

# Approaches to the Influence of Uncertainties on Poverty Risk in the European Union

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## **Abstract**

*In 2010, the European Union has proposed to eradicate poverty at the level of the community space. For this purpose, legislative and economic steps have been taken and the Strategy for social inclusion and equal opportunities has been developed. Faced with multiple economic crises, Europe has experienced significant disparities in the risk of poverty at the level of the Member States. We aim to conduct a study on the influence of uncertainties on the risk of poverty in the European Union. The main objective is to develop an econometric model to study the effect of contagion of uncertainties on the risk of poverty. The methods used are to apply econometric modelling processes on social indicators for the period 2010-2021 at European level. The results of the study will highlight the impact of uncertainty on the risk of poverty and will allow the formulation of public policies to help supranational decision makers to limit this phenomenon at the level of the European Union.*

**Keywords:** Risk of poverty, social inclusion, unemployment, econometric model, social insurance

**JEL classification:** H55, I32, E24

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## **1. Introduction**

A central objective promoted by the European Union since 2010 in the field of social policy is the reduction of poverty and social exclusion. Following successive economic crises, EU efforts in this area have been eroded, with a significant share of the population continuing to face the threat of poverty and social exclusion, which is 21.6% of the total population is at risk of poverty (Eurostat, 2023g).

The problem of at-risk-of-poverty is closely correlated with the unemployment phenomenon that is particularly evident among young people in the

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EU in 2022, this level being 24.7% for the population up to 18 years and 26.5% for the population aged 18 to 24 years. Limited employment opportunities and low wages make it harder for people to get out of poverty and improve living conditions. Another factor is inadequate access to education and healthcare as they restrict people's ability to acquire the skills and opportunities necessary for upward mobility.

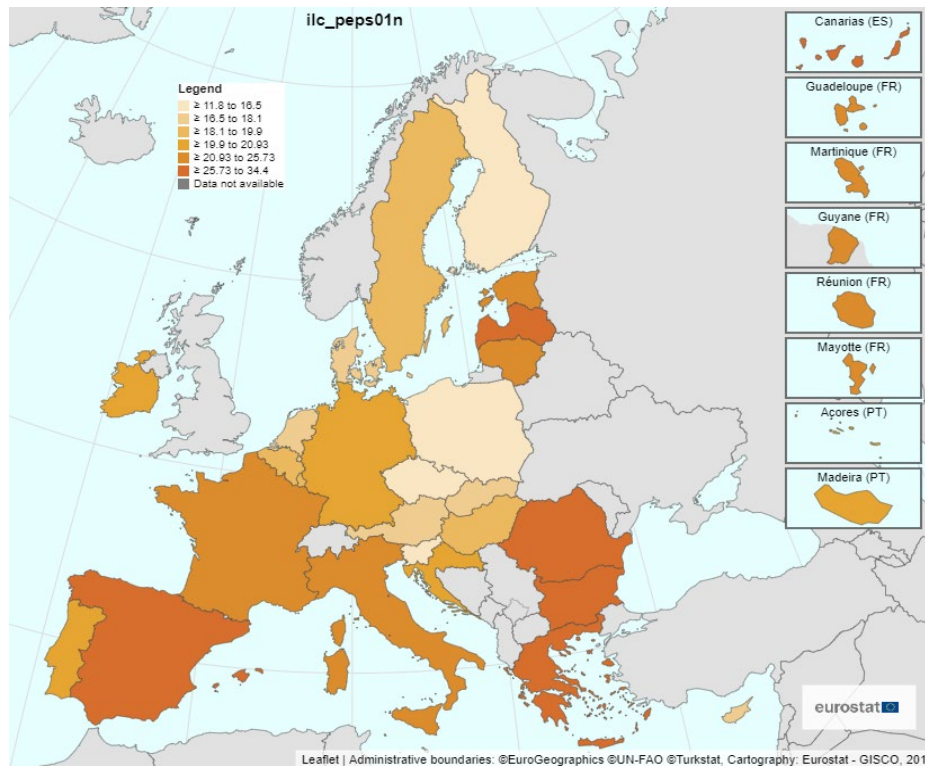
Poverty risk analysis provides insight into the economic well-being of individuals and the level of inequality between European countries (Kuhn, 2019). Thus at EU level the most at-risk-of-poverty countries are Romania and Bulgaria with more than 32% at-risk-of-poverty as a percentage of the total population, which is more than 50% higher than the average at-risk-of-poverty rate of the European population (Eurostat, 2023g). At-risk-of-poverty takes into account not only income levels but also factors such as access to education, healthcare and social support systems (Baccaro & Tober, 2022).

To eradicate the risk of poverty at European level, efforts are being made to promote social cohesion, foster inclusive growth and ensure a fairer society within the European Union. A significant issue is to measure the effectiveness of social policies and adjust them in line with the new threats of population migration from geopolitical conflict zones, rising living costs due to the economic crisis and inflation or the exposure to risk of segments of the working population due to the reconfiguration of the European economy in the context of digitalization.

This requires monitoring the factors that contribute to poverty such as high unemployment rates, low wages or inadequate social protection systems. At the same time, social inequality and discrimination must be monitored and limited by increasing access to quality education and healthcare services (Cristache, N., et al, 2019)

The economic crisis and austerity measures in some EU Member States have worsened the social situation of some European citizens by restricting social assistance programs. At the same time, the growing number of refugees and migrants seeking better opportunities in Europe has intensified competition for job opportunities, leading to increased poverty (Cappelli et al., 2021; Dvouletý et al., 2020).

People at risk of poverty or social exclusion face many challenges, including joblessness, material deprivation, poor housing conditions, inadequate health care and barriers to access to education and culture. Reducing poverty rates has a positive impact on social inclusion, education, and healthcare.



**Figure 1. Analyze People at risk of poverty or social exclusion in 2022 in the EU**  
 Source: Elaborated by the authors according to Eurostat data (Eurostat, 2023g)

According to Eurostat data, in 2022, 22% of the EU population will be at risk of poverty or social exclusion. Figure 1 shows that the share of people at risk of poverty varied across the EU countries, with the highest values in Romania (34.4%), Bulgaria (32.2%), Greece (26.3%), Spain and Latvia (26%), Estonia (25.2), Lithuania (24.6%), Italy (24.4%) and the EU27 (21.6%). At the opposite pole, with the lowest values recorded are Czech Republic (11.8%), Slovenia (13.3%), Poland (15.9%), Finland (16.3%), Netherlands (16.5%), Slovakia (16.5%), Cyprus (16.7%).

We propose to carry out research on poverty risk and its causes at European level in order to identify the influence of multiple crises on the change in the value of this indicator based on the following research objectives:

O1. Critical literature review on the impact of socio-economic factors on poverty risk

O2. Consolidation of the European database on the variation of poverty risk and indicators of poverty risk over the period 2010-2021.

O3. Determine the econometric model of poverty risk exposure of European citizens.



investment environment and unemployment also have a significant impact on poverty rates in both economic areas.

Another study (Kwilinski et al., 2020) investigates the impact of digitisation on poverty and social exclusion in EU Member States. The authors use the Digital Economy and Society Index (DESI) to assess levels of digitisation, and the 'People at risk of poverty or social exclusion' indicator was used to estimate poverty levels. The authors showed that EU countries with higher levels of digitisation had a lower percentage of the population at risk of poverty and social exclusion.

An interesting paper (Ebbinghaus, 2021) examines inequality and risks of poverty in old age in Europe. The author demonstrates that Bismarckian systems are more suitable for poverty reduction in the Nordic countries and the main countries of Central and Eastern Europe. In contrast, Beveridge systems, particularly in the UK and Switzerland, have medium to high poverty risks. The author argues that the current economic crisis and the financial burden triggered by the coronavirus pandemic increase pressures on fiscal sustainability and also lead to largely unintended repercussions for the old-age income situation of pensioners (Hinrichs, 2021).

The poverty rate is influenced by a number of factors, including economic, social, economic growth and the distribution of its effects. An interesting article by Anton Michálek and Ján Výboštok (Michálek & Výboštok, 2019) analyses a country's capacity to meet global challenges in relation to economic and social growth in that country, as well as in the EU. The classification is derived from monitoring trends in economic growth and inequality, and their interconnections with poverty in different countries. To analyse these interactions, this research uses the Bourguignon model (Poverty-Growth-Inequality-PGI triangle) and the growth incidence curve. The authors show that economic growth is related to a decrease in poverty, as income inequality increases, poverty increases.

Changing fiscal policies can have a significant impact on poverty and a fall in population incomes. Authors Leventi et al. (Leventi et al., 2018) attempts to identify the most effective strategies for reducing poverty or preventing its development in seven different EU nations by quantifying the consequences of increasing or reducing each fiscal policy instrument, using micro-simulation techniques, keeping the same policy design and national environment. Determining the most cost-effective instrument depends on the criterion used to measure poverty and the extent and direction of change. However, the authors' findings suggested that, in most countries, the most cost-effective choices for poverty reduction are to increase child benefits and social assistance. Conversely, reducing child benefits is a particularly damaging approach to achieving budgetary savings, as it exacerbates poverty.

An original study on the significance of poverty and its variation among European nations is presented by Mussida and Sciulli (Mussida & Sciulli, 2022), which examines the factors contributing to poverty in Europe and how they have changed over time, by disentangling the role of real state dependency and their

heterogeneity. The objective of the study was to estimate genuine state dependency and examine the influence of observable and unobservable factors on poverty risk in a sample of European countries. The results of the study indicated that the level of state dependency is significant in Europe and that it has increased slightly from the pre-Great Recession period to the post-Great Recession period. These findings confirm that poverty alleviation efforts, such as cash transfers, have become even more important during the Europe 2020 era, yet European states are experiencing an increasing impact of poverty, which has worsened in the post-recession period. In another study, the same authors (Mussida & Sciulli, 2023) have shown that in recent decades poverty has become a worrying phenomenon in Europe, and the pandemic has aggravated this phenomenon (Palomino et al., 2020). Despite the adoption of contrasting measures, poverty has persisted at relatively high levels and even increased in some countries usually characterised by low poverty rates. Over the past decades, trends in poverty and economic vulnerability in the developed countries of the European Union have, according to the authors, increased Cantillon et al. (Cantillon et al., 2018) which also explored how social investment and local social innovation initiatives can contribute to the fight against poverty, given the structural constraints on raising the social threshold and the difficult trade-offs involved in reconciling work and poverty reduction. However, the authors argue that the differences between countries are very large, suggesting that there are lessons to be learned and policy changes that can be implemented if the political will is there (Pricopoaia, O., et al, 2023).

Perspectives on poverty in Europe, are presented by Jenkins (Jenkins, 2020) which identifies a number of causes that can explain this development, referring to historical experience, while providing empirical evidence on poverty trends, using several indicators, together with observations on the direction of anti-poverty policy in an era of austerity and greater questioning of the roles of EU versus national institutions and initiatives. The distinction made by the author is important: as the integration process has deepened, the discourse on poverty in European countries has taken on an increasingly European dimension. This is reflected in the way poverty is now conceptualised, measured and monitored.

The methodology currently used to measure and monitor poverty in the European Union faces some important limitations according to the collective of authors Goedeme et al.(Goedemé et al., 2022), because it believes that work on capturing key aspects of poverty is done using a dashboard of indicators, which is often insufficient or inadequate. The authors' research proposes a new income-based measure of poverty for Europe that captures in a consistent way a single indicator of relative poverty level, poverty intensity, poverty with a time-anchored threshold and a pan-European perspective on poverty. To do this, the authors worked with a recently developed poverty indicator, the extended headcount ratio (EHC), and obtained the relevant poverty lines to calculate the poverty index in Europe. The results of the study showed that Eastern Europe has a much higher level of poverty than Southern Europe, which in turn has a considerably higher level of poverty than North-Western Europe.

In the period before the onset of the global financial crisis in 2008, the author Cantillon (Cantillon, 2011) appreciates that the role played by the rise in low-paid jobs and the decline in passive income support policies is well known, so that in the period that followed, rising unemployment and financial stress caused by the crisis negatively affected household incomes in Europe, and some countries suffered in particular from the implementation of contractionary fiscal policies and labour market deregulation, increasing the socio-economic vulnerability of societies. In the author's view, it is important to understand the origins of poverty in order to design effective policy strategies capable of restoring acceptable levels of economic inequality.

Collectives of authors Gornick and Jntti (Gornick & Jäntti, 2012) and Grotti and Scherer (Grotti & Scherer, 2014) believes that poverty is particularly relevant for certain population groups, such as young people, single parents and families with one income and children. In addition, it can be seen that the risk of poverty can be associated with various triggering events, such as job loss, low-paid jobs, changes in household composition, etc.

The defining characteristics of advanced capitalism, such as income inequality and labour market dualism, pose a challenge to assessing the health of the economy and are presented in an original study by Hellwig and Marinova (Hellwig & Marinova, 2022), which carries out this analysis on the basis of a limited set of macroeconomic indicators. The results of the study showed that poverty risk influences the way individuals assess the economy: individuals at risk of poverty are less likely to rely on conventional indicators of economic growth and unemployment and are more likely to pay attention to the poverty rate. Analyses of public opinion data from 27 European countries supported this argument and showed that people at risk of poverty know less about economic performance by standard economic indicators, but provide more accurate estimates of national poverty rates. These authors' findings support the need to adapt known macroeconomic indicators to how unequal economies structure policy preferences and responses.

An interesting study proposed by Schneider (Schneider, 2019) brings into question a person's subjective social status or perception of their position in society. Based on sociological and social psychological research, he argues that the contextual effect of income inequality on subjective well-being is mediated by perceptions of social status and that income inequality moderates the relationship between subjective social status and individuals' well-being.

Cohesion policy is a core policy of the European Union, the main objective of which is to address uneven economic growth across the EU by promoting balanced and sustainable development and can compensate less favoured population groups and places through the application of internal market policy and economic and monetary union. Cohesion policy should shape regional support for European integration(López-Bazo, 2022), more EU funds spent in regions with social disparities and inequalities does not boost social support for the Union, but

an appropriate temporal distribution of resources to regions in need could have a positive effect.

### 3. Research methodology and stages

In order to achieve the research objective, we used the Eurostat database from which the indicators were collected, for the period 2010-2021 for the European Union states:

- POV - At-risk-of-poverty rate % (Eurostat, 2023a)
- SOCPGDP - Expenditure on social protection (% GDP) (Eurostat, 2023d)
- PENSGD - Expenditure on pensions (% GDP) (Eurostat, 2023c)
- EMPR - Employment rate total (Eurostat, 2023b)
- POVIW - In work at-risk-of-poverty rate (Eurostat, 2023e).

The following working hypotheses are defined to demonstrate the research objective:

H1. The at-risk-of-poverty rate shows significant influence through the at-risk-of-poverty population employed in the labour force.

H2. The at-risk-of-poverty rate shows an inversely proportional influence from social protection expenditure in the sense that the reduction of this expenditure increases the risk of poverty at European level.

H3. The at-risk-of-poverty rate shows a directly proportional correlation with the level of pension expenditure expressed as a percentage of GDP

$$POV_{2010} = -0.303 * SOCPGDP_{2010} + 0.436 * PENSGDP_{2010} + 0.033 * EMPR_{2010} + 0.6 * POVIW_{2010} + 11.473 \quad (1)$$

$$POV_{2011} = -0.373 * SOCPGDP_{2011} + 0.57 * PENSGDP_{2011} + 0.005 * EMPR_{2011} + 0.437 * POVIW_{2011} + 14.958 \quad (2)$$

$$POV_{2012} = -0.384 * SOCPGDP_{2012} + 0.578 * PENSGDP_{2012} - 0.011 * EMPR_{2012} + 0.417 * POVIW_{2012} + 16.394 \quad (3)$$

$$POV_{2013} = -0.454 * SOCPGDP_{2013} + 0.658 * PENSGDP_{2013} + 0.014 * EMPR_{2013} + 0.485 * POVIW_{2013} + 14.939 \quad (4)$$

$$POV_{2014} = -0.343 * SOCPGDP_{2014} + 0.394 * PENSGDP_{2014} + 0.032 * EMPR_{2014} + 0.654 * POVIW_{2014} + 12.855 \quad (5)$$

$$POV_{2015} = -0.404 * SOCPGDP_{2015} + 0.442 * PENSGDP_{2015} + 0.047 * EMPR_{2015} + 0.628 * POVIW_{2015} + 12.931 \quad (6)$$

$$POV_{2016} = -0.348 * SOCPGDP_{2016} + 0.317 * PENSGDP_{2016} + 0.044 * EMPR_{2016} + 0.689 * POVIW_{2016} + 12.645 \quad (7)$$

$$POV_{2017} = -0.331 * SOCPGDP_{2017} + 0.307 * PENSGDP_{2017} + 0.049 * EMPR_{2017} + 0.676 * POVIW_{2017} + 11.822 \quad (8)$$

$$POV_{2018} = -0.269 * SOCPGDP_{2018} + 0.179 * PENSGDP_{2018} + 0.063 * EMPR_{2018} + 0.803 * POVIW_{2018} + 9.747 \quad (9)$$

$$POV_{2019} = -0.249 * SOCPGDP_{2019} + 0.151 * PENSGDP_{2019} + 0.057 * EMPR_{2019} + 0.864 * POVIW_{2019} + 9.315 \quad (10)$$



$$POV2020 = -0.238 * SOCPGDP2020 + 0.284 * PENSGDP2020 + 0.057 * EMPR2020 + 0.927 * POVIW2020 + 7.691 \quad (11)$$

$$POV2021 = -0.226 * SOCPGDP2021 + 0.293 * PENSGDP2021 + 0.055 * EMPR2021 + 0.866 * POVIW2021 + 7.634 \quad (12)$$

From the regression equations presented above, it can be seen that the largest influence on poverty risk at the model level is the employed population at risk of poverty, which has an increasing influence of up to 92% on the increase in the poverty risk rate. This demonstrates working hypothesis H1: The at-risk-of-poverty rate shows significant influence through the at-risk-of-poverty employed population.

In second place with an inverse proportional correlation of up to 45% is social protection expenditure, which shows a tendency to reduce its impact on poverty risk in 2018-2021 compared to the beginning of the period.

This demonstrates working hypothesis H2: The at-risk-of-poverty rate shows an inverse proportional influence of social protection expenditure in the sense that the reduction of this expenditure increases the risk of poverty at the European level. In the same sense, pension expenditure tends to decrease its impact on the risk of poverty over time, the lowest level being in the pre-pandemic period, namely 2019, when it influenced the dynamics of the poverty rate by only 15%, while at the beginning of the period 2012, 2013 its impact was 65%. This demonstrates working hypothesis H3: The at-risk-of-poverty rate shows a direct correlation with the level of pension expenditure expressed as a percentage of GDP.

In last place in terms of impact on poverty risk is the employment rate indicator, which generally shows an influence of maximum 5% on the evolution of poverty risk.

Table 1 shows the dynamics of the proposed model summary.

### Model Summary

Table 1

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
2010	0.741	0.549	0.470	2.5259	0.549	6.990	4	23	0.001	2.011
2011	0.711	0.506	0.420	2.5834	0.506	5.882	4	23	0.002	1.812
2012	0.748	0.559	0.482	2.5101	0.559	7.293	4	23	0.001	1.839
2013	0.771	0.595	0.525	2.4952	0.595	8.446	4	23	0.000	1.881
2014	0.813	0.662	0.603	2.4046	0.662	11.238	4	23	0.000	2.122
2015	0.770	0.593	0.523	2.7703	0.593	8.394	4	23	0.000	1.967
2016	0.788	0.621	0.555	2.6579	0.621	9.418	4	23	0.000	1.751

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
2017	0.719	0.517	0.433	2.9761	0.517	6.163	4	23	0.002	1.839
2018	0.701	0.491	0.402	2.9857	0.491	5.545	4	23	0.003	1.699
2019	0.766	0.587	0.516	2.6944	0.587	8.189	4	23	0.000	1.710
2020	0.744	0.553	0.476	2.7577	0.553	7.126	4	23	0.001	1.722
2021	0.769	0.591	0.520	2.7551	0.591	8.306	4	23	0.000	1.757
a. Predictors: (Constant), POVIW, SOCPGDP, EMPR, PENSGDP										
b. Dependent Variable: POV										

Source: Authors' calculations using SPSS v 26

Table 1 above shows that the statistical significance level of the model is on average between 40% in 2018 and 60% in 2014. The value of the F function is maximum in the year 2014 i.e. 11.2% reaching the minimum value in the year 2015 respectively 5.5. An oscillating trend of variation is observed, with the pandemic period influencing a decrease in the significance level of the regression function as in the crisis period of 2010-2011 or in the period 2017-2018, the recognized period when the poverty risk rate in Europe reaches a level similar to that observed in 2011-2013 (Eurostat, 2021).

The correlation level of the indicators tested by the Durbin-Watson statistical test shows a leftward skewness of the regression function since 2015, the highest level of skewness being recorded in 2015 while the maximum heterogeneity of the regression was recorded in 2010 when the distribution was quasi-homogeneous, the Durbin Watson coefficient being 2.011.

In Table 2 the Anova test was designed

### Anova

Table 2

Model		Sum of Squares	df	Mean Square	F	Sig.
2010	Regression	178.386	4	44.597	6.990	0.001
	Residual	146.743	23	6.380		
	Total	325.130	27			
2011	Regression	157.035	4	39.259	5.882	0.002
	Residual	153.506	23	6.674		
	Total	310.541	27			
2012	Regression	183.788	4	45.947	7.293	0.001
	Residual	144.910	23	6.300		
	Total	328.697	27			

	<b>Model</b>	<b>Sum of Squares</b>	<b>df</b>	<b>Mean Square</b>	<b>F</b>	<b>Sig.</b>
2013	Regression	210.350	4	52.588	8.446	0.000
	Residual	143.200	23	6.226		
	Total	353.550	27			
2014	Regression	259.929	4	64.982	11.238	0.000
	Residual	132.992	23	5.782		
	Total	392.921	27			
2015	Regression	257.669	4	64.417	8.394	0.000
	Residual	176.509	23	7.674		
	Total	434.179	27			
2016	Regression	266.131	4	66.533	9.418	0.000
	Residual	162.479	23	7.064		
	Total	428.610	27			
2017	Regression	218.328	4	54.582	6.163	0.002
	Residual	203.712	23	8.857		
	Total	422.040	27			
2018	Regression	197.708	4	49.427	5.545	0.003
	Residual	205.033	23	8.914		
	Total	402.741	27			
2020	Regression	237.793	4	59.448	8.189	0.000
	Residual	166.974	23	7.260		
	Total	404.767	27			
2021	Regression	216.786	4	54.196	7.126	0.001
	Residual	174.916	23	7.605		
	Total	391.701	27			
a. Dependent Variable: POV						
b. Predictors: (Constant), POVIW, SOCPGDP, EMPR, PENSGDP						

*Source:* Authors' calculations using SPSS v 26

According to the data in Table 2, it can be seen that in almost all cases (except 2018) the value of the sum of the regression squares is greater than the sum of the squares of the residuals, which validates the proposed model. The largest approximation between the two components occurred in 2017 amid the increase in unemployment in the European Union (Statistics Portugal, 2021)

#### **4. The results of bibliometric research**

The model is homogeneous and well determined with the value of the Sig coefficients being in all cases less than the chosen error significance threshold of

5% as shown in Table 2 by calculating the Sig coefficients of the F function. This is also demonstrated by the graphical method shown in Figure 3.

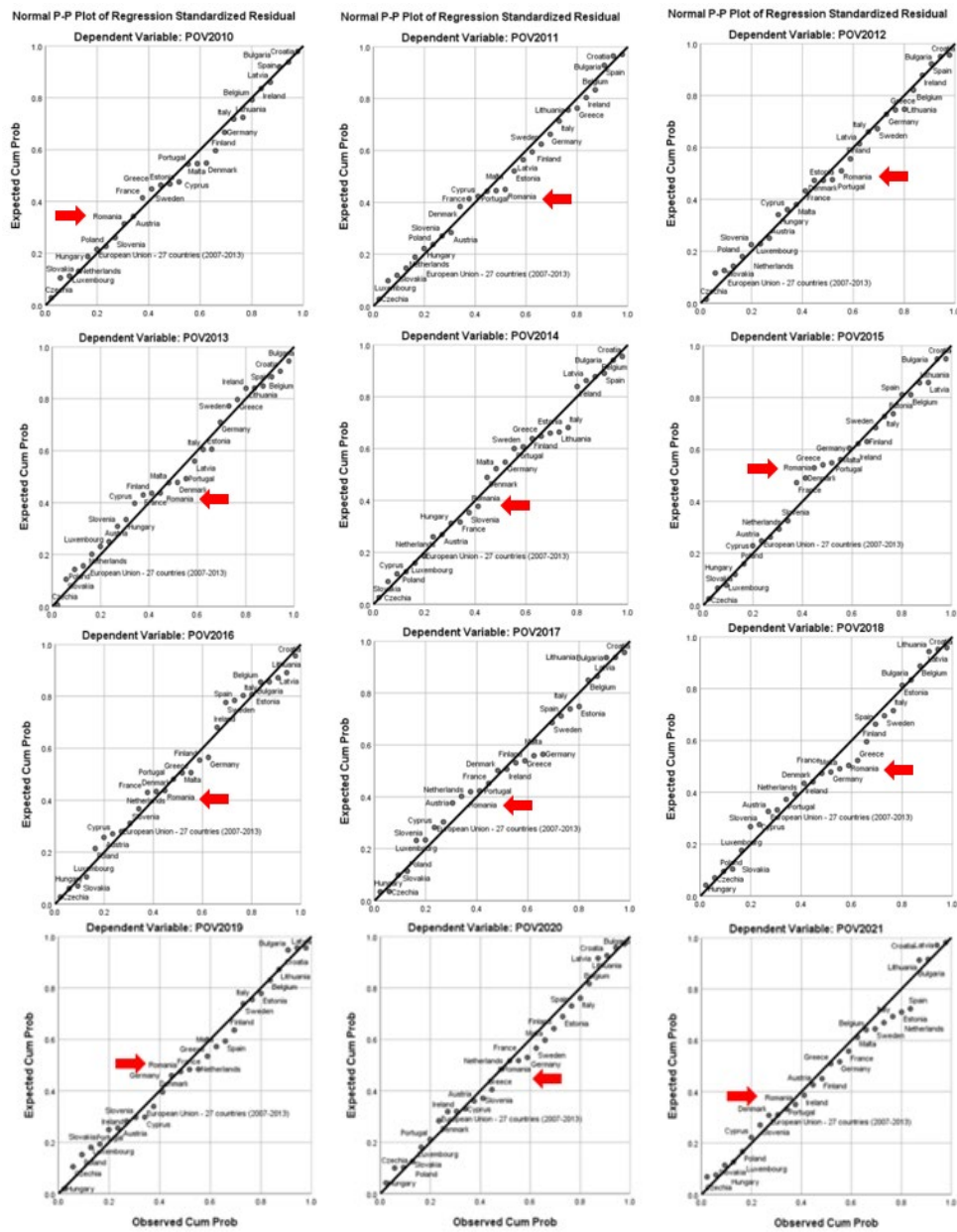
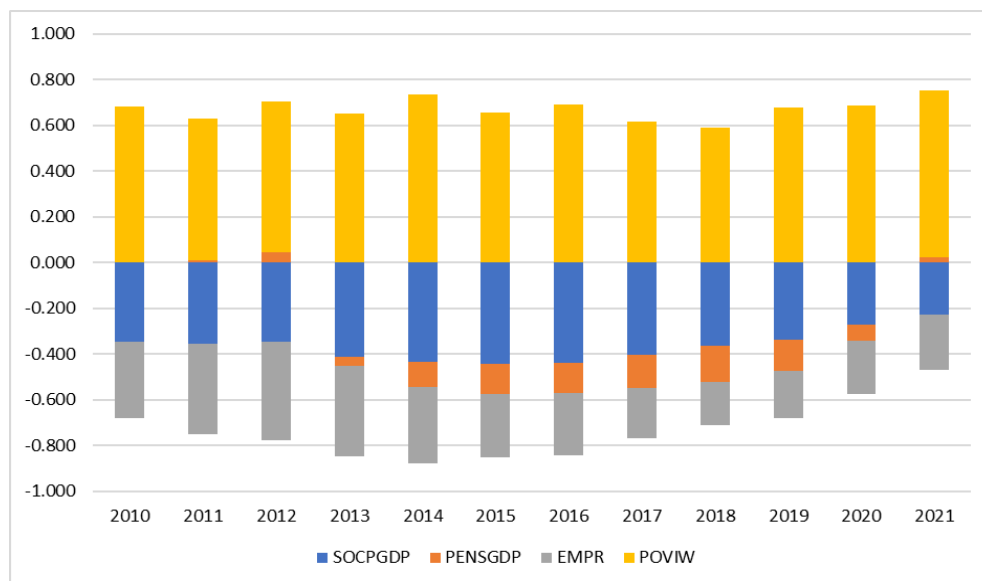


Figure 3. P-P Plot diagram of regression for dependent variable  
 Source: Elaborated by authors

From Figure 3 above it can be seen that there is a distribution of errors on the right of the minimum trend, with Romania generally being in the area of maximum error amplitude in the years 2011, 2015 2017 and 2018. According to Eurostat statistics for the year 2022, 10.7% of the European population is at risk of poverty of which 2% is at severe risk of poverty. The highest rate of population at risk of poverty or poverty exclusion in 2022 is in Romania with 34.4% of the population followed by Bulgaria 32.2% and Greece. At the opposite pole, the lowest rates are for Poland with 15.9%, Slovenia 13.3% and the Czech Republic 11.8%. At the European average level 21.6% of the total population is at risk of poverty.(Eurostat, 2023f).

The risk of poverty is differentiated by gender, being higher for women (22.7%) than for men (20.4%). By age group, the segment most exposed to poverty is those aged between 18 and 24 (26.5%), while at the other end of the scale are people aged 25-49 (19.9%). At the same time, there are significant differences in the risk of poverty and social exclusion at European level depending on the level of education: people with at most secondary education faces a 34.5% risk of poverty while people with a higher level of education have a risk exposure of only 10.5%. Depending on their labour market status, unemployed people have a risk exposure of 65.2% and other inactive labour market categories 42.9%. At the other end of the spectrum, employed or retired people have a much lower risk of poverty of 11.1% or 19.1%.

The evolution of the Pearson correlation levels of the regression variables with the dependent variable was projected, the plot is shown in Figure 4 below.

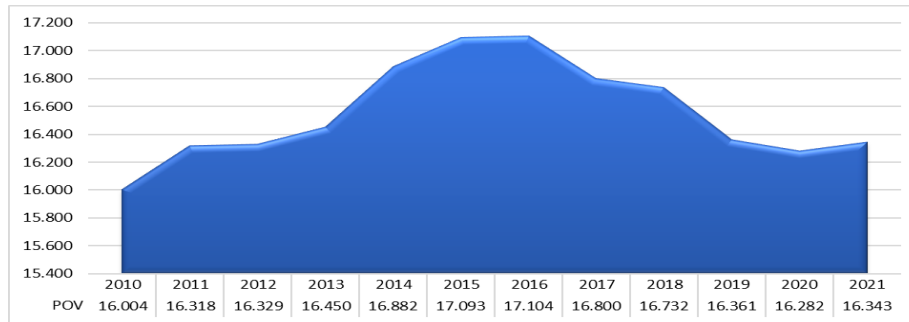


**Figure 4 Pearson correlation table of the proposed econometric model**

*Source:* Elaborated by authors

Figure 4 shows that a significant impact on changes in the dependent variable (poverty risk) is the exposure to risk of people employed in the labour force (working hypothesis 1) followed by the level of social insurance granted to European citizens (working hypothesis 2) and the level of unemployment. The impact of the change in pensions as a percentage of GDP is oscillating as shown in Figure 4 (working hypothesis 3).

In the dynamic analysis of the population at risk of poverty at European level, the average population at risk of poverty ranged from 16% (in 2010) to 17.1% (in 2016) as shown in Figure 5.

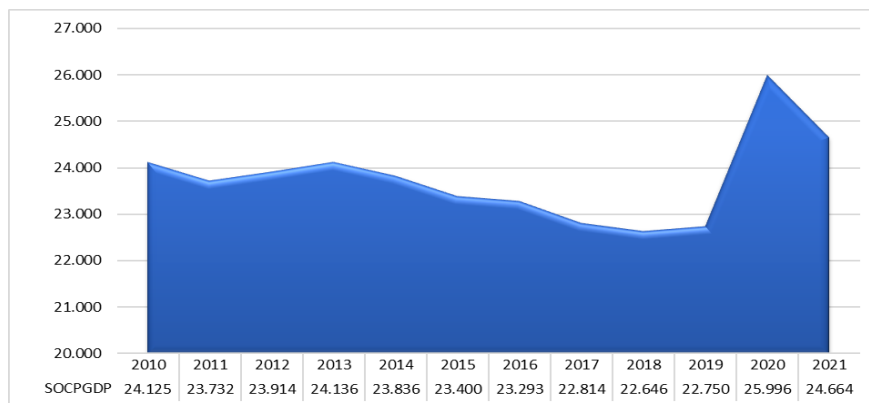


**Figure 5. Dynamics of the evolution of the average at-risk-of-poverty indicator at European Union level**

*Source:* Elaborated by authors

It can be seen from Figure 5 that at the end of the period, after a downward evolution of the population exposed to risk under the impact of the geopolitical crisis, the average of the indicator increases in 2021, the value being close to the value recorded for 2012.

Figure 6 shows the analysis of the average evolution of the Expenditure on social protection indicator (% GDP).

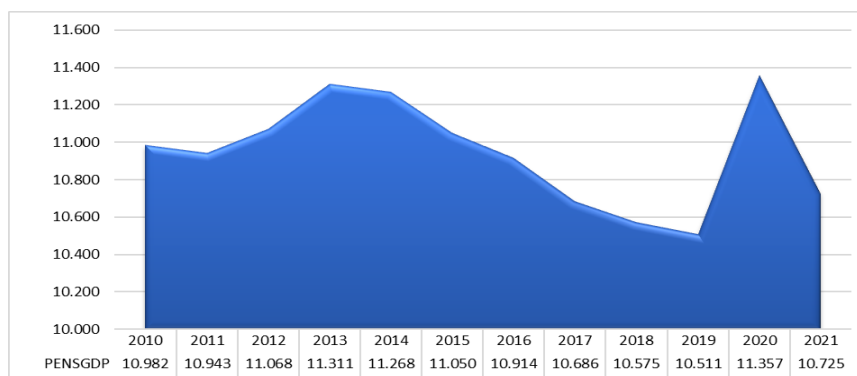


**Figure 6. Dynamics of the evolution of the averages of the indicator Expenditure on social protection (% GDP) at European Union level**

*Source:* Elaborated by authors

From Figure 6 it can be seen that the evolution of the indicator registered an upward trend characterized by the equation  $y = 0.0477x^2 - 0.5934x + 25.05$ , the highest value being recorded in 2020, i.e. 26% of GDP, while the lowest value is recorded in 2018, i.e. 22.8% of GDP. In 2021 the value of the indicator on social protection expenditure was 24.66% of GDP, decreasing compared to 2020.

Figure 7 shows the dynamics of the average evolution of the Expenditure on pensions indicator (% GDP).

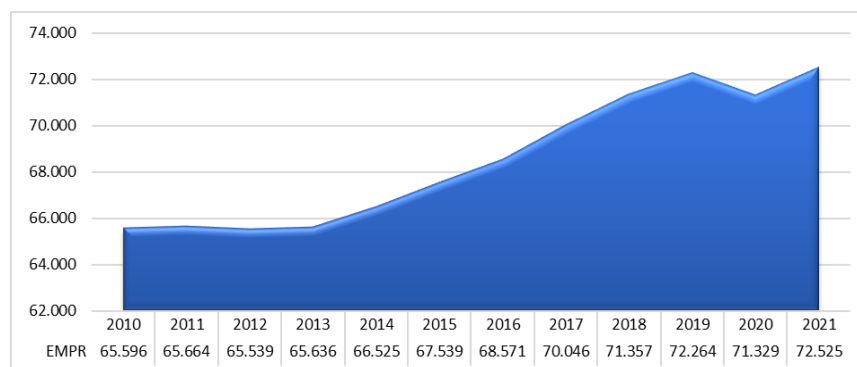


**Figure 7. Dynamics of the evolution of the average Expenditure on pensions indicator (% GDP) at European Union level**

*Source:* Elaborated by authors

From figure 7 shows that unlike the previous indicator, the trend is downward characterized by the equation  $y = -0.0011x^2 - 0.0154x + 11.11$ . The maximum value is reached in 2020 when the pandemic outbreak has been taken additional social protection measures, which has brought the indicator to the level of 2013-2014. In 2021, the value of pension expenditure is back to the downward level of 10.7 of GDP.

Figure 8 shows the evolution of the average Employment indicator as % of total population.

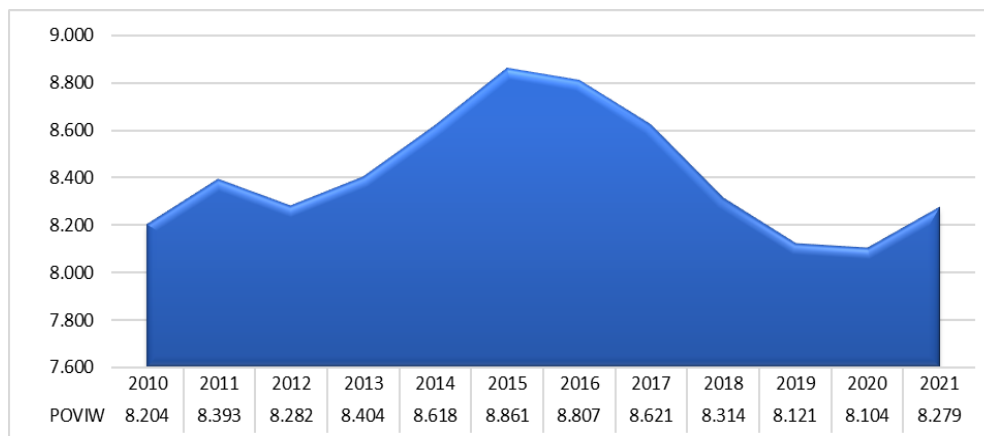


**Figure 8. Dynamics of the evolution of the average Employment rate indicator % of total population at European Union level**

*Source:* Elaborated by authors

Figure 8 shows that the level of employment of the population in the labour force increased steadily until 2020, the pandemic year, the trend being characterized by the equation  $y = 0.0265x^2 + 0.4058x + 64.478$ . This corresponds to the pro-inclusion policies promoted by the European Union which contributed to the moderation of the evolution of the risk of poverty as shown in Figure 5.

Figure 9 shows the evolution of the average In work at-risk-of-poverty rate.



**Figure 9. Dynamics of the evolution of the average in work at-risk-of-poverty rate at European Union level**

*Source:* Elaborated by authors

Figure 9 shows that the evolution of the in work at-risk-of-poverty rate indicator has been a hostial one with a peak of representation in the years 2015-2018, which led to a change in the model parameters for the years 2017-2018 when the statistical representation rate was minimal. After this period the trend was downward until the outbreak of the pandemic which had the effect of increasing the at-risk-of-poverty rate of the employed population as shown in the figure.

The analysis showed that the risk of poverty manifests a contagion effect from economic and pandemic crises being a phenomenon that manifests itself at European level on 21.6% of the population, the most affected countries being Romania and Bulgaria and at the opposite pole being Solvenia and the Czech Republic. The results of the research indicate that although declared in 2010 as a European objective (European Anti-Poverty Network, 2009) poverty eradication is far from being a closed chapter in Europe, with continuing challenges of unequal access to the labour market, obtaining sufficient income to meet basic needs, all due to lack of information and bureaucratisation of social services or lack of decent paid jobs.

## 5. Conclusions

The research achieved all three of the proposed objectives, with the authors conducting a critical review of the literature which highlighted that scientifically



poverty risk is equated with socio-economic status, social inequality, energy poverty, climate change and multiple crises. The authors analysed Eurostat databases to determine the correlation between poverty risk and the dynamics of social assistance and labour market employment and developed an econometric model that revealed the fluctuating evolution of poverty risk reduction policies and the sensitivity of this risk to multiple crises. The authors consider that poverty reduction requires public policies to inform and increase uniform access to the labour market for the European population while ensuring a level of income that covers basic needs and provides adequate social protection for single-parent families. The limitations of the study lie in the relatively small number of indicators, and the authors propose to extend the research on a later occasion to refine the findings and capture more of the issues that influence the risk indicator.

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