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Comparative Analysis of the Impact of Social Benefits on Population Poverty in Scandinavian and Baltic Countries

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ABSTRACT

The following article presents a study on the effect of social benefits on poverty reduction in two groups of European countries - Scandinavian and Baltic. The research analysed the dynamic changes in the poverty indicators of the main population in Denmark, Finland, Sweden, Norway, Estonia, Latvia, and Lithuania from 2005 to 2021. The study used regression analysis models of panel data (Ordinary least squares and Fixed-effects methods) to assess the changes in the situation of the poorest residents. The at-risk poverty rate, relative poverty gap, and severe material deprivation indicators were selected to characterize the poverty of the population. To determine the impact of social benefits on poverty reduction, the study also considered factors like economic growth and general and means-tested social protection benefits The EUROSTAT statistical data analysis revealed both similarities and differences in the effects of social protection benefits on population poverty. The general economic growth of Scandinavian countries was found to reduce poverty, while income inequality and cyclical economic fluctuations were found to be the determining factors in the Baltic countries, affecting the poorest population. Social security benefits have an impact on population poverty in both groups of countries, but the effect is different and time-lagged. Means-tested benefits were found to reduce poverty in the Scandinavian countries, whereas such an effect was not found in the Baltic countries. Therefore, the implementation of more targeted social assistance programs remains the most crucial task for reducing poverty in these countries.

Keywords: income inequality, monetary poverty, social protection benefits, means-tested benefits

1. Introduction

It is an unfortunate reality that poverty and social exclusion remain prevalent issues in society, regardless of the prevailing ideology, politics, or social structure. Despite rapid economic development and technical progress, poverty has not been reduced everywhere and has even increased in some cases. According to Eurostat data, in 2022, one in six households in the European Union (27 countries) experienced the risk of poverty. However, the situation has stabilized somewhat in the last five years. The share of households experiencing permanent poverty grew the fastest in Estonia, Latvia, and the Netherlands, with an average increase of 2-3% per year. The poverty of single residents increased the most by 1.8% points, followed by households where one adult lives with one or more children, which increased by 2.6% points. The risk of poverty is on the rise even in developed countries like Norway, Denmark, and Sweden, where the population's risk of poverty increases annually by an average of 2.2%, 0.25%, and 0.4%, respectively. On the other hand, the risk of poverty decreased only in Poland (2.2% points), Greece, Croatia, and Hungary (1% points), in Germany (0.6% points), and in Finland (0.4% points). In other European countries, the change was insignificant. This increase in the risk of poverty is becoming a significant issue in European social policy. So, the question remains, how can we take care of the poorest residents and ensure a minimum standard of living for them, not only in developing countries but also in economically developed countries, as the expenses for social needs increase? As argued by Esping-Andersen (2002) and Kuivalainen (2004), social protection, targeting, and effective benefit distribution are the most crucial tools for reducing poverty. Even though developed EU countries have improved their social benefit schemes over the past thirty years, the at-risk-of-poverty rate has slowly increased in many countries. The gap in the at-risk-of-poverty has also widened, and the positive effect of social protection benefits on reducing population poverty has decreased. While Eastern European countries experienced unfavourable trends in the past, recent years have shown optimistic changes. Social benefit programs are being developed with consideration for changes in the social and economic environment, as well as the experiences of both old and East EU countries. Studies are being conducted at the micro and institutional levels to determine the reasons behind these changes. However, questions remain about the effectiveness of social security benefits in reducing poverty in countries with varying levels of development and income. Macro-level research is limited due to differences between countries and the relatively short evaluation periods. Nonetheless, comparative analysis of groups of countries with similar socio-economic backgrounds and modern econometric panel data analysis methods can provide more comprehensive research opportunities.

The purpose of the study is to assess the impact of social security benefits on population poverty in the Scandinavian and Baltic countries and to determine the factors that influence changes in poverty. The article discusses the role of social security benefits in the concept of the welfare state, an analysis of changes in the population's poverty risk level, and the impact of social support on poverty reduction in two groups of countries. An evaluation model of the impact of social protection benefits on poverty reduction was created, including three factors

characterizing the population's poverty: at-risk-of-poverty rate, gap, and severe material deprivation. A comparative analysis of this effect was performed in two groups of EU countries: Scandinavia (Denmark, Finland, Sweden, Norway) and Baltic countries (Lithuania, Latvia, and Estonia). The data from the Eurostat database for the years 2005-2021 were used for the research, and the methods of descriptive statistics, and comparative and multivariate regression analysis of panel data were used for processing. GRETL software was used for data processing.

2. Social protection benefits in the welfare state concept

Social security benefits, provided to households and individuals under social security programs to ease the burden of their needs, are often associated with the concept of the welfare state, its goals and development features, and institutional poverty reduction measures. Based on this, different types of welfare states and their characteristic social benefit schemes are distinguished. Titmuss (1974) was one of the first to describe in detail different forms of the welfare state, which reflect a certain interaction between the individual (family), society, the market and the state in ensuring the well-being of the population. The three types of welfare state models presented by him - a liberal or residual model of welfare, institutional redistributive of income and industrial achievement-performance or handmaiden model - show the differences in the method of awarding social benefits, state goals and participation in the distribution of social security funds. The more recent typologies of the welfare state by Esping-Andersen (1990) distinguish three welfare regimes: conservative-corporatist, liberal and social-democratic, whose similarities and differences are based on the interaction of the social rights of the population, the structure of society, the powers and responsibilities of its layers. The influence of the country's historical development, traditions, and cultural and religious factors on ensuring the well-being of the population is also emphasized.

The social policy of the state is a set of means of expression of the welfare state, which reflects the goals of social protection of the population. In many EU countries, the dominant social policy, determined by the historical features of its formation, can easily be attributed to some type of welfare state. Traditionally, the Scandinavian countries are considered to be socially oriented welfare states, where the most important role belongs to the state, which includes all residents in social security schemes through social insurance. Social benefits are generous, guaranteeing a high degree of decommodification of society. However, there are also differences between individual countries, such as Norway's social security against unemployment is compulsory, while Finland and Sweden follow the so-called Ghent system (Sjöberg, 2011), which is characterized by voluntary membership in unemployment insurance funds. Germany, France, and Italy are characterized by an industrial achievement or corporate welfare state model, in which the role of the state and social insurance is important, but social protection primarily depends on the population's participation in the labor market and social status. The socially oriented market of these countries is characterized by an active dialogue between employers and employees, industry-level collective agreements, and various support

schemes for the family, facilitating the participation of its members in the labor market. The most liberal social policy is characterized by the United States, Canada, and the United Kingdom in Europe, where the state provides only minimal support, and individuals receive social guarantees by participating in the market as workers or by creating jobs for themselves (and others). In this type of welfare state, an important role is played by means-tested support provided by the state when the population faces temporary difficulties. Monetary and non-monetary support is provided regardless of the market or employment relationship, taking into account the established minimum standard of living. In economically strong liberal welfare states, the income obtained after employment or other involvement in the labor market usually ensures a higher than the minimum standard of living. Working people usually participate in private insurance funds that provide various types of social security (in case of unemployment, health, old age, etc.), the benefits of which are sufficient for the insured to meet their basic needs.

Despite the differences in the aforementioned models, the most characteristic features of the European welfare state are a high state responsibility for the welfare of citizens (directly through social insurance, institutional support or legal regulation), solidarity, universalism and high public spending on social support. It is recognized that more economically developed countries have greater opportunities not only to provide support to the poor but also to carry out preventive social policies that would prevent the impoverishment of the population. However, due to the rapid socio-economic changes taking place in the world, welfare states are not static. Clegg and Clasen (2011) argue that many welfare states have adapted to the new challenges and are implementing a 'homogenisation of unemployment benefits'. This expression describes the general development of European welfare states, where fewer and fewer unemployed receive means-tested benefits, which in some cases are replaced by flat-rate benefits. Another aspect is the consolidation of separate support payment programs. However, the homogenization of benefits does not necessarily mean the complete elimination of insurance-type protection. This may mean that the income-related component loses its importance in the social protection system, or that generous income-related benefits may only be paid to a declining proportion of the population. However, an important consequence of the homogenization of social protection payments is the blurring of the social insurance divide between poverty reduction and unemployment protection (Lorentzen et al., 2014). This means that more and more people who have lost their jobs in these countries also experience poverty.

The Baltic countries are now just developing their welfare state model, but there are indications that the closest they can get is a liberal welfare regime (Halleröd et al., 2015). It is also believed that they are characterized by a mixed model of the welfare state, but unlike the old-timers of the EU countries, with the development of market relations, they move from a corporate to a liberal model without creating the necessary conditions and necessary legal regulation. The post-Soviet model of the welfare state is characterized by the dominance of social insurance in the social protection system, a large volume, but a relatively low level of benefits, and limited participation of private funds in ensuring the social security of the

population. The market and business entities of these countries do not have deep traditions of social security for corporate employees. The weak bargaining power of workers hinders the achievement of greater social security guarantees. This model is fundamentally different from the old welfare models of the EU (including the Scandinavian countries), so it makes sense to conduct comparative studies of problems related to the development of the welfare state.

The distribution of social benefits in a country is determined by its socioeconomic policy, while the amount of financial resources required is decided by its policy of redistributing state budget income. From an economic perspective, the need and volume of social benefits should be independent of the sources of monetary resources and methods of their collection. However, Scandinavian countries contribute twice as much to their general government as Baltic countries, indicating a greater commitment to the welfare of their population. Greater income redistribution allows countries to allocate more funds to social protection, but it does not guarantee their efficient use. In 2020, according to Eurostat, social benefits accounted for 30.2 % of the GDP generated by Scandinavian and Baltic countries. Denmark, Finland, Sweden, and Norway allocated 30-31 % of their aggregated costs to social benefits, while the Baltic countries only allocated 17-19 %.

3. Dynamic changes in population poverty and social support

Monetary poverty is the most visible and common form of poverty in EU countries. In 2020, 16.5% of the population (15.9% of men and 17.5% of women) experienced monetary poverty based on their income and social benefits. Additionally, 12.7% of the population faced material deprivation during the same year. Economics well-being is determined by a combination of income and material situation, which can be measured by individual and household consumption. Consumption is influenced by earned income, social benefits, available assets, and necessary services such as heat and communal services. However, the impact of these components may vary depending on the evaluation period. Assets play a crucial role in the long-term economic well-being of individuals and households. They not only fulfil basic needs like housing and mobility but can also be converted into monetary income to cover short-term needs. The real consumption of individuals can be determined by their material status and available assets, while their potential consumption can be assessed by their income (Guio, 2009; Guio et al., 2012; Notten, Guio, 2016; Townsend, 1979). However, it's important to note that both income and material status reflect the overall household resources shared among its members. Therefore, both these factors should be considered together while assessing the economic well-being of individuals living within a household. The monetary poverty line and the level of severe material deprivation determine the bottom line of this assessment, and these may vary from country to country based on their welfare standards. The factors that determine this limit remain the same, including income, cash social security benefits and non-cash support, household size, borrowing capacity, number of working family members, housing, childcare, healthcare, and other costs.

Social protection support refers to the provision of extra assistance, both monetary and non-monetary, to households with insufficient income that fall below the poverty line. Such households are unable to improve their financial situation by receiving social insurance benefits, such as for loss of work, child-rearing, medical treatment, housing maintenance, and so on. The need for social support is determined by the income received by residents, as well as an at-risk-of-poverty threshold, which is calculated as 60 % of the national equivalent disposable income medians, and at-risk-of-poverty rate. The poverty risk threshold in the Scandinavian and Baltic countries differs by almost twice as much (according to Eurostat, 2020a). Still, the differences in the at-risk-of-poverty rate between the countries are not as significant, as it accounted for 16.7 % in 27 EU countries in 2020 (Eurostat, 2020b), and the standard deviation was only 4.1 percentage points. This indicates that, regardless of the differences in the population's purchasing power, material situation, and the size of social security benefits, the risk of poverty in EU countries is similar and is characterized by increasing trends.

An additional measure that describes poverty among the population is the relative median gap for those at risk of poverty. The indicator is calculated as the distance between the median equivalised total net income of persons below the at-risk-of-poverty threshold and the at-risk-of-poverty threshold itself, expressed as a percentage of the at-risk-of-poverty threshold (Eurostat, 2021e). This threshold is set at 60 % of the national median equivalised disposable income of all people in a country and not for the EU as a whole. Among the Scandinavian and Baltic countries analysed, Finland has the smallest gap of at-risk-of-poverty, which has remained almost unchanged from 2005 to 2021, averaging 14 %. However, the other Scandinavian countries show a worsening trend in this indicator. Latvia has the highest at-risk-of-poverty gap among all three Baltic countries, but all three countries have shown a tendency to decrease this gap over time.

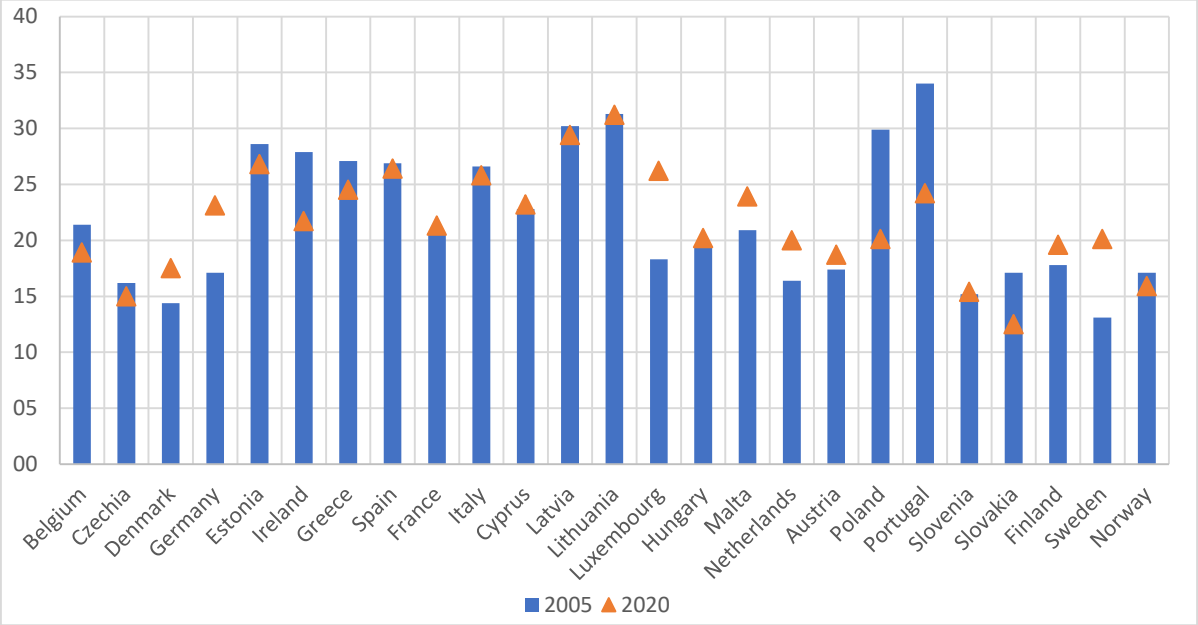
The proportion of people experiencing severe material poverty in European countries is decreasing. However, it remains high in Romania, Bulgaria, and Greece where it reached 19.3%, 16.6%, and 15.2%, respectively. Similarly, in non-EU countries like North Macedonia and Albania, the rate of severe material deprivation was 28.6% and 34.7%, respectively, in 2020 (Eurostat, 2021f). Mostly, single parents raising children experience severe material poverty. Although in the EU (27) countries, men lived in severe material poverty more often than women (9.5% and 8.2%, respectively), in countries with the highest poverty rates, the proportion of women experiencing poverty is significantly higher. Furthermore, in the Czech Republic, France, Latvia, Lithuania, Malta, Portugal, Montenegro, and Albania, more single women than men are poor (Eurostat, 2020f).

Means-tested social support makes up only a small portion of the total social protection benefits provided to the population in European Union countries. On average, it accounted for almost 3% of GDP between 2009 and 2019, but the percentage varies widely among countries. For instance, in Denmark, means-tested support made up 11.3% of GDP in 2020, whereas in the Baltic countries, it was less than 0.5%. Over the past 15 years, the share of social support

in Eastern European countries, which is already small compared to older EU countries, has further decreased. To be effective, social support should reduce poverty and social exclusion. However, in both Old and Eastern European countries, the share of insurance and categorical social benefits, provided in cases of illness, retirement, and death, differs significantly.

In many European countries, the social security system is largely based on social insurance and support payment schemes. However, there are different institutions involved in regulating and providing these services, and the level of income redistribution varies. This has resulted in different welfare state regimes. According to Ringen (1988) and Nelson (2012), both categorical and social protection public services aim to distribute benefits equally, regardless of people's income and material situation. However, studies show that poverty is not only not decreasing, but growing in countries with economic and social prosperity such as Denmark, Germany, Luxembourg, the Netherlands, Finland, and Sweden (see Figure 1).

1 Figure: At risk of poverty rate (cut-off point: 60% of mean equivalised income) in %.



Source: *compiled based on the author's Eurostat database:*
https://ec.europa.eu/eurostat/databrowser/view/ilc_li02/default/table?lang=en

In recent years, socioeconomic stability is no longer ensured by the socially oriented regimes characteristic of Scandinavian countries and the conservative corporate welfare regimes established in other European countries. As Kuivalainen's (2004) study showed, both in Scandinavia and in other countries with the oldest social benefit schemes - the UK, the Netherlands, and Germany - social benefits often cannot ensure a higher standard of living than the poverty threshold. The situation is even worse in the Baltic countries, for example, where in 2021 in Latvia and Lithuania, the at-risk-of-poverty threshold when calculating monthly

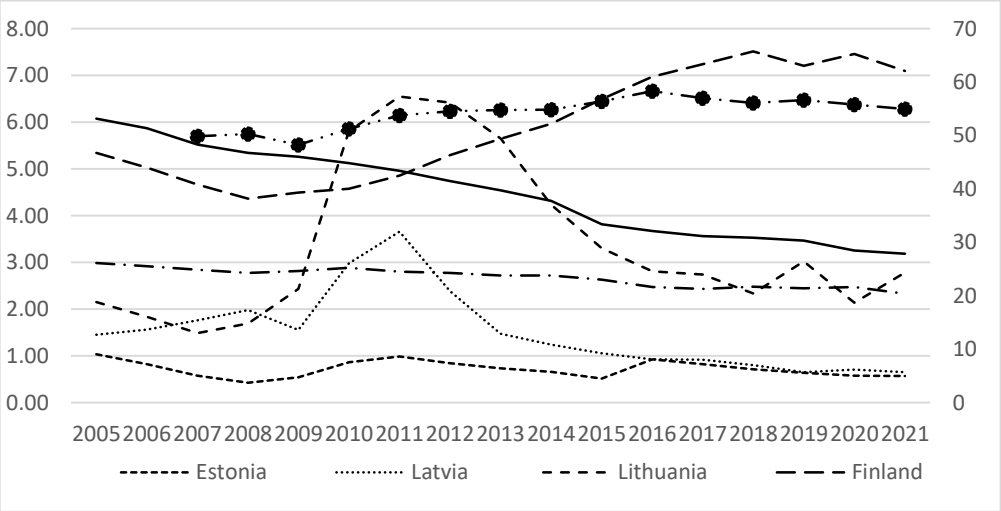
income was 472 and 483 EUR, respectively. Meanwhile, the average old age pensions of the population were 413 and 431 EUR for men and women, respectively (Benefit Old Age Pension, 2021; Report, 2022).

During the last decade, Eastern European countries experienced rapid economic growth, with a chain-linked volume percentage change of 2-4% points on the previous period (Eurostat, 2020d). However, despite this growth, the share of social benefits allocated to citizens did not increase and, in some countries like Latvia, Lithuania, Poland, and Slovakia, it even decreased. In 2009, the EU institutions expressed concern with this situation and predicted that the minimum income of the population should reach the poverty risk threshold (European Commission, 2009). This threshold is determined individually in each EU country, taking into account the disposable income of the population, and it is set at 60% of the median income. Unfortunately, only a few EU countries have reached this target, with most having minimum income levels of only 20-40% of this amount (Nelson, 2012; Van Mechelen at al., 2011). Increasing the minimum income is often a complex and long process that requires additional costs, income distribution policies and reforms of the social insurance system, so social security support becomes the most important tool for reducing monetary poverty and material deprivation of the population.

Social security benefits in European Union countries have been increasing steadily and reached 4.3 trillion Euros in 2021. However, it's important to note that the impact of these benefits on poverty levels varies among individual countries. Scandinavian countries have the largest general social assistance benefits, both for insured and non-insured individuals. In contrast, the Baltic countries have benefits that are 3-5 times lower, which correlates with the salary differences between these groups of countries.

One key difference between the evaluation of social security benefits in Scandinavia versus the Baltic countries is the determination and changes of social protection support (non-insurance) benefits for an individual resident. In the Baltic States, a very small proportion of these benefits are means-tested, whereas in Denmark, for instance, 41% of cash social assistance benefits are means-tested. Additionally, the share of means-tested payments in these countries is related to economic cyclical changes. After the financial crisis of 2007-2008, the share of means-tested social support in Lithuania increased by four times, and in Latvia by 2.5 times. In contrast, in Sweden and Norway, these benefits consistently decreased during the same period. This shows that the social security systems of these two Scandinavian countries are less sensitive to unexpected economic changes.

2 Figure: Share of means-tested social protection benefits compared to non-means-tested benefits (in %.)

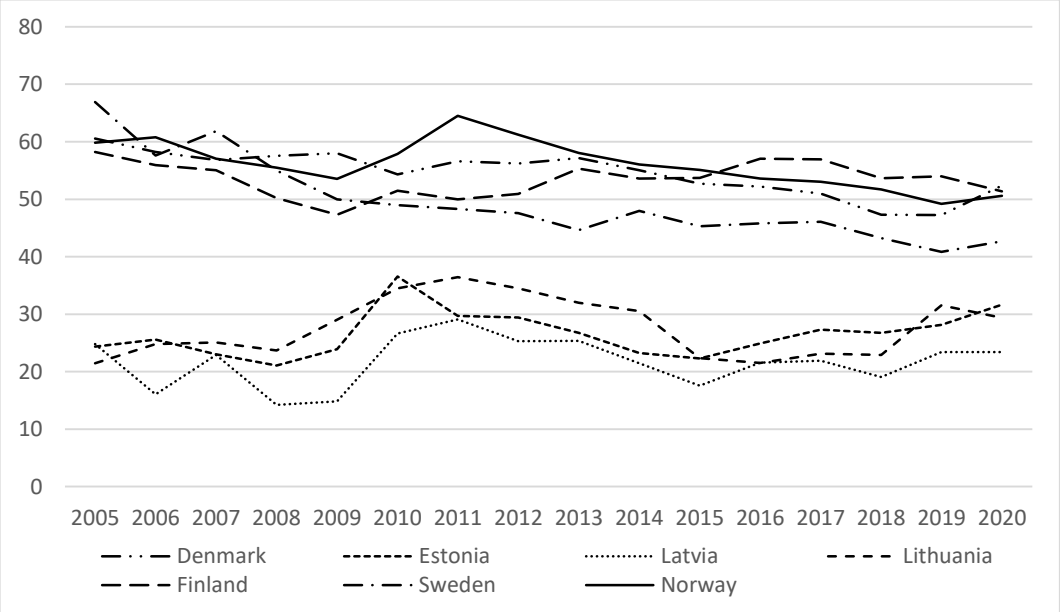


The vertical axis of the Danish data is shown on the right due to the significantly larger data compared to other countries

Source: *compiled based on the author's Eurostat database:*
https://ec.europa.eu/eurostat/databrowser/view/spr_exp_fto__custom_8568362/default/table

The impact of social transfers (excluding pensions) on poverty reduction can be measured by comparing the at-risk-of-poverty rates before and after transfers. This data is available in the Eurostat database (Eurostat, 2021g). Over the last 15 years, the effect of social transfers has become more similar in the Scandinavian and Baltic countries. However, the Scandinavian countries have seen a faster deterioration of the situation compared to the improvement in the Baltic countries (see *Figure 3*). Finland and Denmark have the highest reduction in poverty through social protection benefits, while Latvia has the lowest.

3 Figure. Impact of social transfers (excluding pensions) on poverty reduction in %



Source: *compiled based on the authors Eurostat database:*
https://ec.europa.eu/eurostat/databrowser/view/tespm050/default/table?lang=en

In summary, the social security systems in Scandinavian countries are more extensive, targeted and generous compared to the Baltic countries. This means that they provide greater support to people who need financial assistance or face challenges such as disability, illness, poverty, different age groups, long-term unemployment, loss of family members, etc. These systems are better integrated and coordinated between countries, thereby ensuring better mobility for the population. However, socio-economic changes in the last decade and the decline in the share of social protection benefits (in Sweden and Norway) have led to a situation where, as the number of people receiving social protection support increases, a smaller percentage of them can move above the at-risk-of-poverty threshold.

4. Research methodology and model of the impact of social security benefits on poverty reduction

According to Patel, Sandefur, and Subramanian (2021), three main economic factors determine trends in poverty rates in emerging economies: first, growth in GDP per capita reduces poverty rates. Second, falling income inequality reduces the poverty rate at a given average income level. There is also evidence that absolute poverty declines are faster in economies with more unequal income distribution. Third, the "poverty reduction growth elasticity" measures how average income growth rates translate into poverty reduction. This elasticity depends on income per capita and inequality (Bourguignon, 2003).

The focus of the study is to examine how social security benefits contribute to reducing monetary poverty in seven European countries. The countries were divided into two groups for the comparative analysis of the impact differences - four Scandinavian countries (Denmark, Finland, Sweden, Norway) and three Baltic countries (Lithuania, Latvia, Estonia). Iceland was not included in the study sample due to missing data. The research also used descriptive statistics, comparative analysis, and panel data regression analysis methods.

This study aims to determine how social security benefits impact the poorest residents of two groups of countries. The study creates macro-level models of panel data, where three indicators characterizing the poverty of the population are selected as the dependent variables. These indicators include the population's monetary and material poverty. The three selected indicators are the population's poverty risk level (at 40 or 60 per cent of disposable income), the depth (the gap) of the risk of poverty (at 60 per cent of disposable income), and the level of the population experiencing severe material deprivation. The study excludes public social security services, which can also reduce monetary poverty and material deprivation. Other impact assessment indicators and their representative variables were chosen based on the most important factors determining changes in the population's poverty. These factors were determined by analysing the interactions between social protection benefits and poverty in the concept of the welfare state, as well as empirical studies by other authors (Nelson, 2012; Notten, Guio, 2016).

Regression analysis models have certain characteristics that define them:

- Panel data is a type of data that combines cross-sectional and time variables. It enables us to analyze the impact of various factors on different levels, such as macro level, households, and individuals, over a while. Using panel data provides several advantages over simple time series or cross-sectional data. It helps control individual heterogeneity and reduces the degree of multicollinearity between variables, making it more effective for explanatory purposes (Baltagi, 2005).
- The effects of certain exogenous factors such as economic development, long-term unemployment or education may be long-lasting, hence the inclusion of lagged variables in estimation models is important.
- The study analyzed the impact of independent variables on the endogenous variable using Ordinary Least Squares (OLS) and Fixed Effects Models (FEM). Elasticity coefficients that indicate variable interactions were computed.
- Because the variables were standardized by taking their logarithms or differentiation, the effects of changes in variables were evaluated in the models.
- The models that were created were validated by checking the data for autocorrelation using Durbin-Watson statistics and correlograms, and for heteroskedasticity using the Wald test. Moreover, the reliability of the models was assessed by calculating the standard errors of variable coefficients, t and F statistics, and their probabilities.

Table 1: Description of controlled variables

Controlled variables	Variable description
Gross domestic product per capita *(GDP_pcap)*	GDP at market prices – the sum of added values of all types of economic activity at basic prices after adding taxes on products and subtracting subsidies on products. GDP per capita (EUR) is included in the model (Eurostat 2021c).
Income inequality (*GINI*)	The Gini coefficient is defined as the relationship of cumulative shares of the population arranged according to the level of equivalised disposable income, to the cumulative share of the equivalised total disposable income received by them (2021d).
Social protection benefits (*Socprotben*)	Social protection benefits are transfers to households, in cash or kind, intended to relieve them of the financial burden of several risks and needs as defined in ESSPROS. These include disability, sickness/healthcare, old age, survivors, family/children, unemployment, housing and social exclusion not covered elsewhere (EUR) (Eurostat, 2021i).
Means-tested benefits (*Mtested*)	Means-tested social benefits refer to benefits with entitlement explicitly or implicitly conditional on the beneficiary's income/wealth. It is considered an extreme or last resort when the social insurance system does not ensure the minimum standard of living (EUR) (Eurostat, 2021j).

The study aimed to assess changes in poverty and its determining factors in Scandinavian and Baltic countries. Created models that used independent variables, their lagged equivalents, and 17-time pseudo-variables. The regression analysis was conducted in two stages. In the first stage, four endogenous models were created to examine the impact of changes in total social support, income inequality (measured by the GINI coefficient), and GDP per capita (represented by β coefficients) on changes in population poverty:

$$\Delta(Pov\_risk40(60)_{i,t})=\alpha+\delta_3 td2007_t+...+\delta_{17} td2021_t + \beta_1\Delta\ln(Socprotben_{,t}) + \beta_2\Delta\ln(Socprotben_{,t-1}) + \beta_3\Delta\ln(Socprotben_{,t-2}) +\beta_4\Delta(GINI_{,t}) + \beta_5\Delta\ln(BVP\_pcap_{,t}) + \beta_6\Delta\ln(GDPpcap_{i,t-1}) + \Delta e_{i,t}$$

$$\Delta(Gap\_60_{i,t})=\alpha+\delta_3 td2007_t+...+\delta_{17} td2021_t + \beta_1\Delta\ln(Socprotben_{,t}) + \beta_2\Delta\ln(Socprotben_{,t-1})+ \beta_3\Delta\ln(Socprotben_{,t-2}) +\beta_4\Delta(GINI_{,t}) + \beta_5\Delta\ln(GDP\_pcap_{,t}) + \beta_6\Delta\ln(GDPpcap_{i,t-1}) + \Delta e_{i,t}$$

$$\Delta(MatDepr_{i,t})=\alpha+\delta_3 td2007_t+...+\delta_{17} td2021_t + \beta_1\Delta\ln(Socprotben_{,t})+\beta_2\Delta\ln(Socprotben_{,t-1}) + \beta_3\Delta\ln(Socprotben_{,t-2}) + \beta_4\Delta(GINI_{,t}) + \beta_5\Delta\ln(GDP\_pcap_{,t}) + \beta_6\Delta\ln(GDPpcap_{i,t-1})+ \Delta e_{i,t}$$

The study tested the following hypotheses for the Scandinavian and Baltic groups:

Hypothesis 1 - the overall economic growth of a country reduces poverty among its population. The model includes current and lagged variables.

Hypothesis 2 - the increase in social security benefits (insurance and non-insurance) per inhabitant reduces poverty among the population.

Hypothesis 3 - it was tested whether support payments reduce poverty among the population. The model includes current and lagged variables.

The models were modified by replacing general social security benefits with means-tested social assistance benefits, which many researchers recognize as directly reducing poverty:

$$\Delta(Pov\_risk40(60)_{i,t})=\alpha+\delta_3 td2007_t+...+\delta_{17} td2021_t + \beta_1\Delta_l\ln(Mtested_{i,t}) + \beta_2\Delta\ln(Mtested_{,t-1}) + \beta_3\Delta\ln(Mtested_{,t-2})+ \beta_4\ln(GDP\_pcap_{,t})+ \beta_5\Delta(GDP\_pcap_{i,t-1})+ \Delta e_{i,t}$$

$\Delta(Gap\_60_{i,t})=\alpha+\delta_3 td2007_t+...+\delta_{17} td2021_t + \beta_1\Delta\ln(Mtested_{i,t}) + \beta_2\Delta\ln(Mtested_{,t-1}) + \beta_3\Delta\ln(Mtested_{,t-2}) + \beta_4\ln(GDP\_pcap_{,t}) + \beta_5\ln(GDP\_pcap_{i,t-1}) + \Delta e_{i,t}$

$\Delta(MatDepr_{i,t})=\alpha+\delta_3 td2007_t+...+\delta_{17} td2021_t + \beta_1\Delta\ln(Mtested_{i,t}) + \beta_2\Delta\ln(Mtested_{,t-1}) + \beta_3\Delta\ln(Mtested_{,t-2}) + \beta_2\ln(GDP\_pcap_{,t}) + \beta_3\ln(GDP\_pcap_{i,t-1}) + \Delta e_{i,t}$

According to Polacko (2021), the rise in income inequality has resulted in negative consequences such as poverty and material deprivation, particularly for those with low income. The study analysed to investigate the relationship between income inequality (measured by the d_GINI variable) and poverty in two groups of countries. The study utilized Ordinary Least Squares (OLS) and Fixed Effects Model (FEM) to examine the impact of income inequality on poverty, and the results are presented in Tables 1 and 2.

Table 2: Research results for a group of Scandinavian countries

Independent variable	At risk of poverty rate (40)		At risk of poverty rate (60)		Poverty gap (60)		Severe material deprivation rate	
Model	*OLS*	*FEM*	*OLS*	*FEM*	*OLS*	*FEM*	*OLS*	*FEM*
α	0.355 (0.183)	0.574 (0.167)	0.317 (0.58)	0.27 (0.602)	0.367 (0.824)	0.428 (0.769)	-0.07 (0.627)	-0.07 (0.616)
td2007	-0.439 (0.19)	-0.885 (0.231)	-0.403 (0.685)	-0.378 (0.684)	0.19 (0.897)	0.22 (0.878)		
td2008							0.172 (0.239)	-0.159 (0.254)
…	…	…	…	…	…	…	...	...
td2019	-0,81** (0.025)		-0.4 (0.714)		-1.078 (0.57)	-1.155 (0.505)	-0.159 (0.614)	-0.158 (0.58)
td2020		-0.519 (0.307)		-0.354 (0.731)				
d_GINI	0.097 (0.357)	0.086 (0.333)	0.2 (0.37)	0.168 (0.4)	0.02 (0.92)	-0.022 (0.92)	0.13** (0.04)	0.13*** (0.03)
d_GDP_ $pcap_{,t}$	-2.8* (0.08)	-3.43*** (0.01)	-1.01 (0.644)	-0.88 (0.683)	-0.827 (0.946)	-0.794 (0.944)		
d_GDP_ $pcap_{,t-1}$							-3.7* (0.058)	-3.71*** (0.005)
ld_Socprotben$_{,t}$							4.2* (0.07)	4.22*** (0.009)
ld_Socprotben$_{,t-1}$	-7.37** (0.05)		-21.5** (0.05)	-20.5** (0.03)				
ld_Socprotben$_{,t-2}$					-38.5** (0.034)	-48.5** (0.024)	0.69 (0.888)	-0.512 (0.924)
ld_Mtested $_{i,t}$		-0.34*** (0.01)		-0.508* (0.052)				
ld_Mtested $_{i,t-1}$	0.3* (0.09)		0.08 (0.653)				-0.405*** (0.001)	-0.43*** (1.42e-014)
ld_Mtested $_{i,t-2}$					1.345** (0.034)	1.618** (0.01)		
d_Gap_60$_{,t-1}$					-0.553** (0.018)	-0.56*** (1,12e-05)		
Log-likelihood	-19.42	-23.06	-52.86	-52.39	-97.17	-96.53	-19.78	-19.64
Test statistic:	Wald test Chi-q(4) = 8.838 p-value 0.065	T stat. F(3, 33) = 0.743 p-value 0.534	Wald test Chi-q(4) = 13.058 p-value 0.065	T stat. F(3, 30) = 0.317 p-value 0.813	Wald test Chi-q(4) = 12.854 p-value 0.012	T stat. F(3, 28.5) = 0.347 p-value 0.792	Wald test Chi-q(4) = 15.8 p-value 0.003	T stat. F(3, 25.7) = 0.064 p-value 0.978
Durbin-Watson	1.96	2.00	2.37	2.4	2.05	2.05	2.64	2.63
n	60	64	60	60	60	60	56	56

The following conditions were tested to confirm the hypotheses: β>0, p>0,05. At least one $\beta_{1,2,3,4,5,6}>0$, p<0.05;.

The results showed that there was a statistically significant relationship in only one fixed-effects model, where an increase in the GINI coefficient by 1% led to a 0.13% increase in severe material deprivation.

The study examined the effect of economic growth on poverty and found that a 1% increase in GDP per capita in Scandinavian countries led to a decrease in poverty risk rate by 3.43% and severe material deprivation by 3.71%, but the latter effect was delayed for a year. However, the study did not find any significant relationship between general social support and changes in population poverty during the analyzed period. Regarding the impact of means-tested support on poverty indicators, the study found that a 1% increase in means-tested support led to a 0.34% increase in the at-risk-of-poverty rate in the current year. Additionally, the study found an inverse and statistically significant relationship between the 1-year lagged variable of testing support and severe material deprivation changes, with elasticity coefficients of -0.405 and -0.43.

Table 3: Research results of the Baltic countries group

Independent variable	At risk of poverty rate (40)		Poverty gap (60)	Severe material deprivation rate	
Model	*OLS*	*FEM*	*OLS*	*FEM*	*FEM*
α	-46.07 (0.123)	6.7 (0.6)	-84.58 (0.104)	-8.33 (0.96)	-7.1 (0.96)
td2007	4.11* (0.064)	0.705 (0.16)	7.57* (0.096)	-3.714 (0.801)	-3.92 (0.75)
…	...	...	…	...	...
td2020	0.139* (0.65)	-0.19 (0.768)	1.13 (0.6)	0.335 (0.665)	0.29 (0.688)
d_GINI	0.583*** (0.0001)	0.5*** (0.004)	1.018* (0.074)	0.054 (0.714)	
$d\_GDP\_pok_{i,t-1}$	6.34* (0.089)	5.01** (0.023)	12.58* (0.07)	12.3 (0.218)	0.023 (0.99)
$ld\_Socprotben_{,t}$		-6.92* (0.082)			
$ld\_Socprotben_{,t-2}$	-1.9** (0.011)		-4.78*** (0.05)		
$ld\_Mtested_{i,t-2}$				1.81** (0.035)	1.78*** (3.42e-05)
Log-likelihood	-41.26	-38.4	- 80.26	-77.75	-77.8
Test statistic:	Wald test Chi-q(3) = 732.2 p-value 2.24e-158	T stat. F(2, 26.2) = 0.025 p-value 0.976	Wald test Chi-sq(3) = 9.9 p-value 0.019	T stat. F(2, 27.4) = 0.219 p-value 0.805	T stat. F (2, 27.4) = 0.211 p-value 0.81
Durbin-Watson	2.26	2.12	2.34	2.02	2.01
n	45	45	45	45	45

The following conditions were tested to confirm the hypotheses: β>0, p>0,05. At least one $\beta_{1,2,3,4,5,6}>0$, p<0.05;.

The results show that the statistically significant relationship between income inequality and poverty is stronger in the Baltic countries than in Scandinavia: 1%. point increase in income inequality increases the risk of poverty rate by about 0.5% points. The results showed that a statistically significant relationship between poverty and social protection support exists only in one model. When social protection benefits increase by 1% point, the poverty gap decreases by 4.78% points. It was found that there is a direct relationship between means-tested social support and changes in severe material deprivation (elasticity coefficient 1.78), but it lagged by two years. This is in contrast to the changes in these two indicators during the analysed period: means-test benefits varied unevenly, but at the end of the period it increased by 20-300% in all three countries. Meanwhile, severe material deprivation decreased 5-6 times. This can be explained by assuming that the means-tested social support is too low and/or grows too slowly for the population to lift out of poverty. However, further research is necessary to confirm this assumption and determine the actual reasons for the decrease in severe material deprivation.

5. Conclusions

Most academic sources suggest that economic growth plays a significant role in reducing poverty. However, the findings of this study indicate that economic growth has a greater impact on reducing monetary poverty when the initial poverty level is low. In Scandinavian countries, the poorest population's at-risk-of-poverty decreased due to economic growth in the current year, and the proportion of the population experiencing severe material poverty decreased with a one-year delay.

The study has confirmed that income inequality plays an important role in reducing population poverty. In countries with high income inequality, such as the Baltic countries, changes in income inequality have a direct and significant impact on poverty.

It was found that the impact of general social support payments on poverty varied between the Scandinavian and Baltic countries. In the current year, as general social support increased in the Scandinavian countries, severe material deprivation also increased. This was possibly due to the faster growth of the number of people experiencing deep material poverty compared to the growth of social assistance payments. On the other hand, in the Baltic countries, general social assistance payments do not immediately lift people out of poverty but rather have a delayed effect of reducing poverty depth after two years.

The impact of means-tested aid on poverty reveals a significant difference in poverty reduction among different country groups. Scandinavian countries, with slower economic growth and lower income inequality but higher means-tested social support, have experienced a decline in the risk of poverty and severe material deprivation. On the other hand, Baltic countries show the opposite trend. There is a direct relationship between the annually growing but insufficient means-tested social support payments and the severe material deprivation rate in subsequent years. Therefore, increasing the amount and coverage of means-tested support in these countries could be another measure to reduce population poverty.

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