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SOCIO-ECONOMIC DEVELOPMENT OF THE BALTIC STATES: AN EVALUATION IN THE CONTEXT OF EUROPEAN INTEGRATION

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Abstract. This article presents a comparative analysis of the socio-economic development of the Baltic States – Lithuania, Latvia, and Estonia – during the post-Soviet era, with a focus on their integration into the European Union. It explores key economic reforms, shifts in socio-economic structures, and the social costs associated with the transition to a market economy. The analysis highlights both the successes and shortcomings of the reform processes, as well as the major challenges currently confronting the Baltic economies. Special attention is given to the risks associated with declining competitiveness and the urgent need for structural transformation toward high value-added industries. The findings offer practical insights for assessing policy effectiveness and shaping future development strategies in the region. The study introduces a set of indicators and proposes a methodology for evaluating the effectiveness of socio-economic policies, drawing on statistical data from 2020 to 2023. In order to compare the trajectories of socio-economic development in the Baltic States over the period 2020–2023, the Dynamic Time Warping (DTW) analysis was conducted.

Key words: Baltic States, socio-economic development, European integration, economic reforms, policy evaluation, DTW-analysis.

Introduction. HIn countries with a market economy, the evolution of social relations determines the predominant importance of social factors. The democratization of society and the pursuit of broad economic well-being further reinforce this trend. Social needs are closely tied to the patterns of economic development and, at the same time, play a crucial role in shaping national development strategies. They directly influence shifts in social priorities, core values, and the structure of economic activity.

A key objective of any modern state is to ensure a high standard of living and economic prosperity for its citizens. In this context, the interaction and mutual influence between social policy and economic stability becomes a particularly important area of study. This relationship is clearly reflected in the fact that key macroeconomic and microeconomic indicators are commonly used to assess the overall level of a society's socio-economic development.

At the start of the 1990s, the Baltic States faced a range of complex economic and social challenges, including high inflation, sluggish economic growth, inefficient public administration, deteriorating living conditions, and rising unemployment. Despite these difficulties, Latvia, Lithuania, and Estonia began their economic transformation from a similar starting point. Roughly one-third of their economic infrastructure was rooted in industry and agriculture, while the remaining two-thirds were

tied to the service sector. During this period, all three countries transitioned to free-market economies, with their geographical location playing a key role in shaping development priorities. Positioned as vital "gateways" between Eastern and Western markets, the Baltic States leveraged their strategic location for economic growth. However, their paths diverged–while Latvia and Lithuania experienced contractions in key sectors and declines in household incomes, Estonia embraced rapid market-oriented reforms and prioritized investment in education, science, and technology, setting a distinct trajectory for its economic progress.

In 2004, the Baltic States became full members of one of the world's largest markets by joining the European Union (EU). This accession spurred increased investment, enhanced infrastructure, and provided access to new markets and advanced technologies. At the time of their entry, Latvia, Lithuania, and Estonia were classified as transition economies, marked by extensive economic restructuring, high unemployment, and low Gross Domestic Product (GDP). As EU members, they gained access to a vast market with standardized production regulations and unrestricted entry to a consumer base of approximately 500 million people. Additionally, membership brought expanded opportunities for foreign investment and financial support through EU structural funds, further aiding their economic development.

Given these evolving conditions, the need for a thorough examination of socio-economic policies in the Baltic States within the context of European integration has grown significantly. It is crucial to analyze their implementation, assess their outcomes, identify the challenges each country faces, and evaluate the effectiveness of the strategies used to address these issues. This topic is particularly relevant because Estonia, Latvia, and Lithuania occupy different positions in terms of economic development and social issues within the framework of European integration. While they share common challenges, their approaches to addressing them vary, resulting in significant differences in socio-economic progress and living standards. This disparity is especially critical today, as economic and political instability continues to impact all three countries.

This research aims to provide a thorough analysis of the socio-economic transformations that have occurred in the Baltic States, offering a comparative assessment of their development within the framework of EU membership.

In line with this aim, the authors set the following research objectives:

1. To study the theoretical and methodological foundations of the category "socio-economic development of the state".

2. To assess the socio-economic development of the Baltic States in the context of European Union integration.

3. To identify the problems faced by Lithuania, Latvia and Estonia in their socio-economic development and the ways of overcoming them.

4. To identify trends in the further development of the Baltic States in the context of EU integration.

The study focuses on the socio-economic transformations in the Baltic States and their influence on integration processes.

Its primary aim is to conduct a comparative analysis and evaluation of the Baltic States' socio-economic development within the framework of European integration.

The authors employed general scientific methods in their research, including intuitive search, statistical analysis, and comparative evaluation of statistical data across different time periods and indicators. To strengthen the theoretical foundations of the study, a thorough examination of various sources and academic works was essential. The research draws on periodic reports and reviews from international economic organizations such as the United Nations (UN), International Monetary Fund (IMF), European Union (EU), World Bank, and European Bank for Reconstruction and Development (EBRD), among others. Additionally, it incorporates international and national statistical data from the three Baltic States, as well as information from official government websites, including the Ministries of Finance and other relevant departments in Lithuania, Latvia, and Estonia. Comparative

analysis relies on statistical data from Eurostat, the Central Statistical Bureau of Latvia, the Statistics Departments of Lithuania and Estonia, the central banks of all three countries, and various international agencies.

1. Theoretical Foundations of Socio-Economic Development. According to Article 25 of the Universal Declaration of Human Rights (Universal Declaration of Human Rights,1948), everyone has the right to a standard of living adequate for the health and well-being of themselves and their family, including food, clothing, housing, medical care, and necessary social services, as well as the right to security in the event of unemployment, sickness, disability, widowhood, old age, or other lack of livelihood in circumstances beyond their control.

The economy of any country is a system comprising a variety of different activities, and each of its links or components can only exist because it receives something from others – that is, it is interconnected and interdependent with other components (Morohin, 2008, p.11).

The primary goal of any national economy is to sustain human life, create conditions for the continuation of humanity and improve the well-being of the members of society. To solve the main economic problem – the allocation of scarce resources – every economic system answers in its own way the following three questions: what to produce, how to produce and for whom to produce. The mechanisms and methods for achieving this goal include a set of instruments that make it possible to create a favourable environment for the economic activity of all participants, regardless of their form of ownership (Samujel'son, 1992, p.47).

Socio-economic development is a process that encompasses economic and social progress, improvement of living conditions and increased productivity of the economy (Auzan, 2014)

However, the definition of this term may vary depending on the author and the context in which it is used. Let's consider the evolution of the several approaches to defining the concept of socio-economic development (see Table 1).

Table 1

Evolution of the Definition of "Socio-Economic Development"

Autor(s) / Approach	Definition	Key Characteristics
Classical Economists (18th–19th centuries), e.g. Adam Smith / Classical Economic Liberalism (Smit, 1776, p. 8)	Socio-economic development is the result of economic freedom, limited government intervention, and active entrepreneurship.	Emphasis on market mechanisms, entrepreneurship, minimal state involvement.
Thomas Malthus (1798) / Malthusian Theory (Mal'tus, 1798, p. 22)	Development is constrained by population growth outpacing resource production.	Focus on population control as a factor in sustainable development.
Karl Marx (1867) / Marxist Theory (Marks, 1867, p.7 73)	Development involves class struggle; real progress is possible only through revolutionary change.	Social justice, equality, elimination of capitalist exploitation.
Joseph Schumpeter (1911) / Schumpeterian Innovation Theory (Shumpeter, 1911)	Development is driven by innovation and "creative destruction."	Role of innovation, entrepreneurship, economic instability as a source of progress.
Max Weber (1905) / Protestant Ethic Thesis (Veber, 1905)	Cultural and religious values shape economic behaviour and development.	Influence of Protestant ethics on capitalism and social order.
John Maynard Keynes (1905) / Keynesian Economics (Kejns, 1936).	The state plays a key role in stabilizing the economy and promoting growth.	Government spending, employment, equal access to economic benefits.
Arthur Cecil Pigou (1920) and Vilfredo Pareto (1906) / Welfare Economics (Pigou,1932), (Pareto, 2014)	Development includes providing social guarantees and reducing inequality.	Focus on social safety nets, universal access to services, equality.

Table1 (continuation)

Thorstein Veblen (1899), Douglass C. North (1989) / Institutional Economists (Veblen, 2000), (North, 1993, p. 1319–1332)	Institutions determine development outcomes by shaping economic and social behaviour.	Importance of stable, inclusive, and fair institutions.
Amartya Sen (1999) / Development as Freedom (Sen, 2004)	Development as expansion of human freedoms across all dimensions of life.	Freedom, opportunity, human capabilities, multidimensional well-being.
UNDP (late 20th century–present) / Human Development Approach (Doklad o rabote pervoj i vtoroj ocherednyh sessij i ezhegodnoj sessii 2020 goda)	Socio-economic development is measured by human development indicators, not just GDP.	Focus on life expectancy, education, income, equality, and sustainability.
World Bank / Comprehensive Development Approach (Sodejstvie stranam v adaptacii k menjajushhemusja miru, 2022)	Development encompasses economic growth, poverty reduction, and environmental protection.	Holistic view: income, education, health, equity, environmental sustainability.

Thus, we can distinguish three main directions that determine the concept of socio-economic development.

The economic approach views socio-economic development primarily through the lens of economic indicators – such as GDP growth, investment levels, employment, and income. In this view, social development is often treated because of successful economic performance.

The social approach focuses on human well-being, quality of life, access to education and health care, social equality and opportunities for personal development. From this perspective, economic growth alone is not enough if it does not lead to tangible improvements in people's lives.

The integrated approach combines both economic and social dimensions. It considers socio-economic development as a balanced and sustainable process of economic growth accompanied by improved living standards, social justice, and access to resources and opportunities for all citizens.

According to this broad understanding, socio-economic development is not only about increasing production or income, but also about achieving social cohesion, reducing inequality and ensuring the sustainable use of resources. It involves institutional, technological and cultural changes that contribute to the long-term improvement of people’s lives.

This multidimensional nature of socio-economic development is particularly important for transition economies such as the Baltic States, where changes in political, economic and social structures occur simultaneously and interdependently. In such a context, effective government policies need to address both economic efficiency and social equity.

Studies show that the level of socio-economic development of the state depends in many ways on the strategic goals and objectives, the efficiency of management and the result of the state's activity. The main priorities for the country's socio-economic development are as follows:

– Raising the population's living standards.
– Raising employment levels and reducing unemployment.
– Reduction of social inequalities.
– Ensuring sustainable development and economic growth.
– Attracting additional investment in fixed assets and production.
– Technological modernisation of industry.
– Increase territorial integration in the development of territories.
– Creating favourable competitive conditions for business.

At the same time, the ultimate goals of socio-economic development are (European Commission, 2015):

1. To improve the standard of living of the population. This means ensuring a decent standard of living for the population, including access to education, health care, housing, food, transport and other basic services.
2. Job creation. This includes creating new jobs and reducing unemployment. Job creation is a key factor in improving the economic and social well-being of the population.
3. Economic growth. Economic growth is the basis for improving the living standards of the population, creating new jobs and increasing the country's attractiveness for investment.
4. Sustainable development. Sustainable development means that economic and social growth should be sustained and long-lasting. It means that growth should be based on the use of environmentally friendly technologies, the conservation of natural resources and the reduction of pollution.
5. Social Justice. Social justice means ensuring equal opportunities for all members of society and tackling inequalities in society. This includes access to education, health care, housing and other basic services without discrimination based on social and economic status.

2. Socio-Economic Development of the Baltic States in the Post-Soviet Period and Following EU Accession. After gaining independence, the Baltic States prioritized swift integration into Western European cooperation structures. Achieving this goal required more than a decade of complex systemic reforms aimed at aligning their legal and economic frameworks with European standards. Key aspects of these reforms included a rapid transition to national currencies, the denationalization of enterprises through commercial privatization and restructuring, and the comprehensive overhaul of tax, budgetary, and banking systems. Additionally, price liberalization and the establishment of a market-driven mechanism for regulating foreign trade were critical steps in their economic transformation. International Monetary Fund (IMF) specialists played a crucial role in designing and implementing economic stabilization measures, developing monetary and fiscal programs to support the transition. In terms of governance, reforms shifted the focus of sectoral ministries from direct operational management of the economy to addressing broader strategic objectives.

The transformation processes of the transition to a market economy led to a deep economic recession – in 1991–1994 there was a sharp decline in GDP, income of the population and hyperinflation. In the first 5-6 years of reform, GDP in Latvia, Lithuania and Estonia fell by 51%, 44% and 35% respectively. The economic growth rates in Latvia and Lithuania in 1990–2000 were negative (-3,4% and -2,3% respectively, on average annually) (Official Statistics Portal of Lithuania, 2025; Statistical database of Estonia, 2025; Official Statistics Portal of Latvia, 2025). In Estonia, economic growth rates were also generally negative in the 1990s (-0,5% on average annually), but since 1996 the average annual growth rate has been 6% over 10 years.

Despite initial challenges, market liberalization, foreign capital inflows, and macroeconomic stabilization had already begun to restore positive economic momentum between 1996 and 2000. By the turn of the century, growth rates in the Baltic economies had stabilized and remained relatively high. In the years leading up to their EU accession in 2004, Estonia, Latvia, and Lithuania experienced average economic growth rates of 6,5%, 7,5%, and 6,7%, respectively.

Since Russia, as the legal successor to the former USSR, assumed responsibility for all Soviet-era debts, including those of the Baltic republics, this provided the Baltic States with significant advantages during their transition period. With their public debt effectively reduced to zero, they faced no formal barriers to external borrowing, creating favourable conditions for rapid economic growth and facilitating their adaptation to the new market economy.

Estonia transitioned to a market economy more rapidly than its Baltic neighbours. Immediately after gaining independence, it adopted a liberal approach to foreign trade and opted not to repay deposits from failed banks. The country actively implemented a privatization program based solely

on monetary transactions, without the use of vouchers, granting equal rights to both domestic and foreign investors. This approach attracted substantial foreign investment. As in Latvia and Lithuania, foreign companies and banks played a significant role in the privatization process; however, unprofitable enterprises were swiftly liquidated.

In Lithuania, the use of vouchers has allowed the population to participate in the privatisation process in a meaningful way, resulting in 75% of workers owning shares in privatised companies.

In Latvia, privatization was also carried out through a voucher-based system. However, this approach led to the concentration of the most valuable assets in the hands of a small elite, particularly individuals with strong political connections. For the majority of the population, vouchers were primarily used for the privatization of personal residential property, offering little access to larger economic opportunities. As a result, many strategically significant enterprises were sold at substantially undervalued prices. Due to the limited managerial capacity of domestic entrepreneurs during the transition period, a large share of these enterprises eventually fell under the control of foreign investors.

The experience of the Baltic States illustrates the ambivalent outcomes of the neoliberal reforms implemented during the post-Soviet transition period. These countries adopted free-market economic models in accordance with the policy prescriptions of international institutions such as the IMF, the World Bank, and the World Trade Organization (WTO). However, the rigorous implementation of these externally recommended reforms did not produce the anticipated economic benefits. Despite assurances from Western stakeholders that such measures would lead to sustained prosperity, the reforms instead contributed to a significant rise in poverty levels, which subsequently fuelled large-scale emigration and demographic decline.

After undergoing a steep economic downturn in the early stages of market reforms – primarily caused by the collapse of established economic ties – the Baltic States successfully capitalized on the opportunities presented by global economic expansion. Their accession to the EU marked a turning point, as they quickly became some of the fastest growing economies in Europe, with annual GDP growth rates of between 7% and 12%.

However, this growth trajectory has slowed in recent years. In the earlier stages, robust economic performance and high consumption were largely driven by substantial inflows of Western capital, mainly in trade and financial services, coupled with a rapid expansion of mortgage lending. At the same time, investment in innovation-driven sectors remained relatively limited.

The structural composition of the Baltic economies underwent profound transformation, reflecting a transition toward a post-industrial model. Throughout the reform period, the sectoral balance shifted significantly: the industrial sector's share of GDP declined to 20–25%, and agriculture fell to approximately 5%, while the service sector – dominated by banking, transit, and retail – expanded to around 65% of GDP. Many large industrial enterprises were either liquidated or restructured, leading to a shift in economic priorities toward freight transit, tourism, and consumer-focused industries. However, the Baltic States struggled to develop a competitive high-tech industrial base comparable to their Soviet-era expertise in fields such as radio electronics, transport engineering, and fine chemical production (Tsaurkubule, 2014).

Entire industrial sectors in the Baltic states, previously geared towards integration with other former Soviet republics, were either dismantled or drastically reduced. In the early stages of reform, priority was given to using relatively cheap labour for primary processing of local raw materials. However, these industries produce low value-added products and are therefore largely inefficient – especially given that labour productivity is still only 40-45% of the European average.

The industrial sector in the Baltic States is increasingly evolving into a "subsidiary workshop" within the broader European economy. Today, industrial production is primarily concentrated in labour-intensive sectors such as food processing and textiles, alongside resource-heavy industries like wood processing and construction materials manufacturing. Following the dissolution of most large

enterprises, the industrial landscape is now dominated by small and medium-sized enterprises (SMEs). While these businesses play a crucial role in economic activity, their prevalence limits the widespread adoption of innovative technologies and hinders the growth of high-tech industries. Additionally, investment in research and development remains notably low, trailing far behind European standards.

While the economic growth models of the Baltic States reflect certain national specificities, they share a fundamentally similar approach. These economies are built on the principles of high openness, designed to attract foreign investment through low production costs, liberal tax policies, and relative macroeconomic stability. This framework is best characterized as a small open economy.

Agriculture in the Baltic States has also undergone profound changes, mainly due to the fragmentation of large farms – kolkhozes and sovkhozes – into small farms. The predominance of small-scale production is increasingly becoming an obstacle to improving agricultural efficiency. The share of agriculture in GDP has declined sharply and currently stands at around 2,2% in Estonia, 3,0% in Lithuania and 4,4% in Latvia, while employment in the sector represents 2,6% of the population in Estonia, 5,5% in Lithuania and 6,8% in Latvia (based on 2022 data).

The Baltic States have not prioritized enhancing the competitiveness of their national products. While they specialize in relatively high-quality agricultural and light industrial goods, these sectors have faced challenges in competing within the broader European market. As a result, their competitiveness is largely limited to specific niches, such as affordable, high-quality construction materials, specific chemicals, and wood-processing products.

Competitiveness is still maintained by relatively low production costs, mainly due to lower wages compared to other European countries. However, wages are now rising faster than labour productivity. About half of the Baltic countries' output is exported, due to the limited size of their domestic markets. Industries continue to produce low value-added goods, which limits wage growth and thus exacerbates the problems of population and labour outflows. The potential for industrial development based on low production costs has now been exhausted, leading to the closure of companies and the relocation of production to Asia, where such costs are lower. Industry in the Baltic States needs to diversify, with a focus on high-tech sectors.

Tax reform has played an important role in the system of economic transformation. The Baltic States have a lower tax burden as a percentage of GDP than other EU members, which is a significant competitive advantage that facilitates investment inflows and higher growth rates than in the rest of Europe.

During the reform period, the Baltic States did not implement scientifically grounded programs for the modernization of industry and agriculture, as these sectors were not prioritized in their economic policies. Lithuania was the only country to adopt a law on the economic regulation of agriculture in 1994, alongside a national program that provided targeted state support for agricultural workers. As a result, Lithuania developed the most efficient agricultural sector in the region.

Latvia faces the most significant challenges in agriculture. As part of European Union policies, farmers received financial compensation for ceasing production, leading many either to abandon their land or to emigrate. Consequently, agriculture has become a secondary sector within the national economy. Reforms in this field resulted in the privatization of the Land Fund and a decline in the amount of cultivated land. Restitution further complicated the situation, as numerous plots were returned to former owners who either lacked interest in farming or the resources to maintain agricultural production. Today, Latvia's arable land area stands at approximately 2 million hectares.

As a result of the opening up of the economy, the agricultural market is flooded with imports, making it difficult for local producers to compete. Priorities have shifted: with agriculture seen as unprofitable, Baltic governments are directing funds towards the development of rural tourism (partly to employ the population previously employed in agriculture).

During the post-Soviet period, the financial sector in the Baltic States developed at an accelerated pace: banks and insurance companies experienced growth in almost all areas of activity.

Lending, especially mortgage lending, grew rapidly. Competition in the banking sector increased and new products were introduced, such as investment management, savings plans and life insurance. The financial sector became the most profitable sector of the economy, accounting for up to 40% of annual profits.

One of the conceptual reasons for the shortcomings of the reforms was their one-sided approach. In particular, the relentless pursuit of EU membership often came at the expense of key economic priorities, such as strengthening domestic competitiveness, fostering national investment, and supporting local producers and exporters.

The weaknesses of the reform process were:

1. Social policy, which led to an escalation of social problems and an exodus of labour.
2. The policy of attracting foreign capital, which essentially transferred most (70–80%) of the domestic economy into foreign hands, while developed countries impose restrictions on the presence of foreign capital in their economies.
3. A policy of external borrowing, not for development but for consumption, resulting in significant external debt.

There was insufficient state support for small and medium-sized enterprises and for enterprises in priority sectors; investment in innovation and the quality of education was minimal. The reforms did not include a thorough analysis of the problems in the industrial and agricultural sectors. The political factor was particularly strong – the desire to distance oneself from Russia at the expense of national economic interests.

There were also several internal socio-political factors: corruption, political bias of governments in favour of Western European countries and the US and growing social inequality.

The Baltic States' accession to the European Union holds significant importance (Tsaurkubule&Vishnevska, 2020; Tsaurkubule, 2014). Being in the EU allows these countries to count on substantial support for certain sectors of their economies, as EU policy aims to equalise regional levels of development and compensate for historically uneven patterns. This is particularly relevant for the Baltic States, which are laggards within the EU, but now, with full membership status, can rightly expect various forms of support from the EU.

However, absorbing EU funds is a major challenge, and integration into the European Union brings not only millions of euros in subsidies but also quotas. Latvia, for example, has completely dismantled its once well-developed sugar industry. After joining the EU, the food, textile and pharmaceutical sectors suffered significant losses. The European Union's decision to reduce carbon dioxide emission quotas for companies in Latvia and Lithuania for the period 2008-2012 has significantly constrained expansion plans for certain industries in these countries or will lead to relocation of production to non-EU countries (Tsaurkubule&Vishnevskaya, 2017; Tsaurkubule, 2020).

After joining the EU and the euro area, the central banks of the Baltic States became purely technical bodies responsible for regulating the circulation of money, supervising the activities of commercial banks and collecting and processing statistical data. They effectively gave up their own monetary policy, losing the ability to control the pace of economic growth through changes in interest rates, and forfeited all rights to conduct an independent monetary policy, delegating these powers to the European Central Bank. However, the associated benefits outweigh the costs and risks: almost three-quarters of the Baltic States' trade is with EU countries and two-thirds of their foreign investment originates from the EU, with these indicators continuing to grow as economic interdependence increases.

At the same time, the leaders of the Baltic states incurred significant costs (mainly in the social sphere) in implementing reforms, partly due to the severing and weakening of established economic ties with the Russian market. This led to a deep economic crisis at the beginning of the reforms, followed by widespread poverty and a population exodus from these countries.

Poverty, low birth rates and severe labour shortages are the main internal problems the Baltic states are facing. All this is the result of a state doctrine that promotes an investment climate that favours the wealthy. The current tax base in the Baltic States is insufficient to address pressing social issues. Typically, the tax burden falls mainly on the working population, widening the gap between the rich and the poor. The different approaches of the Baltic States to socio-economic transformation have shaped the subject of this study.

3. Methodology of the Study. The methodology for the comparative analysis of socio-economic development indicators of the analysed subjects includes the following stages (Babkova&Panahov, 2018):

1. The first stage involves analysing relevant literature and processing statistical data to identify key indicators that reflect various aspects of socio-economic development in the regions under study.
2. The second step of the study is to choose a research method that allows to compare the socio-economic policies of different Baltic countries in different time periods.
3. The third stage consists of a comparative analysis of the selected countries.

In order to solve the specific tasks of comparative analysis of the level of socio-economic development of Lithuania, Latvia and Estonia, based on the analysis of literary sources (Tsaurkubule&Vishnevska, 2020; Tsaurkubule.2014; Tsaurkubule&Vishnevska, 2017; Tsaurkubule, 2020; Davydenko&Pasichnyk, 2017; Krasnopjorovs, 2021). and statistical data, a system of non-integrated indicators was selected for the study. These indicators were selected based on the criteria of availability, reliability and justification and cover various areas of socio-economic policy, including social protection, employment, income, poverty, health, education, demography and economic policy (Tsaurkubule, 2011; 2015). In the initial phase of the study, 65 indicators were selected based on the selected policy areas (Tsaurkubule, 2017). Subsequently, many of them were either controversial (ambiguous characterisation of the effectiveness of social policies) or inaccessible for collection and comparison. At the end of the data collection phase, 21 indicators were finally selected (see Table 2).

Table 2

System of socio-economic policy indicators

Economic Policy Indicators	Social Policy Indicators
e1. GDP per capita at PPS, % of the EU average (EU = 100%) e2. Real GDP growth rate, % e3. Total government expenditures, % of GDP e4. Government debt, % of GDP e5. Shadow economy level, % of GDP e6. Inflation (average annual growth rate), % e7. Employment rate, % e8. Unemployment rate, % e9. Population, thousand people e10. Emigration, thousand people	s1. Social protection expenditures, % of GDP s2. Life expectancy at birth, years (average value) s3. Average monthly wage, EUR s4. Minimum monthly wage, EUR s5. Minimum monthly wage as a percentage of the average monthly wage, % s6. Income inequality (Gini coefficient), % s7. Proportion of population at risk of poverty, % s8. Proportion of residents living below the poverty line, % s9. Proportion of residents experiencing severe material and social deprivation, % s10. Proportion of pensioners at risk of poverty, % s11. Proportion of pensioners (65+) at risk of poverty, %

The selection of socio-economic indicators for analysis was based on a number of scientific articles in which similar studies were conducted (Davydenko&Pasichnyk, 2017; Yoji Koyama, 2020; Lonska&Komarova, 2019; Masso&Espenberg, Masso, Mierina, Philips, 2012; Krasnopjorovs, 2021). Appendix 1 presents the statistical data on the socio-economic policies of the Baltic States in the post-COVID period, from 2020 to 2023.

Socio-economic indicators are associated with specific social and economic phenomena for which certain measures can be taken. Such actions are based on a theoretical framework that is largely implemented by professionals in the field of social sciences, statistics or public policy. Many socio-economic indicators have an international character and allow the same social fact to be compared between different societies.

For conducting the comparative analysis, the statistical data on the socio-economic policies of the Baltic States were consolidated into a single data table (3 countries, 4 years, 10 + 11 indicators). Economic indicators were numbered from e1 to e10, and social indicators from s1 to s11 (see Table 3).

Table 3

Input data for analysis

Indicators	Countries											
	Latvia				Lithuania				Estonia			
	2020	2021	2022	2023	2020	2021	2022	2023	2020	2021	2022	2023
e1	69	71	69	70	87	88	88	87	85	85	84	80
e2	-3,5	6,9	1,8	2,9	0,0	6,4	2,5	0,3	-2,9	7,2	0,1	-3,0
e3	44,3	46,5	44,2	44	42,3	37,3	36,2	37,4	44,7	42,1	40	43,3
e4	42,7	44,4	41,8	43,6	46,2	43,4	38,1	38,3	18,6	17,8	18,5	19,6
e5	25,5	26,6	26,5	22,9	20,4	23,1	25,8	26,4	16,5	19	18	17,9
e6	0,1	3,2	17,2	9,1	1,1	4,6	18,9	8,7	-0,6	4,5	19,4	9,1
e7	76,9	75,3	77	77,5	76,7	77,4	79	78,5	79,1	79,3	81,9	82,1
e8	8,1	7,6	6,9	6,5	8,5	7,1	6	6,9	6,9	6,2	5,6	6,4
e9	1900,5	1884,5	1879,4	1877,5	2810,4	2808,4	2831,6	2871,6	1329,5	1330,9	1348,8	1370,3
e10	12	13	16,7	16,3	25,2	25,2	15,3	22,0	12,4	12,5	9,7	14,5
s1	17,2	19,3	17,5	17,3	19,1	18,5	16,2	16,3	18,9	17,4	15,4	15,3
s2	75,5	73,1	74,5	75,9	75,2	74,2	75,8	77,3	78,9	77,2	78,1	78,8
s3	1143	1277	1373	1537	1428	1579	1666	2022	1448	1548	1685	1832
s4	430	500	500	620	607	642	730	840	584	584	654	725
s5	39,5	41,6	38,5	42,4	46,4	44,8	44,3	45,4	42,6	37,9	38,8	38,1
s6	34,5	35,7	34,3	34	35,1	35,4	36,2	35,7	30,5	30,6	31,9	31,8
s7	25,1	26,1	26	25,6	24,5	23,5	24,6	24,3	22,8	22,2	25,2	24,2
s8	23,4	22,5	22,5	21,6	20	20,9	21,2	20,6	20,6	22,8	22,5	20,2
s9	7	5,3	7,8	6,2	8,1	6,4	6	6,1	2,3	1,9	3,3	2,5
s10	46,5	50,9	47,3	46,5	39,5	38,8	43,1	39,2	48,8	47,6	59,8	55
s11	71,7	73,6	68,4	67,8	63,3	61,3	64,1	57,6	76,8	78,1	81,7	79,1

In order to compare the trajectories of socio-economic development in the Baltic States over the period 2020–2023, the Dynamic Time Warping (DTW) analysis was conducted, which consisted of the following steps:

1. Data normalization (to remove the influence of scale).
2. DTW – clasterisation.
3. Visualization of country trajectories by year.

A Dynamic Time Warping (DTW) analysis is a method for measuring similarity between time series that allows for shifts and variations in the pace of changes. Unlike traditional methods, DTW does not require the compared time series to be aligned in time or scale. Instead, it "warps" the time axis by stretching or compressing it to find the optimal alignment between series. This makes it possible to identify similar dynamics even when countries react to external shocks at different times.

In this analysis, DTW enabled the grouping of countries not by static indicator values, but by the similarity of their trends over time, revealing common development paths despite differences in specific years.

Using this method, all variables were divided into two groups: social and economic indicators, each of which was analysed separately. This made it possible to identify features in two separate areas of socio-economic development. A general analysis was then carried out for all 21 factors, which in turn allowed their mutual influence to be taken into account.

All calculations were performed in R program with dtw Package from T. Giorgino (Giorgino, 2009).

4. Statistical data analysis.

4.1. Analysis of DTW Clustering Results of Social Indicators in the Baltic States (2020–2023). To explore the evolution of social dynamics in the Baltic States over the period 2020–2023, a DTW-based clustering was conducted using a set of social indicators s1-s11. Since the comparison was restricted to three countries, the analysis was structured into two distinct clusters. The results of the clustering process are presented in the Table 4 and Figure 1.

Table 4

DTW Clustering Results of Social Indicators in the Baltic States (2020–2023)

Country	Year			
	2020	2021	2022	2023
Latvia	2	2	2	2
Lithuania	2	2	2	1
Estonia	2	2	2	2

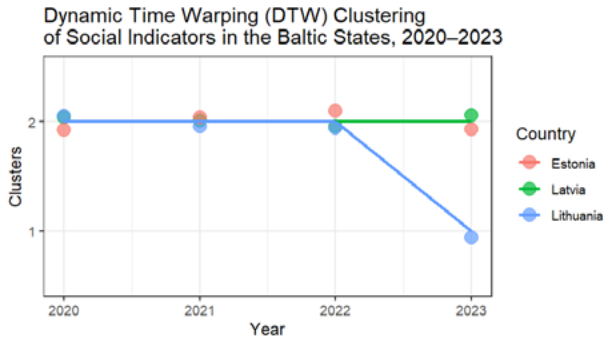

Fig. 1. DTW Clustering Results of Social Indicators

A DTW-based clustering of social indicators in the Baltic States from 2020 to 2023 reveals notable trends. All three countries -Latvia, Lithuania, and Estonia- were grouped in the same cluster (Cluster 2) from 2020 to 2022, indicating a shared trajectory in social development during the post-pandemic recovery. This suggests broadly similar responses to challenges in areas such as health, employment, and social protection.

In 2023, Lithuania shifted to Cluster 1, diverging from Latvia and Estonia. This change may reflect differences in social policy or unique national developments affecting indicators like education, welfare, or public health, which requires additional research methods. Meanwhile, Latvia and Estonia remained in Cluster 2 throughout the period, suggesting a stable and aligned pattern of social progress.

Overall, the findings indicate an initial phase of social convergence across the Baltic States, followed by growing signs of divergence in recent years. DTW clustering effectively highlights these evolving trajectories, offering insights into the pace and nature of social change in the region.

4.2. Analysis of DTW Clustering Results of Economic Indicators in the Baltic States (2020–2023). As was the case in the preceding instance, the division was into two clusters. The results are presented in Table 5 and Figure 2.

Table 5

DTW Clustering Results of Economic Indicators in the Baltic States (2020–2023)

Country	Year			
	2020	2021	2022	2023
Latvia	2	2	1	1
Lithuania	1	1	1	1
Estonia	2	2	2	2

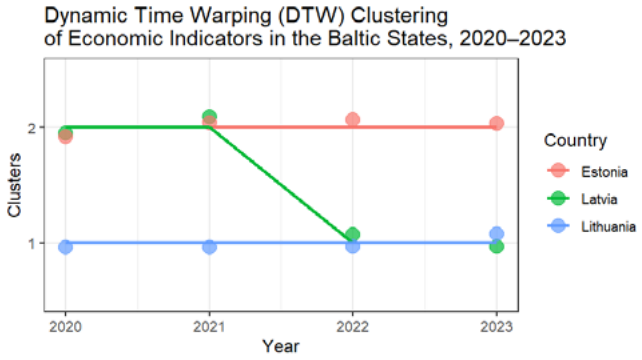

Fig. 2. DTW Clustering Results of Economic Indicators

Analysis of DTW-clustering by economic factors shows that Lithuania demonstrated the most consistent trajectory, remaining in the same (first) cluster throughout all four years. This suggests a stable pattern of economic development, possibly characterized by steady growth or limited fluctuation in key macroeconomic indicators.

Initially, Latvia was placed in the second cluster (2020–2021), but subsequently transitioned to the first cluster in 2022 and 2023. This transition may be indicative of a convergence with Lithuania's economic trajectory, potentially driven by changes in economic structure or policy orientation.

In contrast, Estonia demonstrated the highest level of consistency, occupying the second cluster position consistently throughout the entire period. This suggests an alternative path of economic development, distinct from that of Lithuania and Latvia in the latter years. Potential explanations for this phenomenon may include Estonia's emphasis on the digital economy, specific investment strategies, or external trade orientations.

Overall, the clustering results reveal both shared trends and significant divergences in the economic dynamics of the Baltic States. DTW proves to be a valuable analytical tool, as it captures not only the levels of economic indicators but also the structure of their changes over time, offering a more nuanced view of regional economic processes.

4.3. Analysis of DTW Clustering Results of Socio-Economic Indicators in the Baltic States (2020–2023). Let us consider the clustering results for the set of all 21 indicators of socio-economic policy (see Table 6 and Fig. 3).

DTW's clustering analysis of the socio-economic development of the Baltic States from 2020 to 2023 reveals key trends. Latvia remains consistently in Cluster 2 throughout the period, indicating stable and predictable socio-economic growth or resilience. This may reflect conservative economic policies or balanced responses to social and economic factors. Lithuania showed variability, being in Cluster 1 for three of the four years (2020, 2021, 2023) and moving to Cluster 2 in 2022. This

Table 6

DTW Clustering Results of Socio-Economic Indicators in the Baltic States (2020–2023)

Country	Year			
	2020	2021	2022	2023
Latvia	1	1	1	1
Lithuania	2	2	1	2
Estonia	1	1	2	1

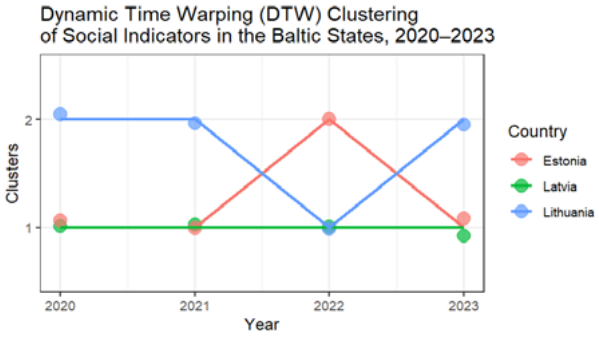

Fig. 3. DTW Clustering Results of Social Indicators

transition suggests a temporary alignment with Latvia and Estonia, possibly due to external shocks such as energy crises, changes in export markets or the war in Ukraine. Estonia shows the highest variability, moving to cluster 1 in 2022 and returning to cluster 2 in 2023. This change is likely to reflect a different response to events such as the war in Ukraine or disruptions in sectors such as IT and logistics. In 2022, the countries diverged, with Latvia and Lithuania in Cluster 2 and Estonia in Cluster 1. By 2023, however, a partial realignment was observed, indicating a recovery of regional development patterns.

Overall, DTW clustering highlights both stable and dynamic aspects of socio-economic development in the region, providing insights into synchronisation and divergence that can inform more flexible regional economic policies.

5. Results and discussion. A comparison of the economic and social indicators of the three Baltic republics reveals significant differences in their development dynamics, despite similar starting conditions after the collapse of the Soviet Union. Following the attainment of independence, each country elected to pursue its own unique trajectory, thereby resulting in divergent socio-economic policies and outcomes. This makes the analysis of common features and differences even more valuable, allowing for a deeper understanding of each country's unique regional characteristics.

Lithuania adopted a state-market approach to its reforms, implementing gradual and incremental changes rather than a complete dismantling of the existing system. In contrast, Latvia and Estonia pursued a more radical approach, opting to dismantle the socialist economic framework rather than reform it. Their transition resembled a bourgeois revolution, characterized by a rapid redistribution of economic power and resources. At a critical juncture, Latvia and Estonia began selling off their resources and industries, while Lithuania took measures to preserve its existing production systems. As a result, Lithuania continues to trade in industrial products, while Latvia has the largest negative trade balance: it finds it easier to import than to produce domestically. At the same time, Estonia, with the support of Finland, managed to achieve significant development compared to Latvia and Lithuania.

This analysis highlights that, despite similar historical starting points, the differing approaches to economic reforms have led to varying levels of success in each country. Estonia's reliance on external support and a more market-oriented approach allowed it to build a stronger and more diversified economy, while Latvia and Lithuania have struggled with trade imbalances and economic transitions.

In recent years, the Baltic States have experienced remarkable economic growth, which is often cited as evidence of successful post-transition reforms. However, a closer analysis shows that this growth has been largely consumption-driven, supported by EU structural funds and the expansion of the mortgage market. Previously, GDP growth was mainly driven by transit trade and, more recently, by the retail, services and financial sectors – rather than by industrial production.

The region's leading growth rates in Europe also need to be put into context: following the almost complete dismantling of their industrial base, the Baltic economies started from a position of negative capacity. As a result, the initial improvements were disproportionately large compared to the more industrialised European countries.

This has given rise to concerns regarding the sustainability of such growth. Foreign investment has been found to be focused on consumption-oriented sectors, while the substantial current account deficit has been financed by bank loans, often sourced from foreign parent banks. This overreliance on mobile financial capital poses systemic risks. Moreover, the process of globalization has led to an acceleration in the relocation of manufacturing from the Baltic region to countries in Southeast Asia and China, which offer lower costs, particularly following the accession of the Baltic States to the EU and China's entry into the WTO.

The European Union's reform of the sugar industry, which resulted in the closure of production facilities in Latvia, serves as an illustrative case study of the manner in which global trade liberalisation and shifts in internal EU policy can potentially compromise the viability of domestic production. It is hypothesised that increased competition from cheaper imports from Asia, Latin America and Africa may result in the displacement of traditional Baltic industries.

In sum, while the Baltic States' economic growth may appear robust, it remains structurally fragile, driven more by external and short-term factors than by sustainable industrial or technological development. Without a strategic shift toward innovation and productive capacity, these economies remain vulnerable to global market fluctuations and financial instability.

The Baltic States are currently confronted with structural challenges that may compromise their long-term economic sustainability. The most significant issue is the increasing labour force deficit, which has resulted in higher labour costs and poses a significant threat to the competitiveness of domestic enterprises in both domestic and international markets.

Another critical concern is the persistent rise in import volumes, which exacerbates already substantial current account deficits. The failure of domestic production to satisfy internal demand serves to perpetuate reliance on external markets, thereby contributing to the exacerbation of trade imbalances and the further erosion of economic resilience.

The increasing cost of production, particularly labour, poses a significant risk to the competitiveness of Baltic enterprises. Indications of this decline are already evident, as firms in the region are experiencing a relative decline in competitiveness compared to their counterparts in other EU member states. If these trends are not addressed, there is a risk of increased reliance on imports and a deterioration in the underlying principles of sustainable growth.

The authors of the analysis suggest that if local businesses and governments fail to effectively manage rising production costs, a negative macroeconomic scenario could unfold. This would lead to sluggish GDP growth, ranging between 3–5% annually, restricting the region's economic potential and impeding efforts to improve living standards.

In order to circumvent this issue, it is imperative that the Baltic States enhance their productivity levels by effecting a transformation in their economic structures. A pivotal step in this process is the transition towards the production of higher value-added goods. This could entail a concentration on technological innovation, an improvement in industrial processes, and an enhancement in the skill level of the workforce to boost productivity and enable businesses to compete on the global stage more effectively.

The necessity for structural changes is imperative, as reliance on low-cost labour and traditional industries will no longer be sufficient in the face of rising global competition and technological advancement. In order to ensure sustainable, long-term growth, the Baltic States must diversify their economies and adapt to the demands of the modern global economy.

The future economic path of the Baltic States will depend on a blend of domestic policy decisions and external economic factors. As highly open economies, they remain vulnerable to global economic downturns. In this context, domestic policy decisions assume added importance, as they will shape the region's ability to withstand future crises.

Despite the notable advancements made by the Baltic States in their economic reform efforts, their experiences underscore the constraints faced by international institutions such as the IMF, World Bank, and WTO in formulating universally applicable transition models. These organisations frequently neglect to consider national particularities, resulting in reform outcomes that might have been enhanced through the implementation of more customised, context-sensitive strategies.

In order to address the current structural challenges, it is necessary to implement long-term national reform programmes that integrate the social dimensions and reflect the unique characteristics of each country. Recent policy shifts indicate that governments in the region are acknowledging previous missteps and transitioning towards more balanced economic planning, incorporating social welfare considerations.

A pivotal aspect of this transition pertains to the strategic promotion of high-tech, value-added industries through targeted incentives, such as tax reductions. Absent a concomitant emphasis on innovation and productivity, the aspiration of attaining rising wages will remain unfulfilled, thereby serving only to exacerbate labour migration and circumscribe sustainable growth. The failure to provide adequate support for high-productivity sectors has the potential to exacerbate the ongoing brain drain.

Conclusion. In conclusion, although the Baltic States have made substantial gains since independence, sustaining growth in the face of global uncertainty will require more diversified, inclusive, and adaptive economic strategies that go beyond market liberalization and foreign capital attraction.

The Dynamic Time Warping (DTW) method allows for the comparison of development trajectories even when the speed and shape of changes differ. In this case, it reveals how synchronously or divergently the Baltic States evolved in terms of socio-economic indicators from 2020 to 2023.

As a result of using this method, the following main trends were identified for the three Baltic countries:

– Latvia demonstrates a stable development trajectory.

– Lithuania shows temporary deviations, likely in response to external challenges (shocks).

– Estonia exhibits the highest variability, reflecting unique economic dynamics.

The analysis recommends a transition towards a socially oriented economic model, like that of Western Europe. The implementation of social inclusion policies has been demonstrated to play a pivotal role in addressing issues of inequality, poverty, and labour shortages, while concurrently fostering long-term development.

DTW helps identify both convergence and divergence in regional development patterns over time. Further research is expected to include a more detailed study of the influence of individual indicators on the identified trends.

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Appendix 1

Indicators of the socio-economic policies of the Baltic States in the post-COVID period, from 2020 to 2023

No.	Indicators	2020	2021	2022	2023
LATVIA					
Economic policy					
1	GDP per capita at PPS, % of the EU average (EU = 100%)	69	71	69	70
2	Real GDP growth rate, %	-3.5	6.9	1.8	2.9
3	Total government expenditures, % of GDP	44.3	46.5	44.2	44.0
4	Government debt, % of GDP	42.7	44.4	41.8	43.6
5	Shadow economy level, % of GDP	25.5	26.6	26.5	22.9
6	Inflation (average annual growth rate), %	0.1	3.2	17.2	9.1
7	Employment rate, %	76.9	75.3	77.0	77.5
8	Unemployment rate, %	8.1	7.6	6.9	6.5
9	Population, thousand people	1900.5	1884.5	1879.4	1877.5
10	Emigration, thousand people	12.0	13.0	16.7	16.3
Social policy					
11	Social protection expenditures, % of GDP	17.2	19.3	17.5	17.3
12	Life expectancy at birth, years (average value)	75.5	73.1	74.5	75.9
13	Average monthly wage, EUR	1143	1277	1373	1537
14	Minimum monthly wage, EUR	430	500	500	620
15	Minimum monthly wage as a percentage of the average monthly wage, %	39.5	41.6	38.5	42.4
16	Income inequality (Gini coefficient), %	34.5	35.7	34.3	34.0
17	Proportion of population at risk of poverty, %	25.1	26.1	26.0	25.6
18	Proportion of residents living below the poverty line, %	23.4	22.5	22.5	21.6
19	Proportion of residents experiencing severe material and social deprivation, %	7.0	5.3	7.8	6.2
20	Proportion of pensioners at risk of poverty, %	46,5	50,9	47,3	46,5
21	Proportion of pensioners (65+) at risk of poverty, %	71.7	73.6	68.4	67.8
LITHUANIA					
Economic policy					
1	GDP per capita at PPS, % of the EU average (EU = 100%)	87	88	88	87
2	Real GDP growth rate, %	0.0	6.4	2.5	0.3
3	Total government expenditures, % of GDP	42.3	37.3	36.2	37.4
4	Government debt, % of GDP	46.2	43.4	38.1	38.3
5	Shadow economy level, % of GDP	20.4	23.1	25.8	26.4
6	Inflation (average annual growth rate), %	1.1	4.6	18.9	8.7
7	Employment rate, %	76.7	77.4	79.0	78.5
8	Unemployment rate, %	8.5	7.1	6.0	6.9
9	Population, thousand people	2810.4	2808.4	2831.6	2871.6
10	Emigration, thousand people	25.2	25.2	15.3	22.0
Social policy					
11	Social protection expenditures, % of GDP	19.1	18.5	16.2	16.3
12	Life expectancy at birth, years (average value)	75.2	74.2	75.8	77.3
13	Average monthly wage, EUR	1428	1579	1666	2022
14	Minimum monthly wage, EUR	607	642	730	840
15	Minimum monthly wage as a percentage of the average monthly wage, %	46.4	44.8	44.3	45.4

Appendix 1 (continuation)

16	Income inequality (Gini coefficient), %	35.1	35.4	36.2	35.7
17	Proportion of population at risk of poverty, %	24.5	23.5	24.6	24.3
18	Proportion of residents living below the poverty line, %	20.0	20.9	21.2	20.6
19	Proportion of residents experiencing severe material and social deprivation, %	8.1	6.4	6.0	6.1
20	Proportion of pensioners at risk of poverty, %	39,5	38.8	43.1	39.2
21	Proportion of pensioners (65+) at risk of poverty, %	63.3	61.3	64.1	57.6
ESTONIA					
Economic policy					
1	GDP per capita at PPS, % of the EU average (EU = 100%)	85	85	84	80
2	Real GDP growth rate, %	-2.9	7.2	0.1	-3.0
3	Total government expenditures, % of GDP	44.7	42.1	40.0	43.3
4	Government debt, % of GDP	18.6	17.8	18.5	19.6
5	Shadow economy level, % of GDP	16.5	19.0	18.0	17.9
6	Inflation (average annual growth rate), %	-0.6	4.5	19.4	9.1
7	Employment rate, %	79.1	79.3	81.9	82.1
8	Unemployment rate, %	6.9	6.2	5.6	6.4
9	Population, thousand people	1329.5	1330.9	1348.8	1370.3
10	Emigration, thousand people	12.4	12.5	9.7	14.5
Social policy					
11	Social protection expenditures, % of GDP	18.9	17.4	15.4	15.3
12	Life expectancy at birth, years (average value)	78.9	77.2	78.1	78.8
13	Average monthly wage, EUR	1448	1548	1685	1832
14	Minimum monthly wage, EUR	584	584	654	725
15	Minimum monthly wage as a percentage of the average monthly wage, %	42.6	37.9	38.8	38.1
16	Income inequality (Gini coefficient), %	30.5	30.6	31.9	31.8
17	Proportion of population at risk of poverty, %	22.8	22.2	25.2	24.2
18	Proportion of residents living below the poverty line, %	20.6	22.8	22.5	20.2
19	Proportion of residents experiencing severe material and social deprivation, %	2.3	1.9	3.3	2.5
20	Proportion of pensioners at risk of poverty, %	48,8	47.6	59.8	55.0
21	Proportion of pensioners (65+) at risk of poverty, %	76.8	78.1	81.7	79.1