Research Article

Welfare State differences in Selected European Union Countries under Conditions of Uncertainty

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Abstract

The article discusses the welfare state models developed for some European Union countries in situations of uncertainty, such as economic crises, the COVID-19 pandemic, and growing social inequalities. The research explores Goal 8 of United Nations Agenda 2030 for Sustainable Development: to ensure that economic growth is continuous, inclusive, and durable; and labor is productive, secure, and decent , available to all. The analysis has also brought out the imperative of attaining an inclusive economy within the frame of modern global challenges, including unemployment, inequality, and environmental sustainability. It further emphasizes the inter-relationship between technological changes, global trade patterns, and shifts in labor market conditions, requiring all-inclusive policies that would grant opportunities even to the marginal groups like women, youth, and people with disability.

The publication is an attempt at undertaking an analysis of the following indicators related to Goal 8 of Agenda 2030: Decent Work and Economic Growth. Indicators of this goal include the following: gross domestic product per capita, share of GDP, employment rate for women, long-term unemployment rate, young people neither in employment nor in education and training, and fatal accidents at work. The models were to be prepared using data from the Eurostat databases for the years 2008-2023 in selected countries within the EU: Lithuania, Poland, Germany, Sweden, and Luxembourg. To do this, it was necessary to apply descriptive statistical methods, primarily the method of linear regression and trend function.

This study explores the balancing act pursued by countries to combine economic productivity with environmental responsibility, while the growth strategies are aligned in coherence with the circular economy and green transformation principles. Research identifies policy frameworks that effectively include decent work standards, protection of workers' rights, and lifelong learning and skill development. In the final instance, the publication underscores the fact that solving structural inequalities, adapting to changes in technology, and economic development towards the inclusive and sustainable future of all until 2030 is the coordinated effort of international responsibility. At the end, parameters of trend function were estimated for chosen indicators, what made possible verification of the research hypotheses considered as true by us.

Introduction

The welfare state has long been a fundamental aspect of European social policy, aimed at providing economic and social security to citizens through various programs and benefits. However, the specific structure and approach to welfare vary significantly between countries of the European Union (EU), reflecting diverse historical, cultural, and economic factors . In recent years, these welfare systems have faced increasing pressure due to various uncertainties, such as economic crises, demographic changes, and political challenges.

This publication explores the differences in welfare-state models across selected EU countries, with a focus on how these systems respond to uncertainty. By examining policies and frameworks in countries with different welfare models, such as the Nordic, Continental, and Baltic systems, this analysis aims to identify key factors that influence their resilience and adaptability. Understanding these differences highlights both the strengths and weaknesses of each model, but also provides insight into potential strategies for improving welfare systems in the face of ongoing and future challenges.

List of indicators from Goal 8 of Agenda 2030:

1. Gross domestic product (GDP per capita)

2. Investment share of GDP

3. Employment rate for women

4. Long-term unemployment rate

5. Young people neither in employment nor in education and training (NEET)

6. Fatal accidents at work

The purpose of the publication will be to analyze the indicators from Goal 8 of Agenda 2030. The models will be prepared on the basis of data taken from Eurostat databases for the years 2008-2023. Forecasts for subsequent periods will be developed using trend functions.

For sustainable economic development and the well-being of a society, it is crucial that economic growth generates not just any kind of job but 'decent' jobs. This means that work should provide fair income, workplace security, and social protection for families, better prospects for personal development, social integration, and equality of opportunity.

Literature review

Issues of state welfare have been and are constantly analyzed, both by politicians and economists. For politicians, issues of state welfare are important in order to earn political capital - to win the loyalty of voters. For economists, issues of state welfare are important to show the progress achieved in state welfare through the analysis of economic indicators. Sociologists are interested in this issue in order to identify how the population itself understands the welfare state. The welfare state is also extensively studied by scholars .

Most researchers refer to the state of public health care as one of the many indicators of the welfare state. Moran (2002) in his research identified the state of public health care as the most important element of the welfare state. Describes the concept of the welfare state from a narrower and broader point of view. He also emphasizes the importance of health programs in the formation of welfare state policy.

Nobel laureates Acemoglu, Johnson, and Robinson [1], in their research on the welfare state, identify the importance of social institutions, one of the results of whose work is the reduction of the huge income gap between countries. Mandel and Semyonov [2], in their research, analyze the possibilities of women's participation in the labor market and their professional achievements as an element of the welfare state. The issue of gender inequality is also raised as one of many elements of state welfare.

OECD specialists Ademai and Ladaiquei [3] analyze the welfare state by assessing social spending as a percentage of GDP. One of the main elements of a state's well-being is the proportion of spending on pensions and public health as a percentage of GDP. Stamsø [4], in researching the characteristics of the welfare state, emphasizes the importance of housing policy in forming social policy. In his opinion, compensation for housing rental costs is an important part of the welfare state. Trüdinger and Gabriel [5] overview the welfare state through the prism of political trust. The dynamics of state spending on pensions and healthcare, as well as assistance to families, are, in the authors' opinion, an important feature of a welfare state.

Kammer, Niehues and Peichl [6], differently from other scientists, show considerable attention to resource allocation at the household level when assessing welfare state issues. In their research, they performed a hierarchical cluster analysis and checked whether the classical typology for western European welfare states reproduces the typical models when economic indicators are evaluated.

Garland [7], while researching the welfare state, says that it is a specific way of state management and a normal social fact. In his research, Garland identified five sectors that are important in the welfare state. These are the sectors that include social insurance, social assistance, publicly funded social services, social work, and personal social services, and economic governance. According to Garland, the welfare state is a component of the modern world and a reflection of society's social health.

Wispelaere and Haagh [8] show the importance of basic income when analyzing the welfare state. The importance of basic income has become particularly evident during the Covid-19 pandemic. In their opinion, one of the most important social policy issues should be the introduction of basic income.

Walker, Druckman and Jackson [9] overview of welfare systems in OECD countries identify common challenges facing these systems. Increasing poverty, demographic changes, and environmental pollution are identified as the main challenges. These scientists suggest thinking about how the welfare state

should solve these challenges in the absence of economic growth.

Zimmermann [10], while researching the welfare state, says that modern welfare state should focus on a green economy attention to address climate change issues. Today, it is not enough to simply stabilize the economy, prevent poverty, and balance class interests. A 'green transition' is inevitable to address the environmental damage caused by capitalism.

Lithuanian scientists who researched welfare state issues emphasize attention to social policy and its content. Šileika and Paškevičiūtė [11] list the main indicators that characterize the welfare state - monthly salary, social benefits, old-age pensions, GDP per capita, comparative weight of state spending on social protection in the GDP expenditure structure.

Aidukaitė [12], in her article, analyzes welfare state models and emphasizes the importance of housing policy. For a more detailed analysis, the researcher selected six countries that most closely correspond to ideal typical welfare state models: Sweden, social democratic; Germany, conservative-corporatist; United Kingdom, liberal; Spain, southern European; Czech Republic and Estonia, post-communist.

Skuodis [13] and Guogis [14] in their research detail the welfare state models according to which social policy is formed. In his opinion, the most generous social model is universal, redistributive, and social democratic, and is most similar to the countries of Northern Europe, primarily Scandinavia. Slightly less generous: "Bismarckian" corporatist, conservative, which is most similar to the countries of continental western Europe. The third model is the least generous, the Anglo-Saxon liberal marginal model. In another article, Guogis and Svirbutaitė-

Krutkienė [15] argue that the welfare state is understood in four ways – as a stage of social development, a way of life, a political essence, or a style of state governance.

Summarizing the research conducted by scientists on the welfare state, it was noted that there is no single specific definition of what a welfare state is. In each country, the welfare state is understood in its own way and solves the problems that are relevant for that period. Therefore, the analysis of the welfare state covers many areas and is assessed using various economic indicators.

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The summary of the literature review shows welfare state differences in selected European Union countries under conditions of uncertainty. The results of our literature review confirm the conclusions of previous scientific articles that under conditions of uncertainty, special attention is paid to the effectiveness of social policy. The importance of social policy under conditions of uncertainty is discussed in articles by scientists. The direction of social policy depends on the social challenges relevant to that period. However, the main core of the welfare state model remains the same - social security. Health care, housing policy, increasing female employment (equal opportunities), retraining opportunities, the green

Table 1: Findings of the reviewed sources.

Authors	Country	Purpose	Type of resource	Major themes
Moran [16]	UK	Identify the elements of a welfare state.	Research	The state of public health care as the most important element of the welfare state. He also emphasizes the importance of health programs in the formation of welfare state policy.
Acemoglu, Johnson and Robinson [1]	UK	Identify the importance of social institutions.	Research	Reduction of the huge income gap between countries.
Ademai and Ladaiquei [3]	France	Analyze the welfare state by assessing social spending as a percentage of GDP.	Analysis	One of the main elements of a state's well-being is the proportion of spending on pensions and public health as a percentage of GDP.
Trüdinger and Gabriel [5]	Germany	Overview the welfare state through the prism of political trust.	Research	The dynamics of state spending on pensions and healthcare, as well as assistance to families, are, in the authors' opinion, an important feature of a welfare state.
Šileika and Paškevičiūtė [11]	LT	Attention to social policy and its content.	Research	The main indicators that characterize the welfare state - monthly salary, social benefits, old-age pensions, GDP per capita, comparative weight of state spending on social protection in the GDP expenditure structure.
Garland [7]	USA	Identify sectors that are important in the welfare state.	Research	These are the sectors that include social insurance, social assistance, publicly funded social services, social work and personal social services, and economic governance.
Wispelaere and Haagh [8]	UK	Identify important social policy issues.	Research	One of the most important social policy issues should be the introduction of basic income.
Guogis and Svirbutaitė-Krutkienė [14]	LT	Understand the direction of welfare state policies	Research	The welfare state is understood in four ways – as a stage of social development, a way of life, a political essence, or a style of state governance.
Walker, Druckman and Jackson [9]	UK	Identify common challenges facing welfare systems.	Research	Increasing poverty, demographic changes and environmental pollution are identified as the main challenges.

Source: prepared on the basis of own research.

economy, and sustainability, etc. – all these are variables of the welfare state model. The economies of the European Union countries are different, and the social challenges are not the same, so it is impossible to generalize all social problems and quickly present one general, specific welfare state model for selected EU countries.

Explanation of selected EU countries

An analysis of scientific literature shows that the Welfare State is characterized by more than one indicator, but one of the main ones is GDP per capita. Our research selects countries whose GDP per capita is higher than the *EU average* GDP per capita (Table 2). This can be explained by the fact that countries with a GDP per capita higher than the EU average will have greater fiscal capacity to develop welfare-oriented policiest and social policies oriented towards it.

Methodology and research hypotheses

The implementation of the objective required the use of descriptive-statistical methods, in particular, a linear trend function. There are a dependent variable and time as the independent variable in the following model: $Y = \alpha_o + \alpha_1 t + \varepsilon$. In the second part of the analysis, VAR models were applied for highlighted variables. The models have been developed for each of the indicators of Goal 8 of the 2030 Agenda:

Gross domestic product (GDP per capita)

1. Investment share of GDP

2. Employment rate for women

3. Long-term unemployment rate

4. Young people neither in employment nor in education and training (NEET).

5. Fatal accidents at work

The following research hypotheses are presented in the article:

1. Gross domestic product (GDP per capita) is increasing in the years 2008–2023 in selected EU countries.

2. Investment share of GDP is increasing in the years 2008–2023 in selected EU countries.

3. Employment rate for women is increasing in the years 2008–2023 in selected EU countries.

4. Long-term unemployment rate is decreasing in the years 2008–2023 in selected EU countries in the years 2008–2023 in selected EU countries.

5. Young people are neither in employment nor education and training (NEET) indicator is decreasing in the years 2008–2023 in selected EU countries.

6. Fatal accidents at work are decreasing in the years 2008–2023 in selected EU countries.

Results

For the highlighted variables, the parameters of the trend models were calculated for selected EU countries, Lithuania, Poland, Germany, Sweden, and Luxembourg. The research results are presented in Table 3 and charts Nos. 1–6. The list of indicators was prepared on the basis of the indicators included in Goal No. 8 of the 2030 Agenda. Table 3 presents the trend model parameters for selected EU countries for indicators of Goal 8 of the 2030 Agenda.

The results obtained show that GDP per capita increases the most for Lithuania, then for Sweden, Luxembourg, Poland and Germany. The share of investments in GDP is decreasing for Lithuania and Poland, while it is increasing for Sweden, Germany, and Luxembourg.

For the employment rate for women for all countries analyzed, the trend coefficient obtained is positive. The long-term unemployment rate is increasing for Luxembourg, and for the remaining countries the coefficients are negative, which means that the trends are decreasing.

For young people neither in employment nor in education and training, negative values of trend coefficients were obtained for Lithuania and Poland, and for other countries the values of trend coefficients are positive.

The last indicator, fatal accidents at work: the positive

Table 2: GDP per capita in PPS (purchasing power parities). Volume indices of real expenditure per capita (in PPS_EU27_2020 = 100).

Country	2020	2021	2022	2023
EU - 27	100	100	100	100
Luxembourg	256	260	252	237
Germany	123	120	118	116
Sweden	121	121	115	114
Poland	79	79	78	77
Lithuania	87	88	88	87

Source of data: Eurostat.

Table 3: Parameters of the trend models for the indicators highlighted in Goal 8 of the Agenda 2030 for selected EU countries.

Indicators	Germany	Lithuania	Luxembourg	Poland	Sweden
GDP per capita	28921.9 +353.3t	4961.8 +443.6t	77050.6 +387.9t	5450 +379.9t	34793.9 +438.2t
Investment share of GDP	2.4+0.03t	4.8-0.1t	3.9+0.02t	5.2-0.07t	4.3+0.06t
Employment rate for women	68.09+0.6t	64.75+t	60.4+0.74t	51.99+1.24t	75.08+0.32t
Long-term unemployment rate	6.5-0.3t	15.8-0.7t	5.3+0.03t	11.6-0.6t	8.2-0.05t
Young people neither in employment nor in education and training	41.3+0.09t	42.8-0.2t	36.8+0.6t	42.9-0.4t	46.6+0.5t
Fatal accidents at work	576.6-13.2t	63.9-2t	11.1+0.04t	472.4-21.8t	54.9-1.5t

Source: prepared on the basis of own research.

trend coefficient was calculated for Luxembourg, negative for other countries. It should be noted that for Poland, the trend coefficient has a value of –21.8, which means that Poland achieved the largest decline in the analyzed period for the highlighted indicator.

Figure 1 presents the GDP per capita values for selected EU countries. The comparison of trend coefficients shows that in the analyzed period, GDP per capita is growing the fastest in Lithuania (443,62), followed by Sweden (438,19), Luxembourg (387,92), Poland (379,9) and Germany (353,28). This was confirmed by the fact that developed countries are developing slower, but this does not apply to all developed EU countries.

Figure 2 shows the trend functions and the values of the parameters of these functions in the period examined for the investment share of the GDP variable. A negative trend coefficient was found for Poland and Lithuania , which means that in the analyzed period the investment share of GDP for these two countries decreased by the value of the trend coefficient, for Poland by 0.07, for Lithuania by 0.1. Germany, Sweden, and Luxembourg have a positive trend coefficient. For Luxembourg it is 0.025, for Germany 0.03 and for Sweden 0.06.

Figure No. 3 presents the trend functions and the values of the parameters of these functions in the period examined for the Employment rate for women variable. For Luxembourg, a positive value of the trend coefficient was obtained (0.7), for the remaining EU countries, the coefficients are also positive – Lithuania (0.99), Poland (1.24), Germany (0.62) and Sweden (0.32).

Figure 4 presents the trend functions and the parameter values of these functions in the period examined for the variable long-term unemployment. Only for Luxembourg, the trend coefficient for the long-term unemployment variable is positive (0.03). The remaining countries obtained a negative trend coefficient for Lithuania (–0.74), Poland (–0.64), Germany (–0.27) and Sweden (–0.05). Long-term unemployment is calculated as a percentage of long-term unemployed people in the population in the labor force (between 15 and 74 years).

Figure 2: Investment share of GDP for selected EU countries. Source: prepared on the basis of own research.

Figure 3: Employment rate for women in selected EU countries. Source: prepared on the basis of own research.

Figure 4: Long-term unemployment in selected EU countries. Source: prepared on the basis of own research.
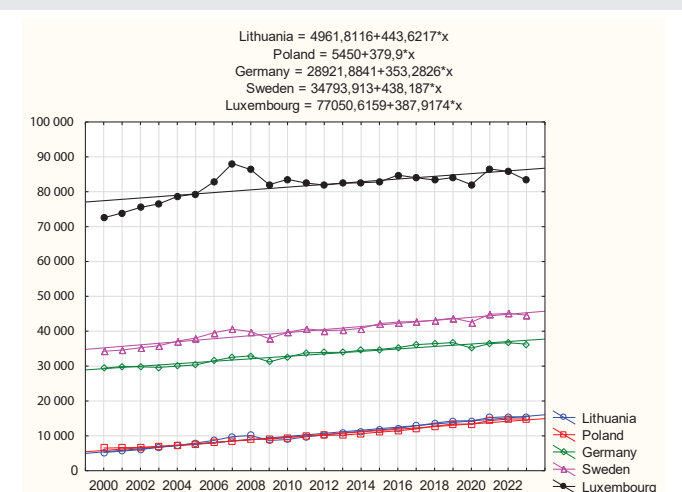

Figure 1: GDP per capita for selected EU countries. Source: prepared on the basis of own research.

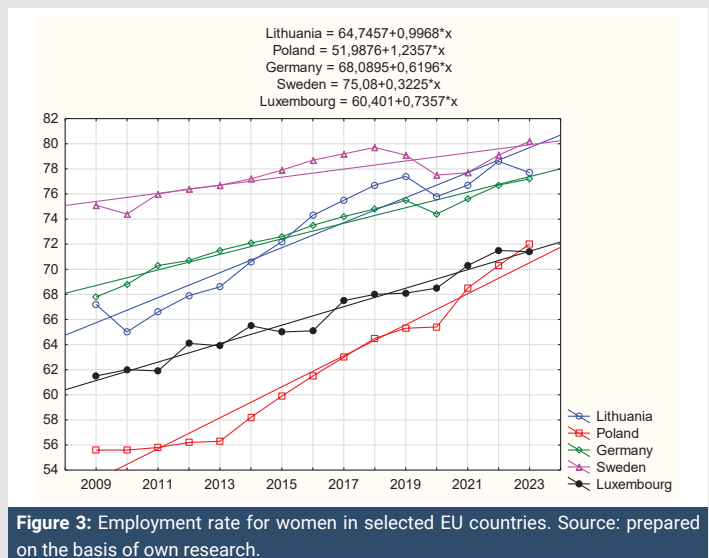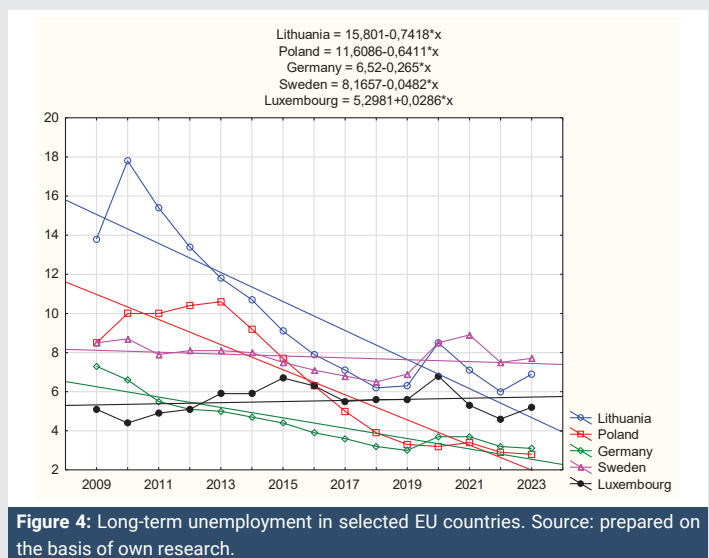Figure 5 presents trends for the variable Young people neither in employment nor in education and training. A positive trend coefficient was obtained for Luxembourg (0.65),

Germany (0.09), and Sweden (0.49). The remaining countries are characterized by a negative value of the trend coefficient – for Lithuania the value of the trend coefficient is (-0.16) and for Poland (-0.38).

Figure 6 presents trends for the Fatal accidents at work variable, for Luxembourg the trend coefficient value was positive (0.04). The remaining countries are characterized by a negative value of the trend coefficient, for Lithuania (-2.03), for Poland (-21.8), for Germany (-13.24), and for Sweden (-1.49) Table 4.

The results of the correlation matrix in the case of Lithuania show that changes in long-term unemployment and young people's investment in their qualifications are of great importance for the formation of a welfare state. The results of the correlation matrix for Poland show that changes in long-term unemployment and young people's investment in their qualifications have a significant impact on the change in GDP per capita. The results of the correlation matrix in the case of Luxembourg show that changes in long-term unemployment and young people's investment in their qualifications are of great importance for attracting investment to the country.

Table 4. Parameters of the correlation coefficients for Goal 8 indicators of the Agenda 2030 for particular EU countries

Lithuania:

	gdppc	isg	ltur	ypn
gdppc	1.00	-0.72	-0.28	-0.62
isg	-0.72	1.00	0.40	0.66
ltur	-0.28	0.40	1.00	0.46
ypn	-0.62	0.66	0.46	1.00

Germany:

	gdppc	isg	ltur	ypn
gdppc	1.00	-0.63	0.08	-0.65
isg	-0.63	1.00	-0.29	0.57
ltur	0.08	-0.29	1.00	0.06
ypn	-0.65	0.57	0.06	1.00

Poland:

	gdppc	isg	ltur	ypn
gdppc	1.00	-0.04	0.24	-0.18
isg	-0.04	1.00	-0.18	-0.22
ltur	0.24	-0.18	1.00	0.49
ypn	-0.18	-0.22	0.49	1.00

Sweden:

	gdppc	isg	ltur	ypn
gdppc	1.00	-0.79	0.53	-0.85
isg	-0.79	1.00	-0.56	0.59
ltur	0.53	-0.56	1.00	-0.25
ypn	-0.85	0.59	-0.25	1.00

Luxembourg:

	gdppc	isg	ltur	ypn
gdppc	1.00	-0.51	-0.12	-0.33
isg	-0.51	1.00	0.25	0.01
ltur	-0.12	0.25	1.00	0.49
ypn	-0.33	0.01	0.49	1.00

gdppc - GDP per capita; **isg** - investment share of GDP;
ltur - long-term unemployment rate;
ypn - young people neither in employment nor in education and training.

Source: prepared on the basis of own research

The results of the correlation matrix for Germany and Sweden show that changes in GDP per capita are influenced by changes in long-term unemployment. Investments by young people in their qualifications are of great importance for attracting investment to these countries. In pursuing the goals of the welfare state and achieving them in our selected EU countries, the dynamics of long-term unemployment, young people's investment in their qualifications, and active attraction of investment to the country are of great importance.

The ADF and KPSS stationarity tests were calculated and it was obtained that for ADF (p-value was less than 0.05) for most variables, which means they are now stationary, and for KPSS (p-value was greater than 0.05) for most variables, which also confirms stationarity.

The VAR model for Lithuania was estimated with one lag. The results are presented in Tables 5–10. The following relationships were observed:

- **GDP per capita** is strongly and statistically significantly associated with long-term unemployment rate ($p = 0.03$), and with fatal accidents at work ($p = 0.005$).

- **Investment share of GDP** is strongly and statistically significantly associated with employment rate for women ($p = 0.003$), long-term unemployment rate ($p = 0.002$), and with fatal accidents at work ($p = 0.04$).

- **Long-term unemployment rate** is strongly and statistically significantly associated with employment rate for women ($p = 0.032$).

- **Fatal accidents at work** is strongly and statistically significantly associated with employment rate for women ($p = 0.039$).

The VAR model for Poland was estimated with one lag. The results are presented in Tables 11–16. The following relationships were observed:

- **GDP per capita** is strongly and statistically significantly associated with employment rate for women ($p = 0.0008$).
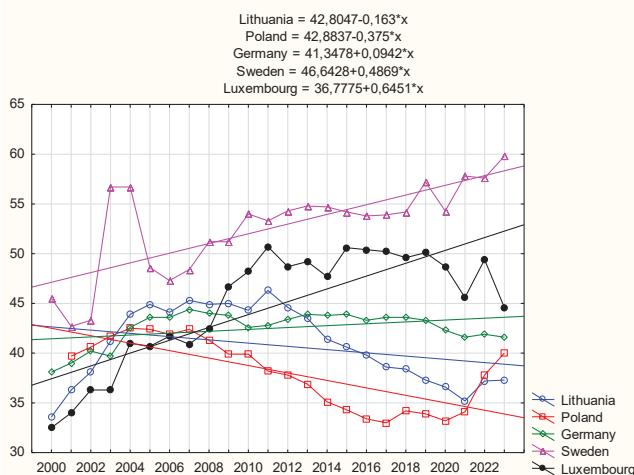
Figure 5: Young people are neither in employment nor education and training. Source: prepared on the basis of own research

Lithuania = 42,8047-0,163*x
Poland = 42,8837-0,375*x
Germany = 41,3478+0,0942*x
Sweden = 46,6428+0,4869*x
Luxembourg = 36,7775+0,6451*x
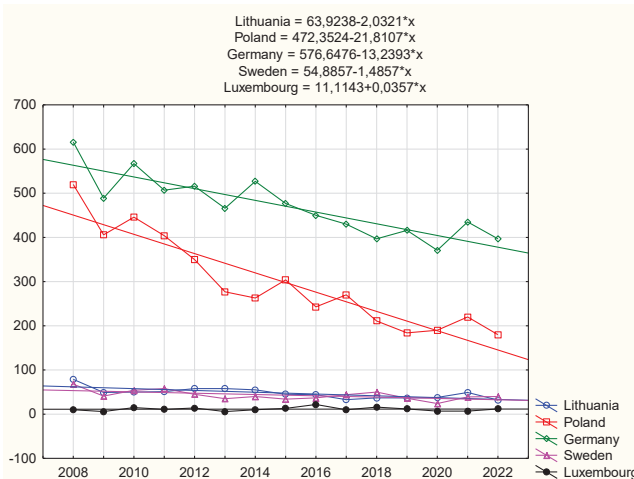
Figure 6: Fatal Accidents at Work. Source: prepared on the basis of own research.

Lithuania = 63,9238-2,0321*x
Poland = 472,3524-21,8107*x
Germany = 576,6476-13,2393*x
Sweden = 54,8857-1,4857*x
Luxembourg = 11,1143+0,0357*x

- **Investment share of GDP** is strongly and statistically significantly associated with GDP per capita (p = 0.05).

- **Employment rate for women** is strongly and statistically significantly associated with employment rate for women (p = 0.002), and with young people neither in employment nor in education and training (p = 0.0002).

- **Young people neither in employment nor in education and training** is strongly and statistically significantly associated with investment share of GDP (p = 0.02).

The VAR model for Germany was estimated with one lag. The results are presented in Tables 17–22. The following relationships were observed:

Table 5: Summary of Regression Results Model: VAR Results for equation GDP per capita Lithuania.

	Coefficient	Std. Error	T-stat	Prob
Const	547.76	234.51	2.34	0.020
GDP per capita	-0.23	0.45	-0.52	0.602
Investment share of GDP	303.74	184.62	1.645	0.1
Employment rate for women	-164.69	142.85	-1.15	0.25
Long-term unemployment rate	-338.57	155.61	-2.18	0.03
Young people neither in employment nor in education and training	115.55	124.65	0.93	0.35
Fatal accidents at work	-32.58	11.6	-2.81	0.005

Source: study based on own research.

Table 6: Summary of Regression Results Model: VAR Results for equation Investment share of GDP Lithuania.

	Coefficient	Std. Error	T-stat	Prob
Const	-0.64	0.47	-1.35	0.18
GDP per capita	0.000868	0.000903	0.962	0.336
Investment share of GDP	-0.657072	0.371397	-1.769	0.077
Employment rate for women	0.848232	0.287362	2.952	0.003
Long-term unemployment rate	0.971181	0.313042	3.102	0.002
Young people neither in employment nor in education and training	-0.027444	0.250751	-0.109	0.913
Fatal accidents at work	0.047875	0.023341	2.051	0.040

Source: study based on own research.

Table 7: Summary of Regression Results Model: VAR Results for equation Employment rate for woman Lithuania.

	Coefficient	Std. Error	T-stat	Prob
Const	1.659923	1.058307	1.568	0.117
GDP per capita	-0.001414	0.002026	-0.698	0.485
Investment share of GDP	0.021853	0.833162	0.026	0.979
Employment rate for women	-0.972289	0.644644	-1.508	0.131
Long-term unemployment rate	-1.169852	0.702252	-1.666	0.096
Young people neither in employment nor in education and training	0.014329	0.562514	0.025	0.980
Fatal accidents at work	-0.092284	0.052362	-1.762	0.078

Source: study based on own research.

Table 8: Summary of Regression Results Model: VAR Results for equation Long-term unemployment rate Lithuania.

	Coefficient	Std. Error	T-stat	Prob
Const	-2.160938	1.075130	-2.010	0.044
GDP per capita	0.002048	0.002058	0.995	0.320
Investment share of GDP	0.128120	0.846406	0.151	0.880
Employment rate for women	1.402368	0.654891	2.141	0.032
Long-term unemployment rate	1.056245	0.713415	1.481	0.139
Young people neither in employment nor in education and training	0.390666	0.571456	0.684	0.494
Fatal accidents at work	0.087386	0.053195	1.643	0.100

Source: study based on own research.

Table 9: Summary of Regression Results Model: VAR Results for equation Young people neither in employment nor in education and training Lithuania.

	Coefficient	Std. Error	T-stat	Prob
Const	-0.985964	1.568919	-0.628	0.530
GDP per capita	0.001035	0.003003	0.345	0.730
Investment share of GDP	0.501681	1.235145	0.406	0.685
Employment rate for women	1.212278	0.955671	1.269	0.205
Long-term unemployment rate	1.069376	1.041074	1.027	0.304
Young people neither in employment nor in education and training	-0.105815	0.833915	-0.127	0.899
Fatal accidents at work	0.100897	0.077626	1.300	0.194

Source: study based on own research.

Table 10: Summary of Regression Results Model: VAR Results for equation Fatal Accidents at work Lithuania.

	Coefficient	Std. Error	T-stat	Prob
Const	-0.055309	5.226996	-0.011	0.992
GDP per capita	0.001771	0.010004	0.177	0.860
Investment share of GDP	-6.486155	4.114999	-1.576	0.115
Employment rate for women	-6.586091	3.183906	-2.069	0.039
Long-term unemployment rate	-5.419857	3.468433	-1.563	0.118
Young people neither in employment nor in education and training	2.888398	2.778265	1.040	0.299
Fatal accidents at work	-0.298168	0.258618	-1.153	0.249

Source: study based on own research.

Table 11: Summary of Regression Results Model: VAR Results for equation GDP per capita Poland.

	Coefficient	Std. Error	T-stat	Prob
Const	575.42	190.88	3.01	0.002
GDP per capita	-0.83	0.52	-1.576	0.115
Investment share of GDP	-0.0008	0.001	-0.599	0.549
Employment rate for women	-0.0044	0.001	-3.349	0.0008
Long-term unemployment rate	0.0006	0.001	0.501	0.617
Young people neither in employment nor in education and training	0.002	0.001	1.391	0.16
Fatal accidents at work	-0.01	0.08	-0.18	0.86

Source: study based on own research.

Table 12: Summary of Regression Results Model: VAR Results for equation Investment share of GDP Poland.

	Coefficient	Std. Error	T-stat	Prob
Const	0.002	0.509	0.004	0.996
GDP per capita	286.80	148.18	1.94	0.05
Investment share of GDP	-0.02	0.396	-0.06	0.95
Employment rate for women	0.71	0.37	1.92	0.055
Long-term unemployment rate	0.09	0.345	0.27	0.786
Young people neither in employment nor in education and training	-0.242	0.35	-0.69	0.49
Fatal accidents at work	23.95	22.88	1.05	0.295

Source: study based on own research.

Table 13: Summary of Regression Results Model: VAR Results for equation Employment rate for woman Poland.

	Coefficient	Std. Error	T-stat	Prob
Const	2.044	0.479	4.271	1.947
GDP per capita	210.596	159.692	1.32	0.187
Investment share of GDP	0.23	0.43	0.54	0.588
Employment rate for women	1.24	0.40	3.11	0.002
Long-term unemployment rate	-0.35	0.37	-0.95	0.34
Young people neither in employment nor in education and training	-1.38	0.377	-3.672	0.0002
Fatal accidents at work	28.78	24.659	1.167	0.243

Source: study based on own research.

Table 14: Summary of Regression Results Model: VAR Results for equation Long-term unemployment rate Poland.

	Coefficient	Std. Error	T-stat	Prob
Const	-0.08	0.44	-0.18	0.86
GDP per capita	-112.40	127.864	-0.879	0.379
Investment share of GDP	0.467	0.34	1.37	0.17
Employment rate for women	-0.03	0.32	-0.09	0.93
Long-term unemployment rate	0.53	0.298	1.78	0.075
Young people neither in employment nor in education and training	-0.41	0.30	-1.34	0.18
Fatal accidents at work	4.75	19.74	0.24	0.81

Source: study based on own research.

Table 15: Summary of Regression Results Model: VAR Results for equation Young people neither in employment nor in education and training Poland.

	Coefficient	Std. Error	T-stat	Prob
Const	0.08	0.45	0.19	0.85
GDP per capita	175.829	100.91	1.74	0.08
Investment share of GDP	-0.64	0.27	-2.37	0.02
Employment rate for women	0.33	0.25	1.28	0.198
Long-term unemployment rate	-0.111	0.235	-0.47	0.64
Young people neither in employment nor in education and training	0.07	0.24	0.31	0.76
Fatal accidents at work	9.77	15.58	0.63	0.53

Source: study based on own research.

Table 16: Summary of Regression Results Model: VAR Results for equation Fatal Accidents at work Poland.

	Coefficient	Std. Error	T-stat	Prob
Const	-44.88	29.47	-1.52	0.13
GDP per capita	0.39	1.83	0.21	0.83
Investment share of GDP	-0.003	0.005	-0.69	0.48
Employment rate for women	0.005	0.005	1.05	0.29
Long-term unemployment rate	0.006	0.004	1.39	0.16
Young people neither in employment nor in education and training	-0.004	0.004	-1.02	0.31
Fatal accidents at work	-0.35	0.28	-1.25	0.21

Source: study based on own research.

Table 17: Summary of Regression Results Model: VAR Results for equation GDP per capita Germany.

	Coefficient	Std. Error	T-stat	Prob
Const	416.02	6477.70	-0.836	0.403
GDP per capita	-0.0052	0.991	-0.005	0.996
Investment share of GDP	226.084	1702.36	-0.133	0.894
Employment rate for women	544.93	1051.34	-0.518	0.604
Long-term unemployment rate	322.052	693.1	-0.465	0.642
Young people neither in employment nor in education and training	786.86	817.17	0.963	0.336
Fatal accidents at work	0.608	8.721	0.07	0.944

Source: study based on own research.

Table 18: Summary of Regression Results Model: VAR Results for equation Investment share of GDP Germany.

	Coefficient	Std. Error	T-stat	Prob
Const	1.568	1.05	1.498	0.134
GDP per capita	0.00071	0.00016	0.444	0.657
Investment share of GDP	0.647	0.275	2.353	0.019
Employment rate for women	-0.045	0.17	-0.267	0.789
Long-term unemployment rate	-0.074	0.112	-0.658	0.511
Young people neither in employment nor in education and training	-0.003	0.132	-0.02	0.984
Fatal accidents at work	-0.0006	0.001	-0.443	0.658

Source: study based on own research.

Table 19: Summary of Regression Results Model: VAR Results for equation Employment rate for woman Germany.

	Coefficient	Std. Error	T-stat	Prob
Const	-4.81	6.16	-0.781	0.435
GDP per capita	0.0003	0.0009	0.298	0.766
Investment share of GDP	0.61	1.62	0.377	0.706
Employment rate for women	-0.54	0.999	-0.538	0.59
Long-term unemployment rate	-0.08	0.659	-0.122	0.903
Young people neither in employment nor in education and training	0.4	0.77	0.52	0.603
Fatal accidents at work	0.001	0.008	0.123	0.902

Source: study based on own research.

- **Investment share of GDP** is strongly and statistically significantly associated with investment share of GDP ($p = 0.019$).

- **Long–term unemployment rate** is strongly and statistically significantly associated with long–term unemployment rate ($p = 0.007$).

- **Fatal Accidents at work** are strongly and statistically significantly associated with investment share of GDP ($p = 0.032$), and with long–term unemployment rate ($p = 0.002$).

The VAR model for Sweden was estimated with one lag. The results are presented in Tables 23–28. The following relationships were observed:

Table 20: Summary of Regression Results Model: VAR Results for equation Long-term unemployment rate Germany.

	Coefficient	Std. Error	T-stat	Prob
Const	2.32	3.27	0.71	0.478
GDP per capita	-0.0004	0.0005	-0.927	0.354
Investment share of GDP	-0.256	0.86	-0.298	0.766
Employment rate for women	0.36	0.53	0.678	0.498
Long-term unemployment rate	0.95	0.35	2.71	0.007
Young people neither in employment nor in education and training	-0.11	0.41	-0.259	0.796
Fatal accidents at work	-0.002	0.004	-0.342	0.733

Source: study based on own research.

Table 21: Summary of Regression Results Model: VAR Results for equation Young people neither in employment nor in education and training Germany.

	Coefficient	Std. Error	T-stat	Prob
Const	4.38	4.22	1.04	0.299
GDP per capita	0.00006	0.0006	0.097	0.923
Investment share of GDP	0.42	1.11	0.377	0.706
Employment rate for women	-0.15	0.68	-0.224	0.823
Long-term unemployment rate	0.41	0.45	0.913	0.361
Young people neither in employment nor in education and training	0.06	0.53	0.114	0.909
Fatal accidents at work	0.003	0.006	0.698	0.485

Source: study based on own research.

Table 22: Summary of Regression Results Model: VAR Results for equation Fatal Accidents at work Germany.

	Coefficient	Std. Error	T-stat	Prob
Const	711.88	176.91	4.02	0.000
GDP per capita	0.02	0.03	0.798	0.425
Investment share of GDP	-99.43	46.49	-2.139	0.032
Employment rate for women	-9.96	28.71	-0.347	0.729
Long-term unemployment rate	57.85	18.93	3.056	0.002
Young people neither in employment nor in education and training	-13.48	22.32	-0.604	0.546
Fatal accidents at work	-0.24	0.24	-1.006	0.314

Source: study based on own research.

Table 23: Summary of Regression Results Model: VAR Results for equation GDP per capita Sweden.

	Coefficient	Std. Error	T-stat	Prob
Const	48356.24	25976.39	1.86	0.06
GDP per capita	0.33	0.54	0.61	0.54
Investment share of GDP	2182.74	1867.76	1.169	0.243
Employment rate for women	-538.656316	267.017762	-2.017	0.044
Long-term unemployment rate	-348.586586	553.577072	-0.630	0.529
Young people neither in employment nor in education and training	1165.88	476.45	2.447	0.014
Fatal accidents at work	-81.79	28.16	-2.904	0.004

Source: study based on own research.

Table 24: Summary of Regression Results Model: VAR Results for equation Investment share of GDP Sweden.

	Coefficient	Std. Error	T-stat	Prob
Const	-1.314381	7.090934	-0.185	0.853
GDP per capita	-0.000168	0.000148	-1.134	0.257
Investment share of GDP	-0.846890	0.509853	-1.661	0.097
Employment rate for women	0.030106	0.072889	0.413	0.680
Long-term unemployment rate	-0.139841	0.151113	-0.925	0.355
Young people neither in employment nor in education and training	-0.270929	0.130061	-2.083	0.037
Fatal accidents at work	0.003842	0.007688	0.500	0.617

Source: study based on own research.

Table 25: Summary of Regression Results Model: VAR Results for equation Employment rate for woman Sweden.

	Coefficient	Std. Error	T-stat	Prob
Const	24.890351	40.674460	0.612	0.541
GDP per capita	0.000034	0.000847	0.040	0.968
Investment share of GDP	0.332757	2.924577	0.114	0.909
Employment rate for women	0.702433	0.418103	1.680	0.093
Long-term unemployment rate	0.103219	0.866804	0.119	0.905
Young people neither in employment nor in education and training	-0.151517	0.746044	-0.203	0.839
Fatal accidents at work	-0.053537	0.044102	-1.214	0.225

Source: study based on own research

Table 26: Summary of Regression Results Model: VAR Results for equation Long-term unemployment rate Sweden.

	Coefficient	Std. Error	T-stat	Prob
Const	-34.450369	30.254540	-1.139	0.255
GDP per capita	-0.000346	0.000630	-0.549	0.583
Investment share of GDP	0.180617	2.175363	0.083	0.934
Employment rate for women	0.379716	0.310994	1.221	0.222
Long-term unemployment rate	1.309051	0.644748	2.030	0.042
Young people neither in employment nor in education and training	-0.446734	0.554924	-0.805	0.421
Fatal accidents at work	0.061619	0.032804	1.878	0.060

Source: study based on own research

- **GDP per capita** is significantly influenced by the female employment rate, the NEET youth population, and the number of fatal accidents at work.

- **Investment share of GDP** is partially explained by the situation of NEET youth.

- **Long-term unemployment** exhibits significant autocorrelation.

- **Fatal accidents** are partially related to the level of GDP.

The VAR model for Luxembourg was estimated with one lag. The results are presented in Tables 29–34. The following relationships were observed:

- **GDP per capita** is strongly and statistically significantly associated with the proportion of NEET youth (p = 0.002).

- **Investment** is negatively affected by the variability in the NEET youth population (p = 0.009).

- **The number of fatal accidents at work** shows significant autocorrelation (p = 0.034), which may indicate the persistence of effects.

Table 27: Summary of Regression Results Model: VAR Results for equation Young people neither in employment nor in education and training Sweden.

	Coefficient	Std. Error	T-stat	Prob
Const	-8.212029	23.644447	-0.347	0.728
GDP per capita	-0.000564	0.000493	-1.146	0.252
Investment share of GDP	-1.793689	1.700084	-1.055	0.291
Employment rate for women	0.103759	0.243047	0.427	0.669
Long-term unemployment rate	-0.122708	0.503881	-0.244	0.808
Young people neither in employment nor in education and training	-0.855756	0.433682	-1.973	0.048
Fatal accidents at work	0.025650	0.025637	1.001	0.317

Source: study based on own research

Table 28: Summary of Regression Results Model: VAR Results for equation Fatal Accidents at work Sweden.

	Coefficient	Std. Error	T-stat	Prob
Const	-11.512643	386.825423	-0.030	0.976
GDP per capita	0.017972	0.008058	2.230	0.026
Investment share of GDP	50.777119	27.813537	1.826	0.068
Employment rate for women	0.030454	3.976274	0.008	0.994
Long-term unemployment rate	1.589516	8.243548	0.193	0.847
Young people neither in employment nor in education and training	6.263929	7.095086	0.883	0.377
Fatal accidents at work	0.673012	0.419423	1.605	0.109

Source: study based on own research

Table 29: Summary of Regression Results Model: VAR Results for equation GDP per capita Luxembourg.

	Coefficient	Std. Error	T-stat	Prob
Const	-4203.2274	2661.5615	-1.579	0.114
GDP per capita	-0.233987	0.167214	-1.399	0.162
Investment share of GDP	1301.253695	912.212810	1.426	0.154
Employment rate for women	-179.067851	284.016364	-0.630	0.528
Long-term unemployment rate	795.526426	456.682340	1.742	0.082
Young people neither in employment nor in education and training	945.199753	305.806944	3.091	0.002
Fatal accidents at work	-58.129568	40.355576	-1.440	0.150

Source: study based on own research

Table 30: Summary of Regression Results Model: VAR Results for equation Investment share of GDP Luxembourg.

	Coefficient	Std. Error	T-stat	Prob
Const	-1.623268	1.106206	-1.467	0.142
GDP per capita	0.000008	0.000069	-0.114	0.910
Investment share of GDP	-0.628614	0.379137	-1.658	0.097
Employment rate for women	0.015518	0.118044	0.131	0.895
Long-term unemployment rate	0.285243	0.189808	1.503	0.133
Young people neither in employment nor in education and training	-0.334321	0.127100	-2.630	0.009
Fatal accidents at work	-0.007726	0.016773	-0.461	0.645

Source: **study** based on own research

Table 31: Summary of Regression Results Model: VAR Results for equation Employment rate for woman Luxembourg.

	Coefficient	Std. Error	T-stat	Prob
Const	-1.295645	3.209107	-0.404	0.686
GDP per capita	0.000034	0.000202	0.170	0.865
Investment share of GDP	-1.017201	1.099876	-0.925	0.355
Employment rate for women	-0.271625	0.342445	-0.793	0.428
Long-term unemployment rate	0.397983	0.550633	0.723	0.470
Young people neither in employment nor in education and training	0.057995	0.368719	0.157	0.875
Fatal accidents at work	0.052161	0.048658	1.072	0.284

Source: study based on own research

Table 32: Summary of Regression Results Model: VAR Results for equation Long-term unemployment rate Luxembourg.

	Coefficient	Std. Error	T-stat	Prob
Const	2.248727	2.414122	0.931	0.352
GDP per capita	-0.000107	0.000152	-0.703	0.482
Investment share of GDP	-0.257459	0.827406	-0.311	0.756
Employment rate for women	0.081164	0.257612	0.315	0.753
Long-term unemployment rate	0.599623	0.414226	1.448	0.148
Young people neither in employment nor in education and training	-0.277341	0.277377	-1.000	0.317
Fatal accidents at work	-0.000997	0.036604	-0.027	0.978

Source: study based on own research

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Table 33: Summary of Regression Results Model: VAR Results for equation Young people neither in employment nor in education and training Luxembourg.

	Coefficient	Std. Error	T-stat	Prob
Const	0.993979	2.090161	0.476	0.634
GDP per capita	-0.000346	0.000131	-2.634	0.008
Investment share of GDP	0.913461	0.716373	1.275	0.202
Employment rate for women	0.135867	0.223042	0.609	0.542
Long-term unemployment rate	-0.146805	0.358639	-0.409	0.682
Young people neither in employment nor in education and training	-0.467617	0.240154	-1.947	0.052
Fatal accidents at work	0.035403	0.031692	1.117	0.264

Source: study based on own research

Table 34: Summary of Regression Results Model: VAR Results for equation Fatal Accidents at work Luxembourg.

	Coefficient	Std. Error	T-stat	Prob
Const	12.292003	19.806501	0.621	0.535
GDP per capita	0.001009	0.001244	0.811	0.417
Investment share of GDP	2.466442	6.788400	0.363	0.716
Employment rate for women	-2.341925	2.113560	-1.108	0.268
Long-term unemployment rate	-1.881948	3.398486	-0.554	0.580
Young people neither in employment nor in education and training	-1.140794	2.275719	-0.501	0.616
Fatal accidents at work	-0.636364	0.300313	-2.119	0.034

Source: study based on own research

Discussion

This research shows welfare state differences in selected European Union countries under conditions of uncertainty. The research data shows that welfare state models reflect Europe's historical, cultural, and economic diversity. Nordic countries such as Denmark and Sweden are characterized by a universal approach to social policy, providing citizens with a high level of protection during crises such as the COVID-19 pandemic or rising living costs. In contrast, in southern European countries such as Greece and Spain, welfare systems are more limited, often underfunded, and heavily dependent on the family as the main support unit. The results of our research confirm the conclusions of previous scientific articles that under conditions of uncertainty, special attention is paid to the effectiveness of social policy . The importance of social policy under conditions of uncertainty is discussed in articles by scientists Kammer, Niehues, Peichl [6], Garland [7], Guogis [14], Wispelaere and Haagh (2019). Therefore, policymakers should prioritize the improvement, efficiency, and ongoing analysis of social policy when designing welfare state models. This is consistent with our research, which shows that the direction of social policy is not fixed in one direction but is constantly changing, especially under conditions of uncertainty.

The direction of social policy depends on the social challenges relevant to that period. However, the main core of the welfare state model remains the same – social security. Health care, housing policy, increasing female employment (equal opportunities), retraining opportunities, the green

economy, and sustainability, etc. – all these are variables of the welfare state model. The economies of the European Union countries are different, and the social challenges are not the same, so it is impossible to generalize all social problems and quickly present one general, specific welfare state model for selected EU countries. These observations are consistent with the findings of other researchers, including Moran (2002), Acemoglu, Johnson, Robinson [1], Ademai, Ladaiquei [3], Mandel, Semyonov [2], Wispelaere, Haagh [8], and Zimmermann [10], on the differences in the welfare state in selected countries. The differences in the welfare state are also confirmed by our research in selected EU countries under conditions of uncertainty. Our research also highlights distinctive features in Sweden's model , which prioritizes a universal social policy that ensures a high level of security, while the continental model (Germany) focuses mainly on social insurance systems but faces difficulties in adapting to rapid social and economic changes.

Our research also showed the challenges that selected EU countries face in implementing the Agenda 2030 welfare state plan under Goal 8 under conditions of uncertainty. Although the European Union, despite the differences between its member states, aims to reduce inequality through joint initiatives, the effectiveness of these measures depends on the ability of individual countries to adapt their welfare systems to changing conditions.

The results of the research conducted in the article will be useful for politicians who are interested in differences in the welfare state in selected EU countries. Also for those politicians and professionals who shape social policies under conditions of uncertainty. The authors of the research show in the article that differences in the welfare state in selected EU countries depend on the appropriate attention to social policy directions, and the result is different economic development of the selected EU countries. This is particularly important in solidarity with other countries because welfare state issues are not just a matter for one EU member state but for the entire EU in order to achieve the goals set out in Goal 8 of the Agenda 2030.

Conclusion

The analysis of welfare states in selected countries of the European Union under conditions of uncertainty shows that models reflect the historical, cultural, and economic diversity of Europe. The Nordic countries, like Denmark and Sweden, follow a universal approach to social policy and provide their citizens with a high level of protection in crisis situations, such as the COVID-19 pandemic or rising living costs. In contrast, southern European countries such as Greece and Spain have more residual welfare states, which are often under-resourced and heavily supplemented by the family as the main unit of welfare.

France and Germany represent the continental model with its social insurance systems, which have guaranteed stability in unemployment and sickness but in many aspects have to be harmonized in the framework of dynamic economic changes. Periods of uncertainty-for instance, economic or migration

crises-always reveal both the strong and weak points of the various welfare models and how policy needs to change toward new emerging challenges, including population aging, digitalization, and inequality .

While there are certain differences among member states, the European Union, through joint initiatives such as the European Pillar of Social Rights, works toward less inequality. The success of this, however, is ultimately pegged upon how each country modifies its welfare system to changing circumstances. In 2023, the overqualification rate in the EU was 22%, having reached 21% for men and 23% for women. Overqualification occurs when people with tertiary education are employed in occupations that do not require such a high level of education. Among EU countries, the overqualification rate was highest in Spain (36%), followed by Greece (31%) and Cyprus (30%). Meanwhile, Luxembourg (5%), Denmark, and Czechia (each 13%) recorded the lowest rates. In 18 of the 27 EU countries, women had higher over-qualification rates than men, with the biggest differences recorded in Malta and Slovakia (both +8 (pp)) and Italy (+7 pp). In 9 EU countries, men had higher over-qualification rates: the biggest differences were found in Lithuania (+5 pp), Latvia (+4 pp) and Bulgaria (+3 pp). In 2023, 11.2% of people aged 15-29 in the EU were not employed or in education and training. The share of 15-29-year-olds in the EU not employed or in education and training in 2023 ranged from 4.8% for the Netherlands to 19.3% for Romania. This paper compares welfare state models regarding uncertainty-economic crises, the COVID-19 pandemic, and growing social inequalities-in selected countries of the European Union.

The discrepancy in the approaches pursued by Nordic, Continental, and Southern Europe, due to their historic, cultural, and economic environment. Whereas Nordic countries emphasize universal social policies with high levels of security, countries such as Greece and Spain represent the southern countries that have underfunded systems and rely a lot on familial support. The Continental models are represented by countries such as France and Germany and are mainly based on social insurance but are very challenged in adapting to rapid socio-economic changes. This analysis underlines the role of the European Union, through initiatives such as the European Pillar of Social Rights, while emphasizing that the welfare policies of the individual states need to adapt to the challenges arising.

Author contributions

"conceptualization, A.M-W. and A.V.; methodology, A.M-W.; software, A.V.; validation, A.M-W. and A.V.; formal analysis, A.M-W. and M.W.; investigation, A.M-W. A.V., D.P. and M.W.; resources, A.M-W.; data curation, A.M-W.; writing-original draft preparation, A.V., D.P.; writing-review and editing, A.M-W.; visualization, A.V.; supervision, A.M-W.; project administration, A.M-W.; funding acquisition, A.M-W."

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