more than  $-15\%$ . A more devastating impact on the Ukrainian economy was the Russian-Ukrainian war, during the acute phase of which 10% of Ukraine's territory was temporarily occupied during 2014-2015, resulting in a real GDP decline of  $-10.1\%$  in 2014 compared to 2013, and  $-9.8\%$ , in 2015 compared to 2014. At the end of the 2020, Ukraine's real GDP decline was  $-3.8\%$ ,  $0.7\%$  below the global level,  $1.9\%$  above the EU average, but  $1.7\%$  below Poland. Already by the end of 2021, Ukraine's real GDP growth was  $+3.4\%$ , which was the lowest result compared to the world, EU and Poland.

To analyse the unemployment rates (modelled ILO estimate) in Poland and Ukraine compared with EU and global averages, we first compiled Figure 3.

The unemployment rate in Poland in 2007-2021 ranged from  $3.16\%$  in 2021 (the lowest value in the examined period) to  $10.33\%$  in 2013 (the highest value). From the crisis year of 2008 to 2013, the unemployment rate increased from  $7.1\%$  to



10.33%, and then the trend reversed and the unemployment rate decreased, reaching 3.2% in 2020 and 3.4% in 2021. The unemployment trends in Poland and the EU in 2007-2021 are very similar, but in the EU the unemployment rate reached 7.1% by the end of 2021. The volatility of the global unemployment rate during the reviewed period was insignificant, ranging between 5.36-6.58% and reaching 6.2% by the end of 2021. The Ukrainian unemployment rate fluctuated between 6.35% in 2007 (the lowest value in the examined period) and 9.5% in 2017 (the highest value). The crisis year of 2009 saw an increase in the unemployment rate of 2.5% and the crisis year of 2020 an increase of 0.94%. In addition, the unemployment rate in Ukraine increased by 2.1% in 2014 compared to 2013.



**Figure 3. Comparative dynamics of Unemployment Rate (modelled ILO estimate) of Poland and Ukraine with EU and the world**

Source: Authors' compilation based on data from (Word Bank, 2023)

The main reason for the significant decrease in the unemployment rate in Poland since 2013 can be considered the emigration of the labour force to richer EU countries where salaries are higher. The main reason for the increase in the unemployment rate in Ukraine since 2013 is internal labour migration as a result of the resettlement of inhabitants from regions where active hostilities are taking place and the loss of productive forces owing to the occupation of more than 10% of the territory.

To simulate the relationship between unemployment and socio-economic development, annual growth rates of the physical GDP index and unemployment rates (modelled ILO estimate) were calculated using Formulae (1) and (2) and are summarised in Table 1.

**Table 1. Annual growth rates of GDP volume indexes and unemployment rates for 2007-2021 [%]**

Year	Poland		Ukraine		European Union		World	
	$\Delta Y$	$\Delta U$	$\Delta Y$	$\Delta U$	$\Delta Y$	$\Delta U$	$\Delta Y$	$\Delta U$
2007	7.062	-4.240	8.216	-0.460	3.156	-1.174	4.382	-0.215
2008	4.200	-2.480	2.243	0.010	0.641	-0.242	2.069	-0.008
2009	2.832	1.050	-15.136	2.480	-4.349	1.923	-1.341	0.593
2010	2.935	1.470	4.092	-0.740	2.225	0.674	4.541	-0.102
2011	5.042	-0.010	5.445	-0.250	1.894	0.038	3.310	-0.137
2012	1.545	0.460	0.152	-0.320	-0.700	0.969	2.709	-0.028
2013	0.857	0.240	0.045	-0.360	-0.084	0.519	2.808	-0.009
2014	3.837	-1.340	-10.079	2.100	1.598	-0.480	3.090	-0.122
2015	4.383	-1.490	-9.773	-0.130	2.307	-0.819	3.079	0.020
2016	2.954	-1.340	2.441	0.210	1.977	-0.914	2.802	0.037
2017	5.140	-1.270	2.360	0.150	2.838	-0.981	3.385	-0.100
2018	5.945	-1.040	3.488	-0.700	2.066	-0.868	3.286	-0.169
2019	4.450	-0.570	3.200	-0.610	1.805	-0.574	2.591	-0.035
2020	-2.020	-0.120	-3.753	0.942	-5.678	0.355	-3.115	1.218
2021	6.848	0.208	3.400	-0.253	5.393	0.001	5.870	-0.399

Source: Authors' compilation based on data from (Word Bank, 2023)

The data in Table 1 are used to model Okun's law:

- 1) by means of Formula (1), where the independent variable is chain growth in the unemployment rate and the dependent variable is chain growth in the GDP volume index
- 2) Formula (2), where chain growth of the GDP volume index is used as the explanatory variable and chain growth of the unemployment rate as a dependent variable.

The results of the modelling are summarised in Table 2.

**Table 2. Results of Okun's law modelling by Formulas (1) and (2)**

Coefficient	Country			
	Poland	Ukraine	European Union	World
$\alpha$	0.3598	0.1084	0.0919	0.4809
$\beta$	-0.2833	-0.1210	-0.1957	-0.1690
$\alpha_1$	3.2012	0.5181	0.7883	2.8299
$\beta_1$	-0.7631	-5.5243	-2.0750	-5.4747
$R$	0.4650	0.8176	0.6372	0.9618
$R^2$	0.2162	0.6684	0.4060	0.9251
$F > 3.1362$	3.5863	26.2051	8.8848	160.5931
$t > 1.7709$	1.8938	5.1191	2.9807	12.6725
$1.36 < DW < 2.64$	2.4107	2.2327	2.3902	1.9814

Source: Authors' compilation based on data in Table 1 and Formulas (1) and (2)

The data in Table 2 show that all the resulting linear relationships are inverse, statistically significant, adequate, and devoid of autocorrelation; thus they can be used in further explorations to forecast the socio-economic development of the countries under study and develop management measures.

Based on the parameter values of the obtained pairwise linear relationships, the following conclusions can be drawn:

- 1) the validity of both hypotheses set at the beginning of the study is proved, that there is an inverse relationship between unemployment and economic growth and the Okun effect is confirmed
- 2) for Poland: a 1% increase in the physical GDP index is compensated by a decrease in the unemployment rate by 0.28%; the equivalent of a 1% increase in the unemployment rate is a decrease in real GDP by 0.76%
- 3) for Ukraine: a 1% increase in real GDP was accompanied by a decrease in the unemployment rate by 0.12%; a 1% increase in the unemployment rate was accompanied by a decrease in the real GDP volume index by 5.52%
- 4) for the EU: a 1% increase in the real GDP volume index was compensated by a 0.2% decrease in the unemployment rate; the equivalent of a 1% increase in the unemployment rate was a 2.08% decrease in real GDP
- 5) compared to the world: a 1% increase in real GDP was accompanied by a 0.17% decrease in the unemployment rate; a 1% increase in the unemployment rate was accompanied by a 5.47% decrease in the GDP volume index.

An important result of Okun's law modelling is parameter  $\alpha_1$  (see Table 2), which can be interpreted as a percentage increase in real GDP when the national economy reaches a situation of relative full employment (or natural rate of unemployment) under the condition  $\Delta U = 0$  in Formula (2), i.e.  $U = U^*$  in formula (3). This indicator was the lowest (+0.52%) for the Ukrainian national economy and the highest (+3.2%) for the Polish national economy in comparison to the EU (+0.79%) and the world (+2.83%).

Consequently, the impact of unemployment on Ukraine's social and economic development is greater as GDP losses grow higher, but during an economic crisis, more people will lose their jobs in Poland than in Ukraine, the EU, or the world. In terms of economic growth, Ukraine has the slowest and Poland has the fastest rate of unemployment. That is why, in order to balance the mutual effects of unemployment and real GDP, government social policies, including employment policies, are significantly updated (Biloshkurska et al., 2017).

In 2020-2021, the greatest challenge to overcoming unemployment was the crisis caused by the COVID-19 pandemic. The 2020 recession occurred as a consequence of quarantine and restrictive measures, lockdowns imposed by all governments, resulting in reduced public production, and an economic recession, including lay-offs of salaried workers. The negative impact of the COVID-19 crisis on the global labour market, compared with the Great Recession of 2008-2009, has been much greater. Thus, in 2020 there was a reduction of 8.8% in working time (the equivalent of 255 million full-time jobs), which is four times more than in 2009. At the same time, earnings were cut by 3.7 trillion USD (-8.3% in 2020) or 4.4% of the global GDP (International Labour Organization, 2021, pp. 1-2).

The results of this study allow us to propose the main ways of overcoming unemployment. For example, in Poland to fight the effects of the COVID-19 pandemic as part of the Anti-Crisis Shield governmental program (Government of Poland, 2023), some 312 billion PLN (13.4% of GDP) were spent on social policy and the fight against unemployment in 2020 alone. In particular, employers who had to reduce their working hours were compensated for wage costs between 50% and 90% of the minimum wage (2.6 thousand PLN gross or 590 EUR per month) (Aidukaite et al., 2021).

In Ukraine, a successful case during the coronavirus crisis was the Large Construction national program which provided around 200 thousand new jobs (President of Ukraine, 2021); as a result, the growth of the unemployed population in 2020 was +186.4 thousand people (+12.5%), while in 2009 it was +532.6 thousand people (+37.4%) (Minfin, 2023). The government also allocated 1.4 billion UAH for one-off material assistance to entrepreneurs and employees affected by quarantine restrictions (Economichna pravda, 2021), with the nominal income per person increasing by 6.1% and real income by 2.6% in 2020 (State Statistics Service of Ukraine, 2023). It is also important to intensify social policy means and comply with the adopted model with a bias towards its liberalisation, which might be another additional factor influencing unemployment rates in the countries under study (Stolarska-Szeląg, 2022). Since the COVID-19 pandemic is likely to continue, these public employment policies must be continued and expanded with the help of international organisations, businesses, territorial communities, etc.

## Conclusions

Several important outcomes emerged from the assessment of the governance aspects of the impact of unemployment on the socio-economic development of Poland and Ukraine.

Firstly, it is appropriate to simulate the Okun effect twice: 1) when the dependent variable is the annual growth rate of unemployment and the independent variable is the annual growth rate of the GDP volume index; 2) when the dependent variable is the annual growth rate of the GDP volume index and the independent variable is the annual growth rate of unemployment. This allowed us to obtain extended information and prove the existence of a reciprocal inverse stochastic relationship between the unemployment rate and real GDP.

Secondly, the assessment of the socio-economic development of Poland, by modelling the interrelation between the dynamics of the unemployment rate and the real GDP volume index according to Okun's law, proves that the sensitivity of the real GDP of Poland to changes in the unemployment rate is the lowest (a 1% increase in the unemployment rate corresponds to an 0.76% decrease in real GDP), as compared to the EU (2.08%), the world (5.47%) and Ukraine (5.52%). This means that with an increase in the unemployment rate in Poland, the economic downturn will be much smaller.

Thirdly, it is proved that the sensitivity of unemployment to the cyclicity of the national economy in Ukraine (a 1% real GDP growth corresponds to an 0.12% unemployment reduction) is the lowest compared to the world (0.17%), the EU (0.2%), and Poland (0.28%). In other words, during an economic downturn, Ukraine loses far fewer workers than other countries, but when the economy grows, the unemployment rate decreases the slowest.

Fourthly, it is proved that the percentage increase in real GDP when the national economy reaches a situation of relatively full employment (or the natural rate of unemployment) is the highest for Poland (+3.2%) and the lowest for Ukraine (+0.52%), while for the EU it is +0.79% and for the world +2.83%.

Fifthly, it has been argued that public anti-crisis management in the social sphere of employment should aim both at financial support for employers and employees (e.g. Anti-Crisis Shield governmental program) and at creating new jobs in infrastructure projects (e.g. Large Construction national program in Ukraine).

Thus, the main limitation in modelling the Okun effect is the statistically insignificant stochastic relationship between the increase in unemployment (modelled ILO estimate) and the increase in real GDP. To overcome this limitation, one can take quarterly data for analysis, replace GDP by GNP, or change the real indicator into a nominal one. The prospects for the authors' further research will be the modelling of the impact of unemployment on the socio-economic development of the EU-27 countries in order to rank them according to the value of the Okun parameter and to adapt successful social policy practices in Poland and Ukraine.

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## WPŁYW BEZROBOCIA NA ROZWÓJ SPOŁECZNO-GOSPODARCZY POLSKI I UKRAINY: ASPEKTY ZARZĄDZANIA

**Streszczenie:** Znaczenie tych badań polega na udowodnieniu istnienia efektu Okuna za pomocą wskaźników rozwoju społeczno-gospodarczego Polski, Ukrainy, UE i świata, a mianowicie: wzrost gospodarczy prowadzi do spadku bezrobocia, a recesja gospodarcza do wzrostu bezrobocia; wzrostowi bezrobocia towarzyszy recesja gospodarcza, a spadkowi bezrobocia towarzyszy wzrost gospodarczy. Artykuł ma charakter eksploracyjny i opiera się na analizie porównawczej, analizie regresji, ANOVA, metodzie graficznej, uogólnieniu logicznym, syntezie, indukcji i dedukcji. Uzasadniono celowość porównawczej oceny wpływu bezrobocia na rozwój społeczno-gospodarczy sąsiadujących krajów: Rzeczypospolitej Polskiej (członka Unii Europejskiej) i Ukrainy (kandydata do Unii Europejskiej), uzupełnionej porównaniem z danymi średnimi europejskimi i światowymi. Wykazano, że wrażliwość realnego PKB na zmiany bezrobocia, jak również wrażliwość bezrobocia na zmiany realnego PKB w Polsce jest najniższa, natomiast na Ukrainie najwyższa w stosunku do średniej unijnej i światowej. Ustalono, że państwowe zarządzanie antykryzysowe w sferze społecznej powinno koncentrować się zarówno na wsparciu finansowym dla pracodawców i pracowników, jak i na tworzeniu nowych miejsc pracy przy realizacji projektów infrastrukturalnych.

**Słowa kluczowe:** rozwój, efekt Okuna, prawo Okuna, realny PKB, bezrobocie

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