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# The Big Bang Enlargement

20 Years of Central Europe's Membership in the EU

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# Key figures

**27%**

aggregate increase in the GDP per capita PPP of the eight Central European countries compared to the counterfactual scenario of no EU accession

**40% - increase in**

Poland's GDP per capita PPP compared to the counterfactual scenario of no EU accession

**8.5%**

the eight Central European countries' share of the combined EU GDP in 2022

**5-fold - increase**

in the value of EU-8 exports between 2008 and 2022

**EUR 329 billion – the total funding**

received by Central European countries from European Structural Funds

**USD 63**

is the domestic Central European added value of every 100 USD of exports

**21-fold – increase**

in cumulative FDI in Central Europe between 2004 and 2022

**29 pp – decrease in**

the risk of poverty in Poland since 2004

**only 5.2%**

the value of EU funding for scientific projects in Central Europe compared to total spending for Western Europe

**4.1%**

the EU-8 rural unemployment rate

**2-fold – increase**

in added value generated in the digital services sector in Central European countries between 2008 and 2021

**34%**

reduction in greenhouse gases by Central European countries between 1990 and 2022 (3 pp more than the EU average)

# Key findings

- Accession of 10 countries to the European Union in 2004 is often referred to as the 'Big Bang' enlargement. In most of the Central European countries, as well as in Malta and Cyprus, it had a positive impact on the living standards of their inhabitants. **The eight countries of the region (the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia and Slovenia) achieved a 27% higher combined GDP per capita PPP growth rate when compared to the counterfactual scenario, i.e. if they had not joined the EU.** Relatively, the largest gains from membership were achieved by Lithuania and Poland, and the smallest by Estonia and Slovenia, which were strongly affected by the financial crisis in Europe.
- **These findings resonate with historical data: Poland, Slovakia and Lithuania were the leaders in economic growth between 2004 and 2022 among the eight countries surveyed, and they were the ones to narrow the development gap with Western Europe to the greatest extent.** The share of eight CEE countries in the EU economy increased from 6 to 8.5%. Poland and Lithuania increased the value generated in industrial production during this period, while the EU saw a decline of more than 1 pp between 2004 and 2022.
- **One of the most significant factors has been Central Europe's integration into EU supply chains, which has brought an influx of foreign investment, led to a fivefold increase in the value of merchandise exports and increased their sophistication.** EU integration transformed Central Europe into an export hub. Although most products and services were supplied to the EU, almost half of the value added eventually went - through indirect exports - to markets around the world. For each dollar of exports of the EU-8 countries, 63 cents were generated from these countries.
- **The region has increased the complexity of its exports as well as technological sophistication of its products, but the advance could be even more significant.** The development of the regions, most of which were still below the threshold of 75% of the EU average in 2022, indicates that even this incredible progress has still not allowed them to catch up to the level of development of Western Europe. The insufficient progress in innovation and participation in research, with less than 5% of European Funds going to Central European countries, also seems particularly significant. In each of the eight countries of the region, the proportion of graduates in STEM (science, technology, engineering, mathematics) subjects was lower than the average among all 27 Member States in 2022.

- **A positive aspect, however, is the translation of this economic success into social success.** The risk of poverty fell below the EU average in five of the eight Member States analysed, the perception of corruption fell significantly in all but two cases, and living standards in rural areas improved significantly. All the countries advanced in a commonly used measure of quality of life - the Human Development Index (HDI).
- **The eight-country region boasts leaders in digital growth as well as innovative e-government solutions (Estonia and Latvia).** Digital transformation has taken place in Central Europe at a pace similar to the EU average. The value added generated in the IT services sector doubled between 2008 and 2021. Interestingly, the only country in the region with an above average number of IT professionals, was Estonia.
- **Health care is still one of the areas in need of improvement, with spending lagging behind Europe.** Poland has a particularly low share of such expenditures in relation to GDP. Thanks to the European Union, environmental and climate protection has become one of the important elements of public policies pursued by the countries of the region. Reductions in greenhouse gas emissions outpaced the rate of reduction in the EU-27. Air quality has also improved, and the protected areas in Central Europe have doubled.
- **Two decades of integration have brought enormous socio-economic transformation to the region. At the same time, the picture of this transformation reveals an easily discernible goal for the next two decades.** Central Europe needs to keep up the pace in closing the income gap with Western Europe. Above all, qualitative measures are needed to increase the region's potential in living standards (e.g. health care), in scientific and technological potential or in cutting-edge economic sectors such as digital services or new industrial technologies enabling the export of high-tech goods.

# Introduction

**Students from the Czech Republic, Estonia, Lithuania, Latvia, Slovakia, Slovenia and Hungary starting in the 2023/2024 academic year, were born and raised in the European Union. EU accession is no longer a recent event, but a generational affair.**

The public increasingly remembers less and less what life was like before integration. To emphasise the scale of the changes that have taken place over this 20-year period, it should be enough to mention that Facebook was launched in 2004 and Nord Stream was not only put into service in 2011, but also taken out of service in 2022. Two decades is long enough to stop to apply the term "new Member State" to the countries that joined the EU in 2004.

The timing of Central European countries' accession to the European

Union might be seen as a pivotal moment, marking the start of a new era for these countries. This perception of a significant turning point is even more pronounced in light of the Russian invasion of Ukraine. Since the 1990s, enormous systemic changes have been taking place with the aim, among other things, of meeting the requirements of European integration. This process, along with NATO membership, today guarantees the security and stability of the region, which is something that the citizens of Ukraine cannot enjoy. In addition to security, integration has brought enormous economic benefits that have contributed to the civilisational advancement of the countries of the region. This is evidenced by, among other things, the convergence of GDP towards Western European levels or improvements in quality-of-life indicators, such as the HDI index.

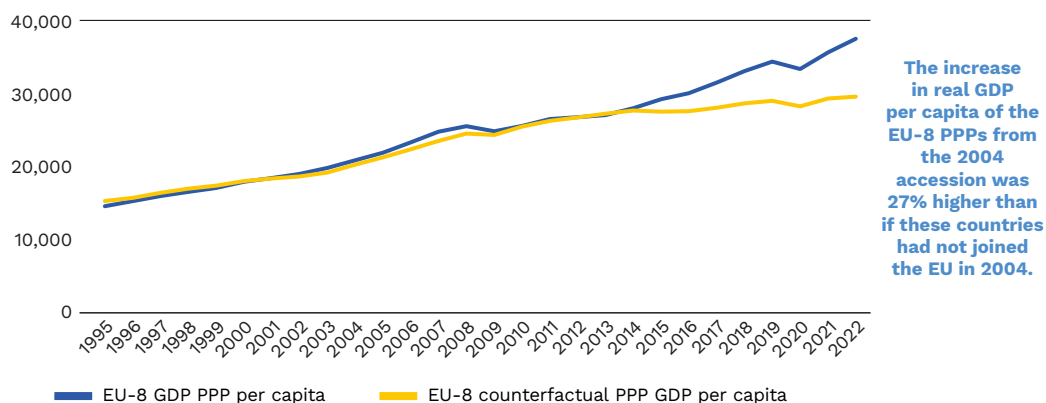
With this report, we aim to present the changes taking place in the eight countries that joined the Union in 2004 and that will celebrate 20 years of membership in May 2024. We have not included Malta and Cyprus in the report, due to the size and specificities of these island states. At the same time, to emphasise the absence in the report of Romania and Bulgaria, which joined the EU in 2007, we do not refer to the region under study as Central and Eastern Europe, but simply as Central Europe.

In the first part of the report, we present calculations on counterfactual scenarios for the region, attempting to quantify the benefits of membership against the potential path of economic development without EU membership. The remainder of the report contains historical data ranging from an indication of the parameters for narrowing the development gap with Western Europe, trade and investment data, social development, and quality of life issues to the development of the digital economy and environmental issues. In this way, we aimed to present the region's transformation in a nutshell and to indicate its current place on the European map.

# Cumulative benefits of accession

**The real GDP per capita at purchasing power parity (PPP) of the EU-8 countries is 27% higher than it would have been had the Central European countries not joined the EU.** This is how much the region's economies outperformed compared to the alternative counterfactual scenario determined by the synthetic control method. It is apparent that there was a decline in growth associated with the 2008 financial crisis, which affected income growth in the region compared to alternative growth paths. However, from 2014 onwards, the EU-8 achieved significantly higher growth than countries would have achieved in the counterfactual scenario.

**Figure 1. Real GDP per capita PPP of the EU-8 countries compared to the counterfactual scenario (in USD) from 1995 to 2022**

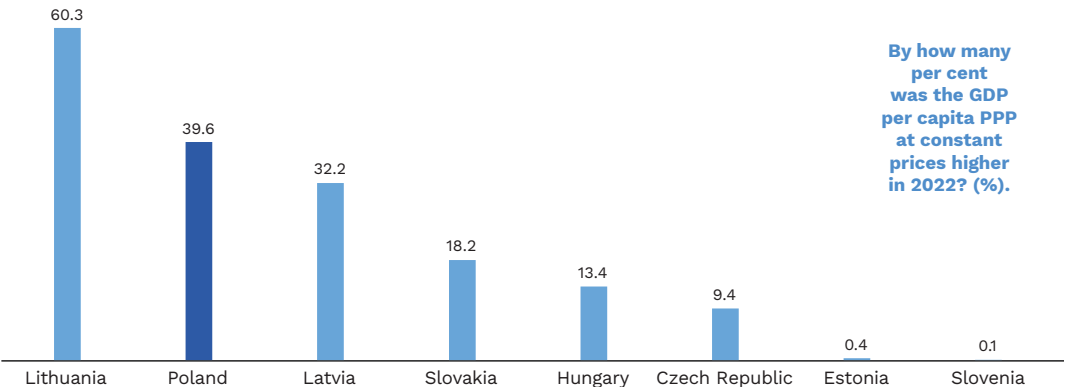


Source: prepared by PEI based on World Bank data (2024).

Slovenia and the Czech Republic, i.e. countries that were at a higher level of development before accession than others from the region, have benefited less from integration than the other countries. **Lithuania, Poland and Latvia benefited the most from the 2004 enlargement, while Slovenia and Estonia benefited the least, having developed at the same rate as before joining the EU, according to the study.**



**Figure 2. Ratio between the GDPs per capita PPP at constant prices in 2022 of individual EU-8 countries and the counterfactual (%)**



Source: prepared by PEI based on World Bank data (2024).

**Compared to other countries in the world, for the region, as well as for Poland, the period from 2004 to 2022 was a period of tremendous economic success.** Regardless of the variables considered to shape the similarity, the list of countries that could form a counterfactual development scenario or the period determining such a scenario, Poland benefited significantly from accession.

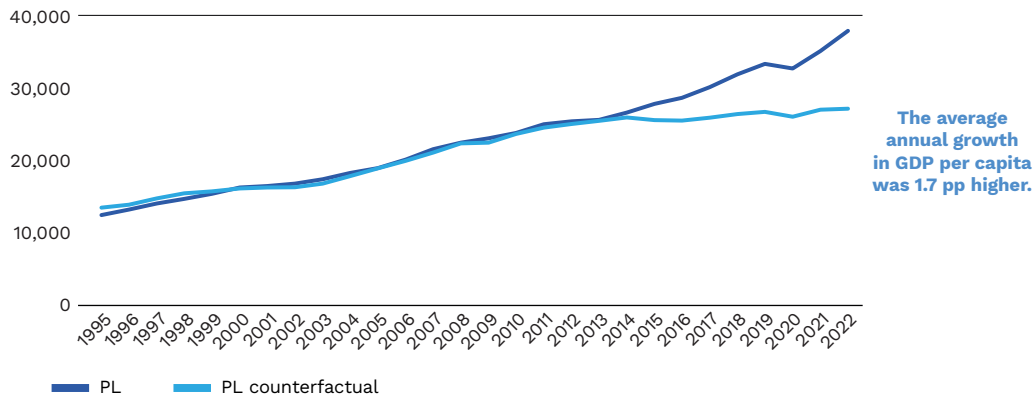
**According to the synthetic control model prepared, Poland's GDP per capita in 2022 was 40% higher than in the alternative scenario of no EU accession.**

This means that the average annual growth of GDP per capita PPP between 2004 and 2022 was 4.2%, 1.7 pp higher than if Poland had sought to develop outside the EU. If it had remained outside the EU, the Polish standard of living, as measured by GDP per capita, would have remained at 2014 and 2015 levels.

The synthetic control method assumes the creation of a counterfactual scenario based on the reproduction of the surveyed unit from among units with similar characteristics and statistically adjusted weights in relation to this similarity. **A counterfactual indicator (here GDP per capita), e.g. of Poland, is composed of data for several countries with appropriate weights assigned to them in the study and creates a 'synthetic' Poland of the same value (in this case GDP per capita) at the time before accession.**

More information on the advantages and constraints of the synthetic control method can be found in the methodological appendix.

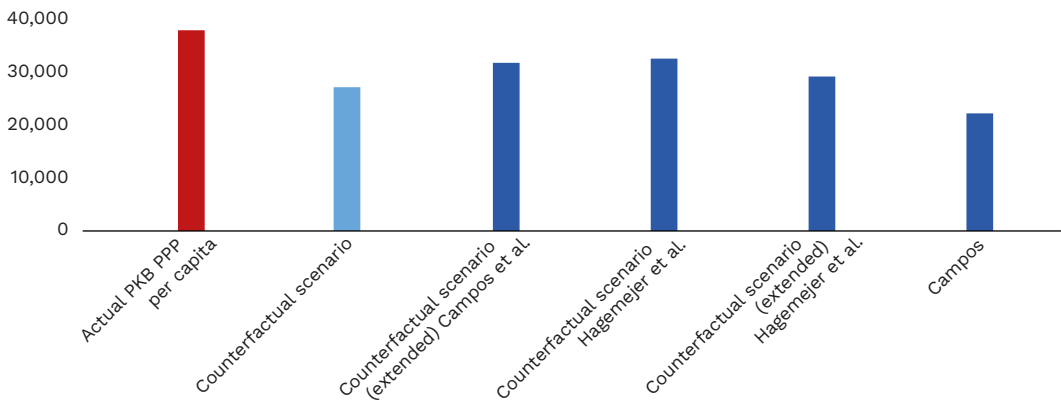
**Figure 3. Comparison of Poland's actual real GDP per capita PPP and the counterfactual scenario from 1995 to 2022**



Source: prepared by PEI based on World Bank data (2024).

**Previous studies using the synthetic control method have also indicated that Poland has benefited greatly from accession.** The 2019 study (Hagemejer, Michalek, Svatko, 2021) yielded results of between more than 20% and more than 50% higher GDP per capita PPP achieved by 2019 as compared to the counterfactual scenario. Using the country weights calculated in the counterfactual scenario at the time for the World Bank data used in this report, Poland's GDP per capita was 30–71% higher than in the scenario in which the country had not joined the EU.<sup>1</sup>

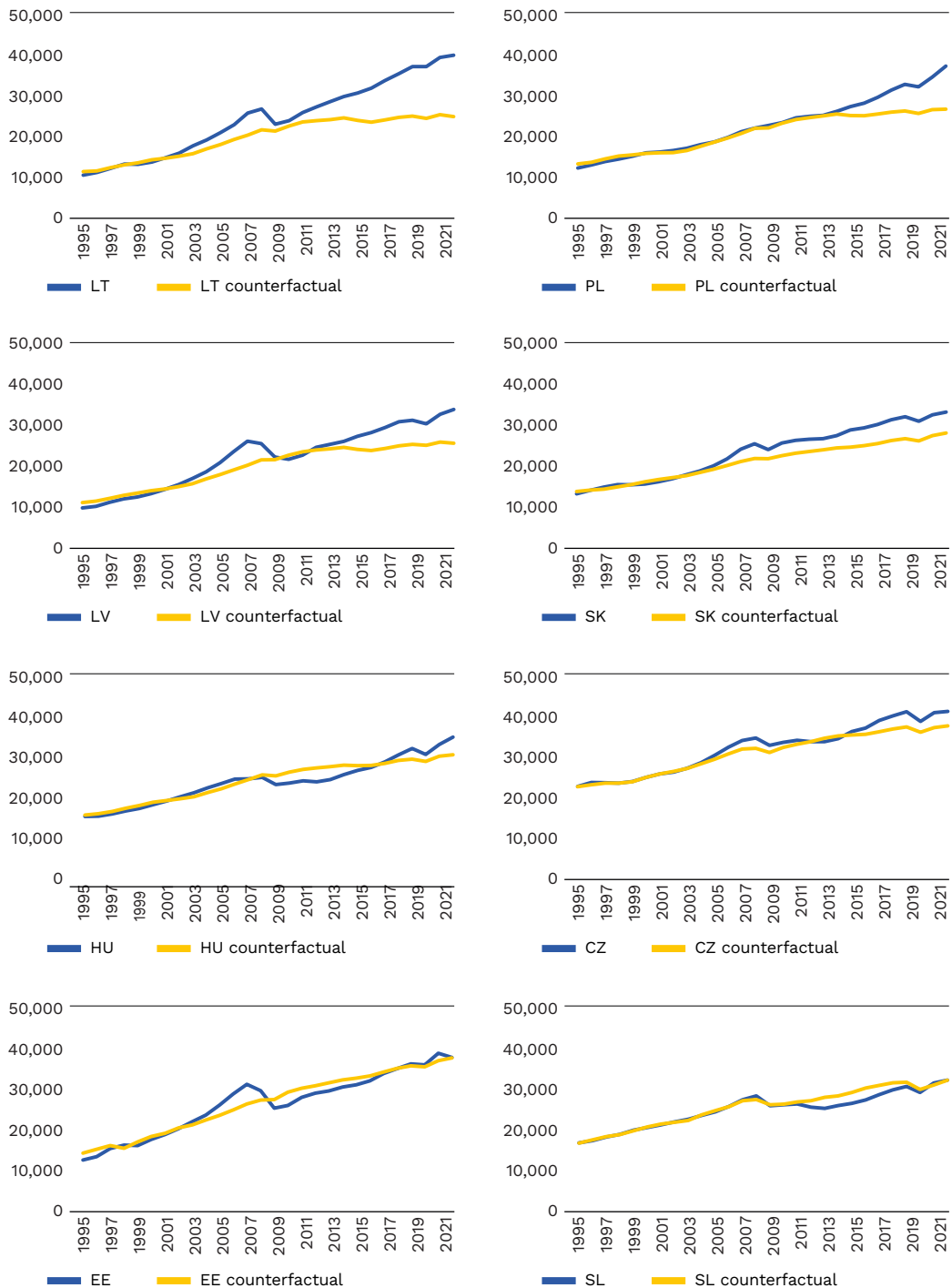
**Figure 4. Comparison using counterfactual scenario weights for Poland from other synthetic control studies**



Source: prepared by PEI based on World Bank (2024) and (Hagemejer, Michalek, Svatko 2021; Campos, Coricelli, Moretti, 2019).

<sup>1</sup> The authors of the 2019 publication worked on GDP per capita PPP from the Penn World Tables database.

**Figure 5. Development paths of the EU-8 countries' actual real GDP per capita PPP and counterfactual scenario from 1995 to 2022**



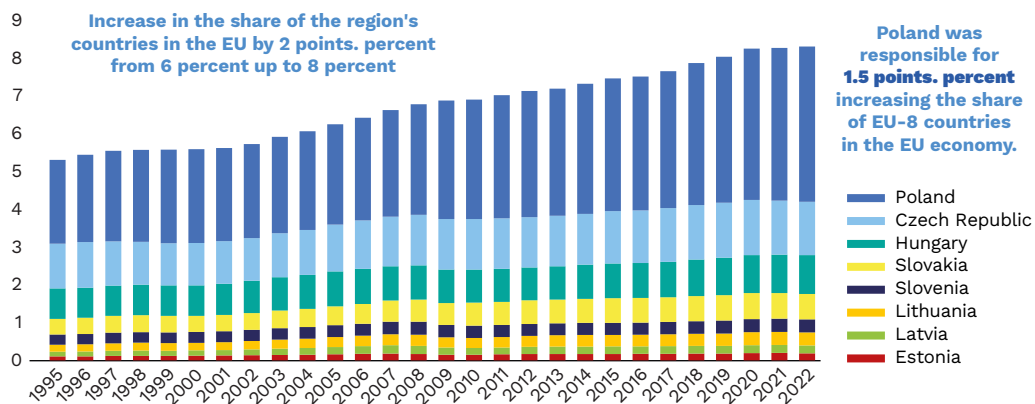
Source: prepared by PEI based on World Bank data (2024).

# Convergence – narrowing the income gap

The results of the synthetic control study are consistent with the conclusions of the analyses of macroeconomic indicators achieved by the countries of the region. The EU-8 grew faster than the EU average and rich countries – such as Germany – thus narrowing the development gap.

The share of the CEE economies (GDP in constant 2015 prices) in the EU increased by more than 2 pp during their membership – from 6% to 8%. Poland was responsible for two-thirds of the total recorded increase. This means that the GDP of these countries, stripped of the effect of price increases, grew faster than the EU average. The share of EU GDP, when price changes are taken into account, also rose to 8.5%, an increase of 3 pp.

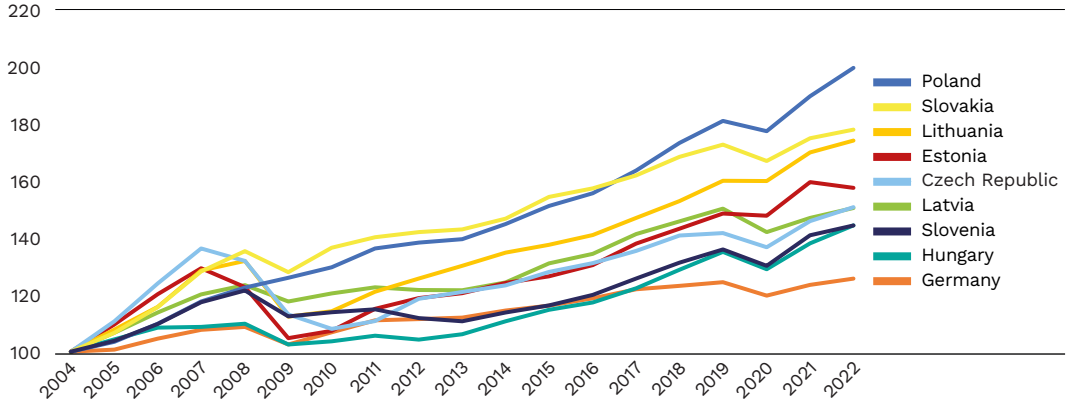
Figure 6. Convergence of EU-8 countries compared to EU-27 GDP 1995-2022



Source: prepared by PEI based on World Bank data (2024).

Every country in the region recorded a higher growth rate than Germany. Poland's GDP grew the fastest, doubling between 2004 and 2022, similarly to Slovakia and Lithuania. Apart from Hungary and Slovenia, which recorded growth of 44%, the GDP of all other countries grew by at least 50%.

**Figure 7. GDP growth rates for EU-8 countries and Germany at 2015 constant prices (2004 = 100)**

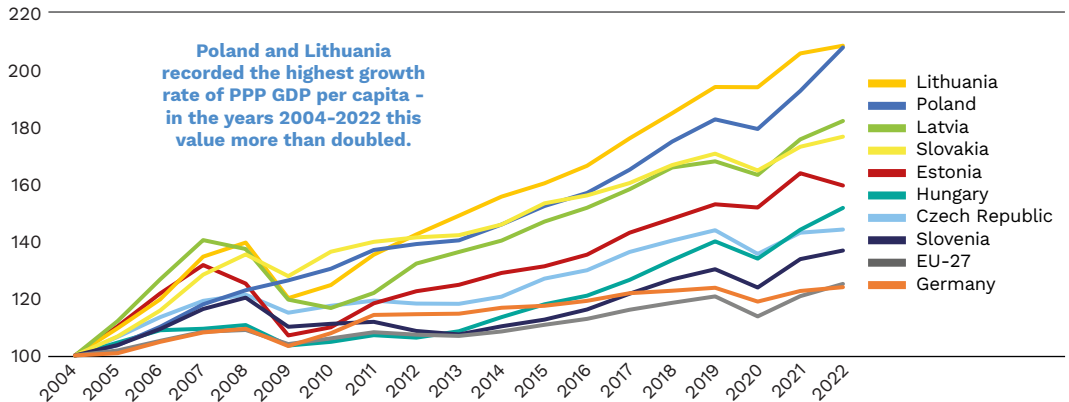


Source: prepared by PEI based on World Bank data (2024).

**Also, GDP measured in purchasing power parity per capita shows a clear increase, the strongest - more than double - for Poland and Lithuania.**

The rate of growth compared to 2004 was the lowest for those countries that recorded the highest GDP per capita PPP values in the year of accession to the EU. Slovenia and the Czech Republic could boast less than 50% growth. At the same time, GDP per capita PPP best illustrates the narrowing of development gaps.

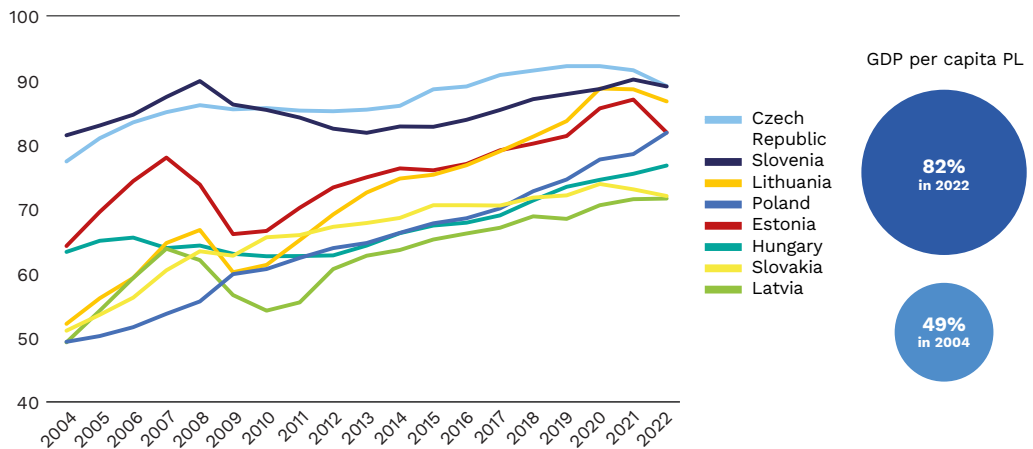
**Figure 8. GDP per capita growth rate by purchasing power parity (constant prices) 2004-2022 (2004 = 100)**



Source: prepared by PEI based on World Bank data (2024).

The income gap has been shrinking markedly among all the countries that joined the EU in 2004, with the average GDP per capita PPP for the eight countries increasing by 37%. Latvia and Slovakia are countries with a development gap of almost 30 pp compared to the EU-27 average, but have narrowed the gap over two decades by more than 20 pp. The lowest rate of convergence has been recorded by Slovenia and the Czech Republic, whose GDP per capita PPP level in 2022 was almost 90% of the EU average. Lithuania and Poland made the biggest leap in development by reducing the income gap by 35 pp and 33 pp respectively.

**Figure 9. Convergence of EU-8 countries compared to EU-27 GDP (GDP per capita, constant prices)**

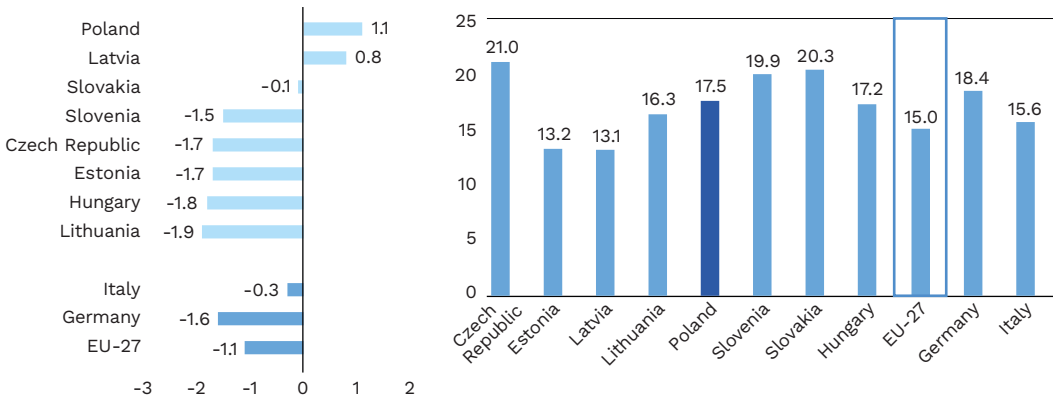


Source: prepared by PEI based on World Bank data (2024).

**An important aspect of the convergence taking place is that, although GDP grew faster than the EU average and there was a reduction in the income gap, there was no structural convergence.** The structure of the economy in terms of Krugman's specialisation index remained similar and there was no bridging of differences within the EU, including between the countries of the region and the EU centre. This means that the specialisations of individual industrial or service sectors of the EU-27 economies remained similar, without the development of other sectors of economic activity in Central Europe.

**Only Poland and Latvia increased the share of manufacturing value added in GDP.** The remaining countries, apart from Slovakia, recorded a decline even greater than the EU average, Germany or Italy. At the same time, there was strong growth **in industrial** employment among the EU-8. A comparison with the average value of the share of industrial production in GDP shows that, apart from Latvia and Estonia, the importance of this activity is higher than the EU average.

**Figure 10. Change in the share of value added produced in industrial production between 2004 and 2022 (in pp) and the share of value added produced in industrial production in 2022**

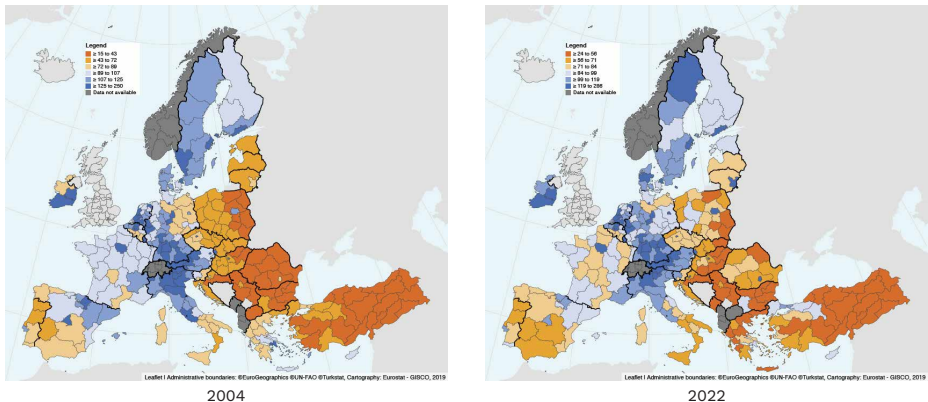


Source: prepared by PEI based on Eurostat (2024).

## Convergence at regional level

**The vast majority of regions in the EU-8 countries were characterised by high development dynamics compared to the EU as a whole. The improvement was achieved especially by metropolitan regions located around or in close proximity to national capitals** (Warsaw, Prague, Bratislava, Budapest, Ljubljana) and those with a more favourable location (proximity to other developed regions). It is worth recalling that, as of the date of accession, all regions of the EU-8 countries were eligible for support from the Structural Funds (see more in the next chapter).

**Map 1. GDP per capita by purchasing power parity by region in 2004 and 2022  
(as % of EU-27 average)**

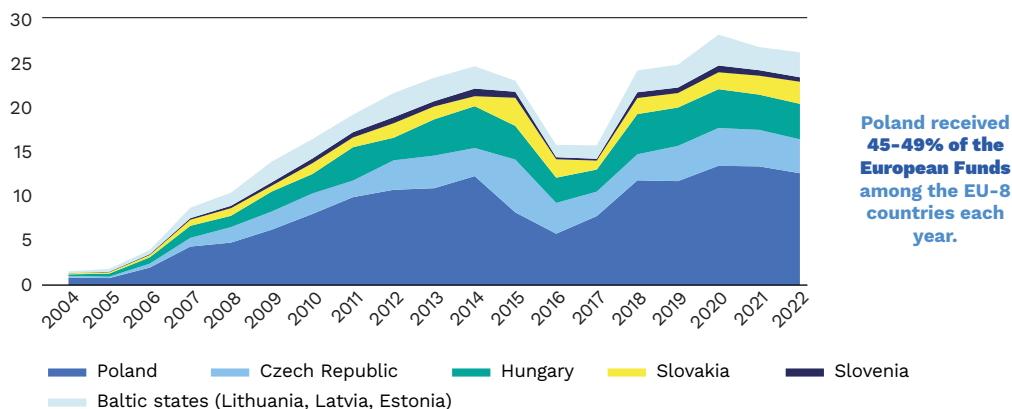




# Development support from European Funds

Poland and the other countries of the region have developed thanks to economic integration into the Single European Market and the impact of reforms resulting from accession. In addition, integration into EU structures has resulted in a significant inflow of funds supporting local investment potential. According to the European Commission (2024a), between 2004 and 2022 the EU-8 countries received a total of EUR 329 billion under structural policy, the vast share of which (47%) went to Poland. The share of these funds in the weighted average GDP of the EU-8 after 2007 ranged from 1.2-2.8%. For Poland it was 1.3-3% of GDP. For the period 2021-2027, in turn, almost EUR 150 billion is planned for the EU-8 countries. In the context of this amount, however, it is important to bear in mind the prospect of a gradual reduction in aid and a shift in the focus of structural intervention in favour of regions from countries that joined the EU later.

Figure 11. Inflows of funds to the EU-8 under structural policy 2004-2022 (in billion EUR)



Source: prepared by PEI based on data from the European Commission (2024a).

Projects implemented with European Funds have, in a relatively short period of time, noticeably contributed to, among other things, the modernisation of infrastructure and institutions, support for regional development, the potential and profitability of farms and small and medium-sized enterprises

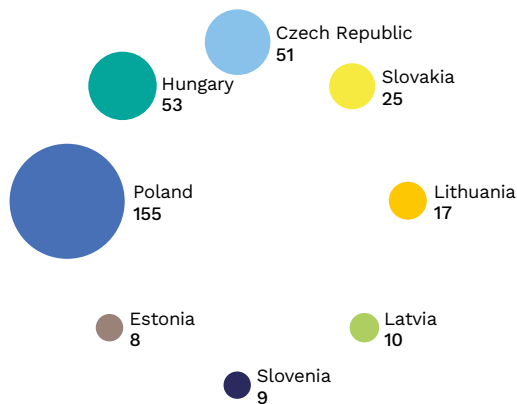
**as well as support for disadvantaged people in the labour market.** From the perspective of everyday life, they represent the most tangible effects of EU membership, consolidating the practical significance of integration ideas (Borz, Brandenburg, Mendez, 2022).

**Table 1. Inflow of European Structural Funds to the EU-8 countries from 2004 to 2022 (in billion EUR)**

State	2004–2006		2007–2013		2014–2020		2021–2022	
	amount	percent of GDP	amount	percent of GDP	amount	percent of GDP	amount	percent of GDP
Czech Republic	0.8	0.1	15.9	1.4	26.3	1.9	7.9	1.5
Estonia	0.3	0.4	3.3	2.9	3.4	2.0	1.4	2.1
Hungary	1.2	0.2	17.4	2.4	27.0	3.1	7.9	2.4
Lithuania	0.4	0.4	7.1	3.3	7.0	2.3	2.5	2.0
Latvia	0.3	0.4	4.0	2.7	4.6	2.4	1.5	2.1
Poland	3.6	0.2	54.7	2.2	70.6	2.2	25.8	2.1
Slovakia	0.5	0.2	7.5	1.6	12.7	2.1	4.6	2.2
Slovenia	0.2	0.1	3.2	1.3	4.0	1.3	1.1	1.0
EU-8 total	7.3	0.2	113.1	2.0	155.7	2.2	52.8	2.0

Source: prepared by PEI based on data from the European Commission (2024a) and Eurostat (2024).

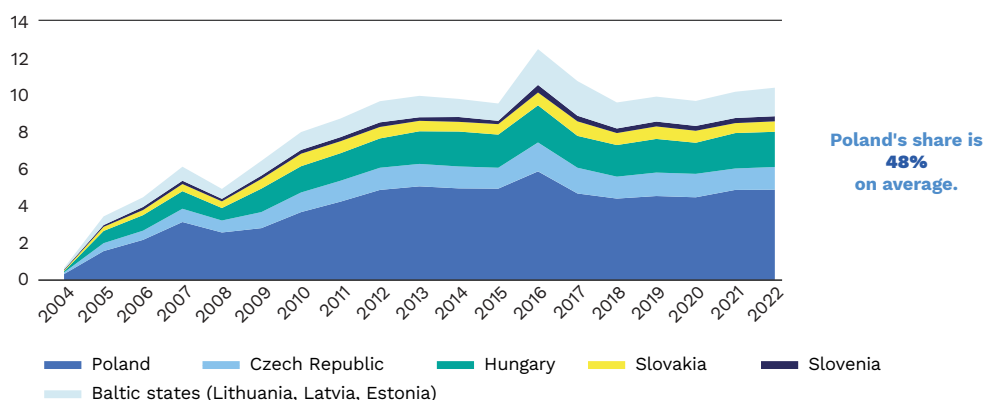
**Infographic 1. Inflow of European Funds to the EU-8 countries under the structural policy for the period 2004-2022 (in billion EUR)**



Source: prepared by PEI based on data from the European Commission (2024a).

**The inflow of agriculture-related funds for the EU-8 region between 2004 and 2022 amounted to just over EUR 154 billion (of which Poland received EUR 73.5 billion).** The share of the EU-8 countries in the EU budget has increased gradually: from 7% in 2005 to 17-19% in 2020-2022. The main direction of the changes in the funding of the Common Agricultural Policy is increasingly shaped by the environmental protection, food security, sustainable use of resources and multifunctional development of rural areas aimed at income diversification.

**Figure 12. Funding for agriculture for the EU-8 over the period 2004–2022 (in billion EUR)**



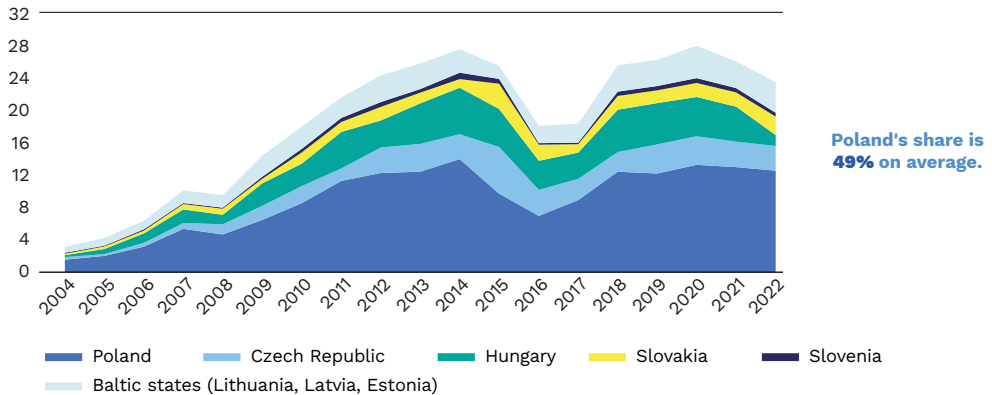
Source: prepared by PEI based on data from the European Commission (2024a).

**The EU-8 region is among the net beneficiaries of the EU budget. The total amount of funding for the years 2004–2022 reached almost EUR 355 billion (of which almost EUR 170 billion went to Poland).** At the same time, it is worth noting that the EU-8 national contributionst, in absolute terms in 2004–2022, increased more than fourfold to EUR 12.1 bn annually (including Poland's EUR 5.8 bn). This represents an increase in the EU-8 countries share in the financing of the EU budget from just under 3% to 5% in 2022. On the expenditure side, on the other hand, the share of the EU-8 countries grew dynamically in the first years of membership: from 6% in 2004 and 13.6% in 2008 to a peak of 24.5% in 2014, then falling steadily to 14.6% in 2022. Poland's share in the EU-8 expenditures usually did not exceed half of the total funds spent.

**The experience of the COVID-19 pandemic and the Russian aggression of Ukraine have caused that the EU budget has been turned into an instrument to cushion global and regional challenges.** For this reason, new sources of revenue are being sought. These are, or are expected to be: taxes on fossil fuels, profits from emissions trading, resources generated by the EU's CO<sub>2</sub> border price adjustment mechanism (CBAM) and revenues from the taxation of multinational corporations (European Parliament, 2024). This should

ensure that national contributions, which are lengthy and difficult to negotiate, will not increase. This is supposed to allow the European Union to have more fixed revenues, which at the same time may distort the equal contributions of the Member States, determined by their GNI.

**Figure 13. Net financial position of EU-8 countries in the EU budget 2004-2022 (in EUR billion)**



Source: prepared by PEI based on data from the European Commission (2024a).

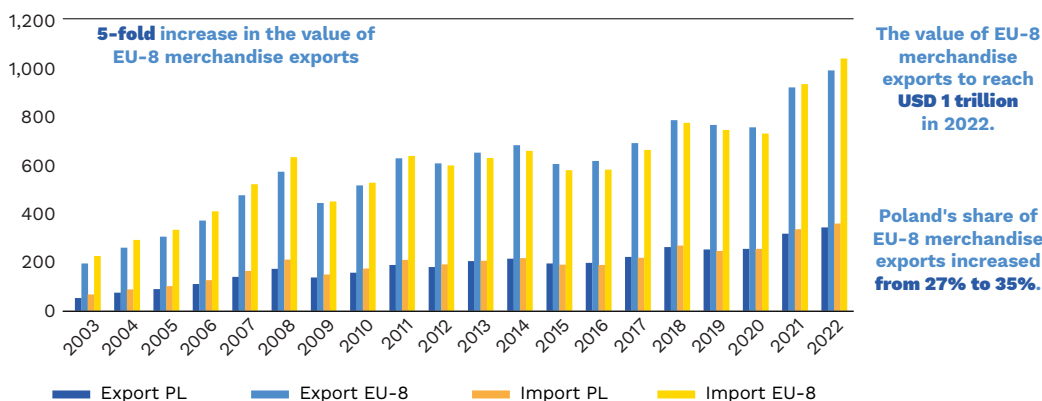
**It is worth remembering that the EU budget is not a zero-sum game. By avoiding simple divisions into net beneficiaries and net contributors, it is possible to draw attention to more than just the direct effects.** Shortly after the Eastern enlargement, its positive impact "lifting all boats" was accentuated, with estimations of around +1% of real GDP for Germany and the UK (Baas, Brücker, 2009). It is therefore important to take into account the cross-border nature of the impact of the European Funds, especially in terms of the benefits for the functioning of the Single Market and thus the further strengthening of economic ties. Similarly, the benefits for the countries of the region from EU membership extend significantly beyond the Funds themselves.

# International cooperation

## Trade development

**EU membership translated into a fivefold increase in the value of total EU-8 exports between 2003 and 2022 (10% in average per annum).** The above-average pace of this growth is evidenced by the growing importance of the region in global exports - from 2.6% to more than 4%. Imports grew slightly less, by more than 4.5 times (9.5% in average per annum). Furthermore, between 2013 and 2020, the EU-8 countries recorded a trade surplus, reaching more than USD 35 billion in 2016, mainly due to the Czech Republic, Hungary, and Poland. In addition, the ratio of the value of exports and imports to GDP, that measures the openness of the economy, for all countries, except Poland, exceeded 100% (the value for the EU-8 in 2022 is 137%).

**Figure 14. EU-8 countries' merchandise exports and imports (in USD billion) from 2003 to 2022**



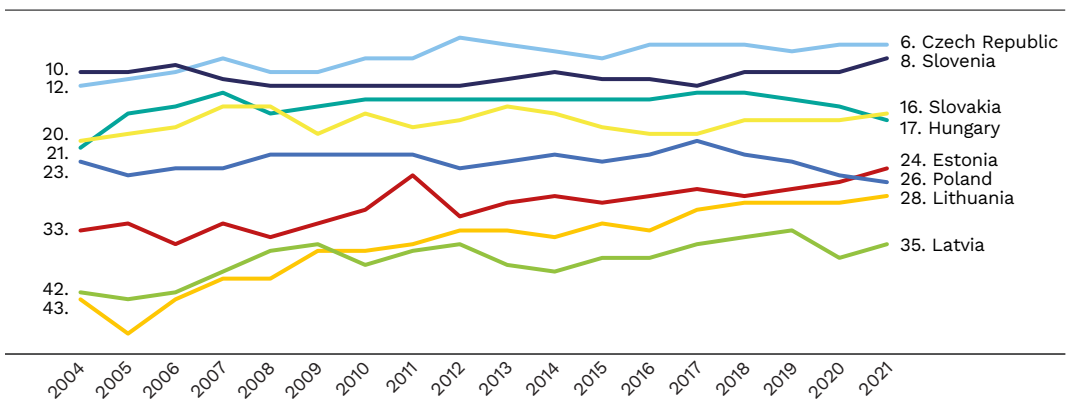
Source: prepared by PEI based on ITC data (2024).

**The exports of the EU-8 countries are highly diversified and thus not dependent on a single sector.** This is illustrated by the Herfindahl-Hirschmann Index (HHI), a popular statistical measure, with a value below 0.1 indicating low concentration and above 0.18 indicating high concentration. In the case of the EU-8, the HHI was consistently below 0.02 throughout membership.

Due to the dominance of the V4 countries (Czech Republic, Hungary, Poland, Slovakia; about 85-87% of EU-8 exports), machinery (HS 84), electrical and electronic goods (HS 85) and transport equipment, its parts and accessories (HS 87) were among the main commodity groups defining export specialisation. The combined share of these three categories oscillated between 43-47%, in line with trends characteristic of global exports. In the case of the Baltic States, the importance of the fuel industry (HS 27) and the pharmaceutical sector (HS 30) in Slovenia should also be pointed out.

**During the period of EU membership, the economic complexity of the EU-8 countries' merchandise exports has steadily increased. Higher values of the economic complexity index (ECI) mean that export-led production has been created with more advanced skills and unique knowledge.** High complexity is also considered a good indicator of future growth and development, as the economy has the skills to produce many advanced goods (Maličká, 2024). Data from Harvard AEC (2024) shows that the Czech Republic, Slovenia, Hungary, and Slovakia were among the 15 countries with the highest ECI values. Poland remained virtually unchanged in its position, while the Baltic States strongly improved their scores and qualified for the top 40.

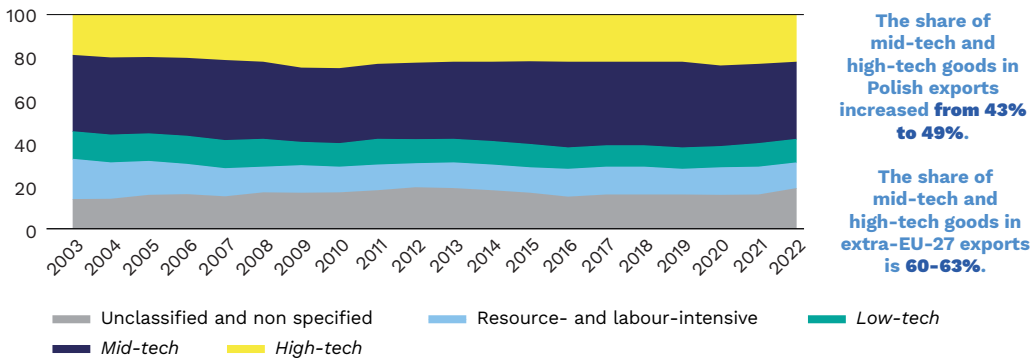
**Figure 15. Position of EU-8 countries in the export economic complexity ranking 2004-2021**



Source: prepared by PEI based on data from AEC Harvard (2024).

**The aforementioned trend was accompanied by an expected change in the technological sophistication of EU-8 exports: the share of mid-tech and high-tech goods increased from 54.6 to 58.5% (the highest shares were recorded by Hungary, Slovenia, the Czech Republic and Slovakia).** Applying this measure to extra-EU-27 exports, i.e. excluding intra-EU-27 trade, indicates the existence of a technology gap characteristic of catching-up economies.

Figure 16. Technological sophistication of EU-8 countries' merchandise exports 2003-2022 (share in %)

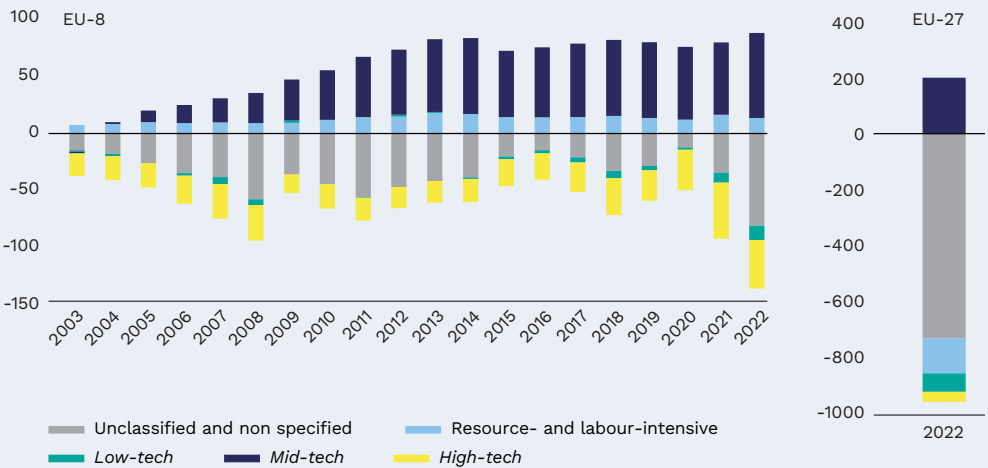


Source: prepared by PEI based on ITC data (2024).

At the same time, the structure of the trade balance indicates the consolidation of the EU-8's competitive advantages in the group of mid-tech and resource- and labour-intensive goods, in which the region recorded a sustained surplus. Deficits, on the other hand, invariably occurred in the group of high-tech, low-tech and unclassified and other goods (including raw materials). These are categories whose competitiveness depends either on advanced advantages and innovative capabilities (high-tech) or low production costs (low-tech).

In the Polish commodity trade in 2022, the surplus in the mid-tech group amounted to a record **USD 20 billion**, and in the raw material and labor-intensive group - **USD 8.4 billion**

Figure 17. Structure of the EU-8 merchandise trade balance (in USD billion) from 2003 to 2022 and EU-27 in 2022

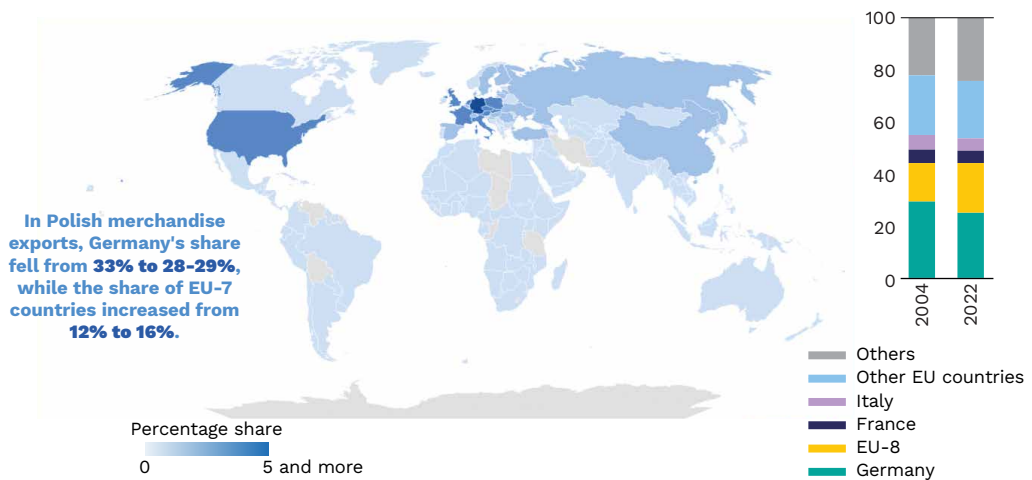


Source: prepared by PEI based on ITC data (2024).

The EU-27 as a whole, in terms of extra-EU trade, had a clear and sustained competitive advantage in the mid-tech goods group, but no such advantage in high-tech goods, which in turn may explain the strong shift towards an active industrial policy.

**Geographically, merchandise exports from the EU-8 went predominantly to the EU-27 (with shares fluctuating in the range of 71-79%), mainly to Germany (24-26%)** (Ambroziak et al., 2022). Moreover, the links in exports between individual EU-8 countries strengthened during the period of membership, from 13.5% in 2003 to over 19% in 2022 (Ambroziak et al., 2020a).

**Map 3 and Figure 18. EU-8 countries' merchandise exports destinations in 2022 (percentages)**

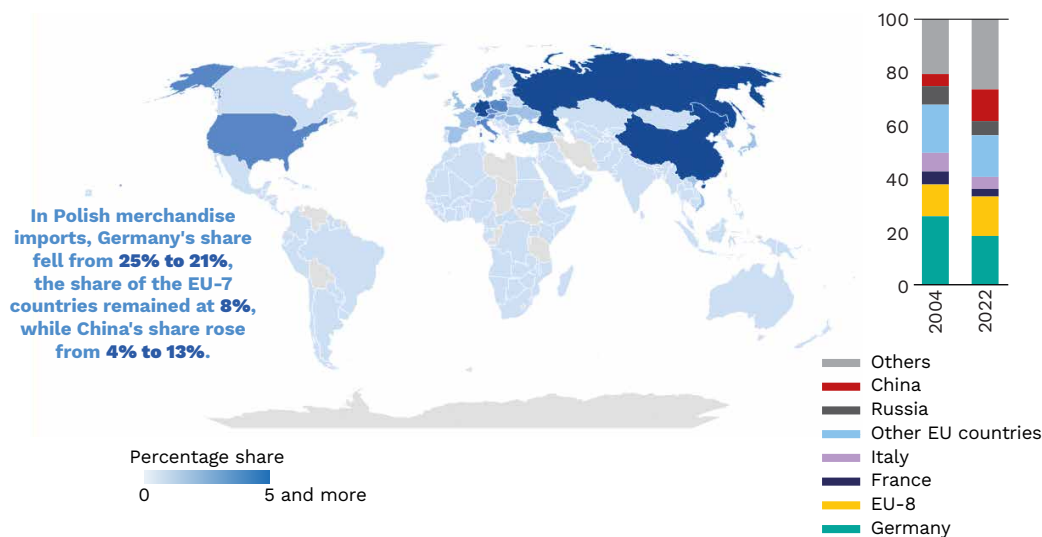


Source: prepared by PEI based on ITC data (2024).

In turn, imports were also dominated by the EU-27 countries, although their share decreased from 65.7% to 56.2% (including Germany from 25% to 18%), while the share of imports of the EU-8 countries increased from 11% to 15%. Russia's share as a trading partner increased until 2012, when it reached 11%, but decreased to only 5.3% from 2014 to 2022. China, on the other hand, grew in importance (from 4.6% to 12%).



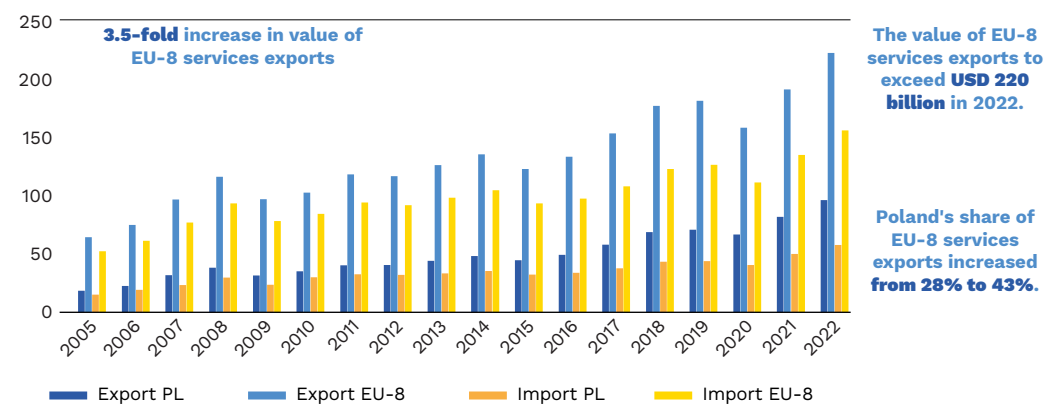
Map 4 and Figure 19. EU-8 countries' merchandise imports destinations in 2022 (percentages)



Source: prepared by PEI based on ITC data (2024).

**International trade in services also has been developing dynamically, as the value of EU-8 exports and imports increased 3.5 times between 2005 and 2022. The share of the EU-8 countries in global trade increased from 2.5% to 3.1%**, accompanied by a sustained increase in the trade surplus to above USD 66 billion in 2022. The structure of exports was mainly dominated by transport services (over 30% after 2020, mainly due to the importance of Poland). In addition to this, the share of other business services grew steadily (from 12% in 2005 to 23% in 2022) and ICT services (from 4% to over 14%; Michalski et al., 2023), requiring a more intensive use of human capital and advanced skills, which is one of the prerequisites for growing shares of domestic value added and for strengthening innovation in the long term.

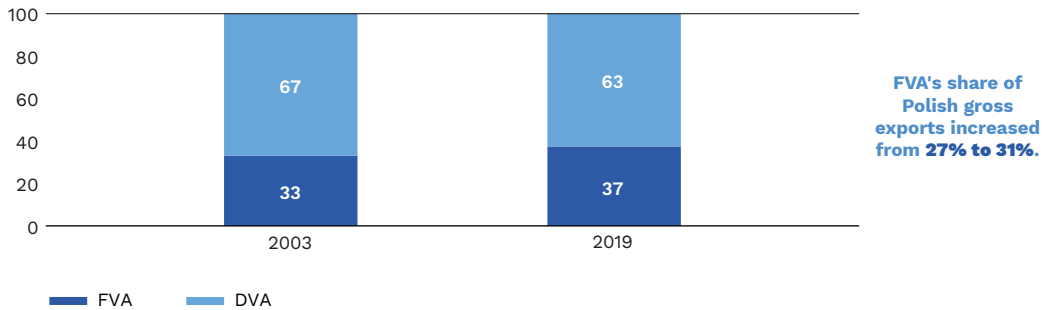
Figure 20. EU-8 exports and imports of services (USD billion) 2005-2022



Source: prepared by PEI based on ITC data (2024).

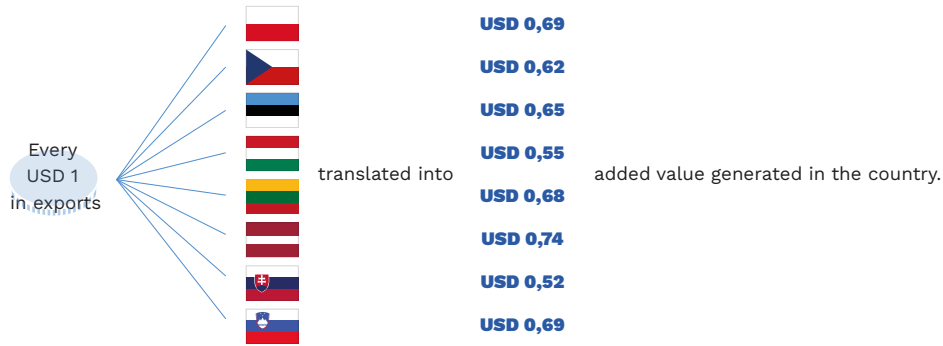
**The trade success of the EU-8 was also strongly linked to the integration of EU-8 economies into regional and global value chains** (OECD, 2024). The role of the EU-8 is evidenced by the growing shares of foreign value added in gross exports, which took place both in the pre-accession period (from 25% to 33%) and already within membership (from 33% to 37%). Moreover, the share of intermediate exports in total gross exports remained at 59-62% (2003-2020; in the pre-accession period 56-60%). This means that the domestic value added generated by the EU-8 economies went to final consumers not only directly, but also through other EU countries.

Figure 21. Change in the share of domestic and foreign value added in gross exports of EU-8 countries from 2003 to 2019 (%)



Source: prepared by PEI based on OECD data (2024).

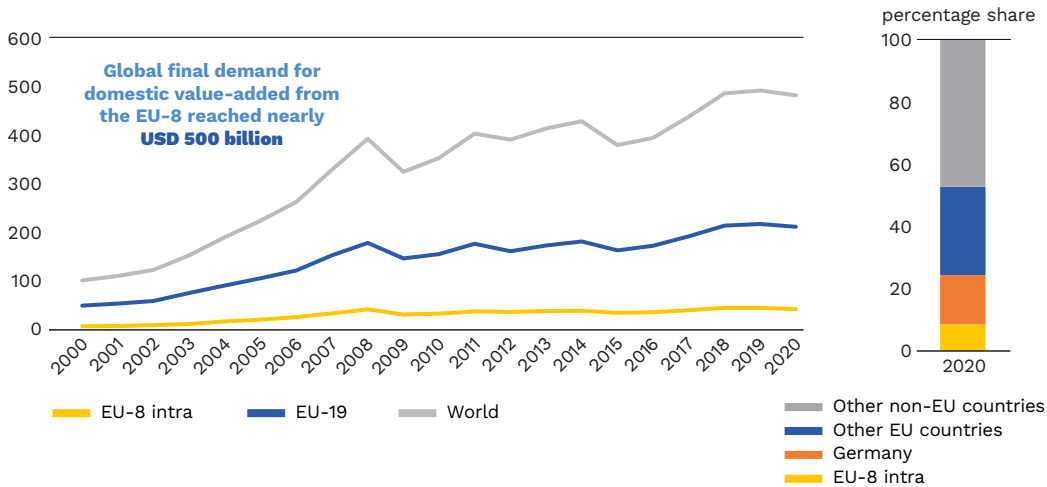
In 2020, the level of national value added contained in exports varies from country to country:



**The geographic structure of final consumption of value added produced in the EU-8 countries gradually diversified.** Still, albeit with a gently declining trend, domestic value added was mainly consumed within the EU single market (down from 56% to 53%; in the case of Poland, down from 65% to 56%). Moreover, between 2000 and 2020, the share of Germany decreased significantly from 22% to 16% (in the case of Poland, from 30% to 18%), while the share of intra-EU-8 final consumption remained stable (around 8-9%, while 7-8% for Poland).

**EU-27 final demand for Polish value added reached USD 111 billion**

**Figure 22. Final demand for domestic value added produced in the EU-8 countries (USD billion), 2000-2020**



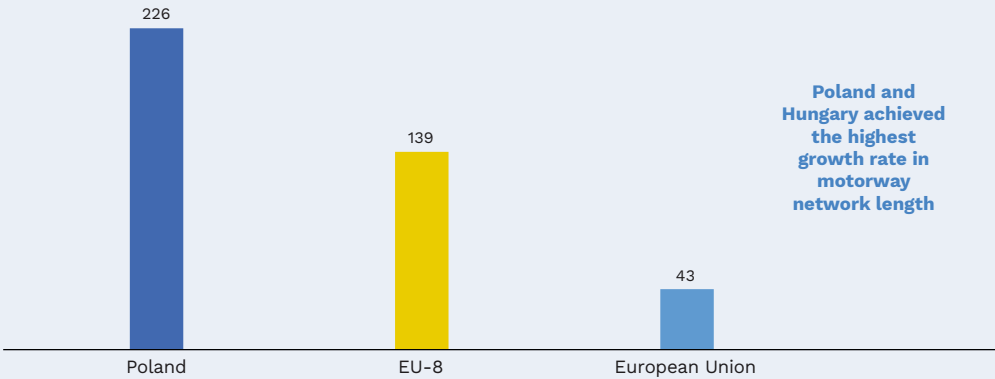
Source: prepared by PEI based on OECD data (2024).

The most important structural challenge of the EU-8 economies remains the pursuit of narrowing the technology gap, strengthening economic complexity, searching for unique areas of advanced specialisation, and shifting position in global and regional value chains towards capital- and knowledge-intensive stages, including the production of final goods. These are characteristics of the so-called middle-income trap and the sub-supplier economy phenomenon (Ambroziak et al., 2020b; Błaszczuk-Zawiła et al., 2019). No less important is the further strengthening of cooperation in the region and the geographical diversification of exports.

**Improving the quality of infrastructure in the EU-8 makes the region more attractive for investment**

In the entire group, the size of motorways (measured in km) increased by almost 140% between 2004 and 2022. The greatest increase took place in Poland and Hungary, where the motorway network increased by more than 225% in relation to the year of accession to the EU. Despite increased investment in infrastructure and a greater than average increase in the length of motorways, the EU-8 countries are outside the top EU countries in terms of motorway network density. Of the entire group, only Slovenia is in the top ten with more than 30 km of motorways per 1,000 km<sup>2</sup> in 2021.

**Figure 23. Increase in the length of the motorway network (%)**

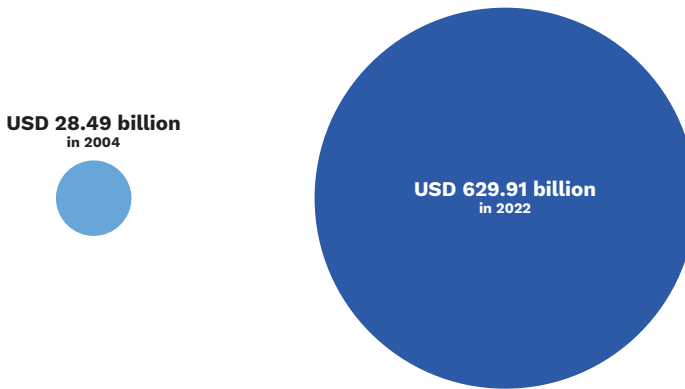


Source: prepared by PEI based on Eurostat data (2024).

# Foreign direct investment

**The accession of the EU-8 countries in 2004 has been a strong catalyst for foreign direct investment (FDI) inflows.** Since 2004, they have attracted nearly USD 630 billion of foreign investment, with two-thirds of these inflows attributable to two countries – Poland (USD 279 billion) and the Czech Republic (USD 136 billion). The FDI liabilities of the EU-8 countries in relation to the EU-14 countries increased slightly over the analysed period, from 5.85% in 2004 to 6.6% in 2022. At the same time, in 2001, the share of FDI liabilities of the entire Union was 4.6%. This indicates the important fact that foreign investors were already discounting the enlargement of the Union to a large extent in the pre-accession period (Kaminski, 2001; Egger, Pfaffermayr, 2004).

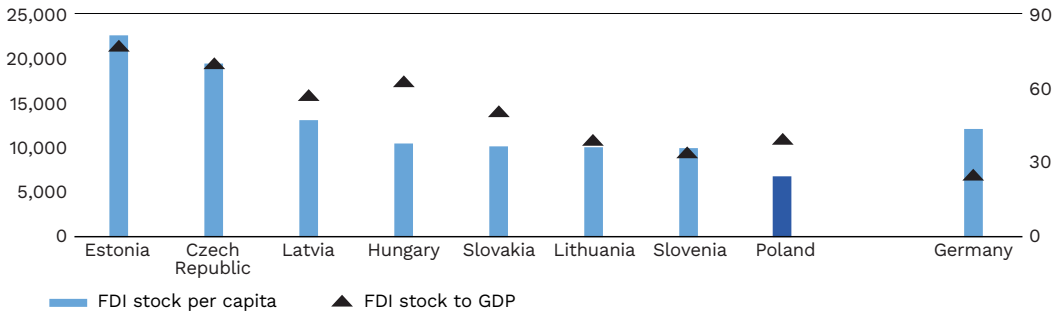
**Figure 24. Cumulative FDI inflows in EU-8 countries – 2004 vs 2022**



Source: prepared by PEI based on UNCTAD (2024).

**In relative terms, larger economies such as Poland attract less investment than small economies such as Estonia or Latvia.** At the same time, FDI intensity ratios (in terms of FDI stock) for individual countries in the region do not differ significantly (excluding the Netherlands, Ireland, Luxembourg or Cyprus, where values are inflated due to round-tripping). The highest FDI intensity is observed in Estonia and the Czech Republic – both in relation to GDP and per capita. Poland ranks last in terms of FDI stock per capita, and Slovenia has the lowest FDI stock in relation to GDP.

**Figure 25. FDI liabilities as a share of GDP (%) and per capita (in USD) in EU-8 countries (in 2022)**

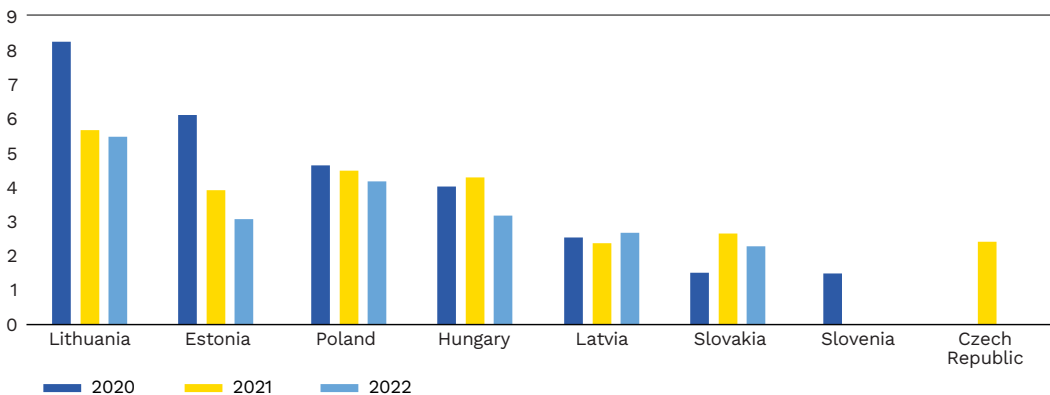


Source: prepared by PEI based on UNCTAD (2024).

**The economies of the eight Central European countries are characterised by high investment attractiveness for greenfield projects.**

This is shown by the FDI greenfield performance indicator, which compares the value of greenfield projects in a given year with the relative size of the economy (a value of 1 means that FDI inflows correspond to the size of the economy in relation to global GDP). This is particularly evident in the case of Lithuania, Estonia, Poland and Hungary, which have ranked high in FDI greenfield performance in recent years. In 2022, two countries - Lithuania and Poland - were in the top 20 of the ranking, ranking 8<sup>th</sup> and 16<sup>th</sup> globally respectively. In 2021, there were four countries in the top 10 (Lithuania - 5<sup>th</sup>, Poland - 8<sup>th</sup>, Hungary - 9<sup>th</sup>, Estonia - 10<sup>th</sup>) and in 2020, as many as five countries were in the top 10 (Lithuania - 2<sup>nd</sup>, Estonia - 5<sup>th</sup>, Poland - 7<sup>th</sup>, Latvia - 8<sup>th</sup> and Hungary - 9<sup>th</sup>). Lithuania was the EU leader in 2020 and 2021 (overtaken by Portugal in 2022).

**Figure 26. FDI greenfield performance index of EU-8 countries in 2020-2022**

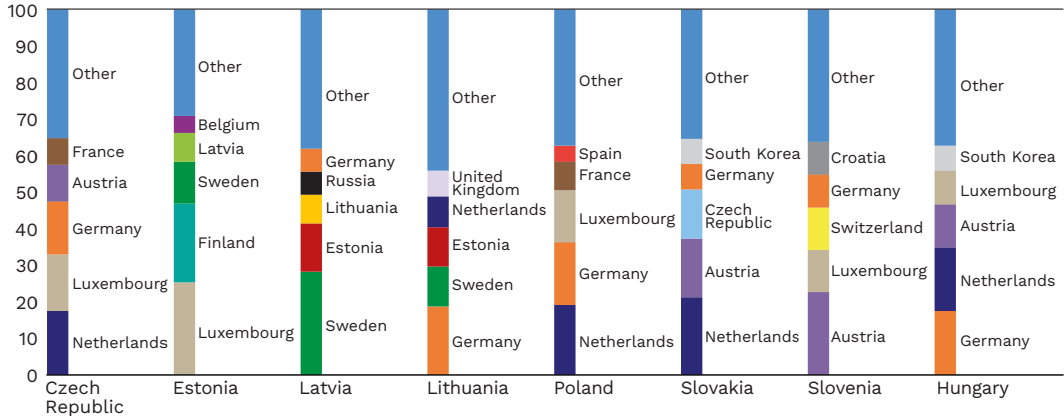


Source: prepared by PEI based on data from FDI Markets (2024).

**The main motives for FDI inflows to countries in the region have been market access (especially in large economies such as Poland) and cost efficiency resulting from low labour costs.**

The structure of FDI inflows is invariably determined by geography. The bulk of investment comes from EU countries - from 69.9% in Hungary to 91.9% in Poland (82% on average). At the same time, geographical proximity and the neighbourhood effect are strong determinants (Serwicka, Jones, Wren, 2022) - e.g. in the Baltic States, a large proportion of investment has flowed in from the Nordic countries, and in Central European countries from Germany and Austria. The Netherlands and Luxembourg also appear among the main investor countries, which is mainly due to the round-tripping phenomenon.

**Figure 27. Geographical breakdown of EU-8 countries' FDI inward stock (as of 2022, %)**

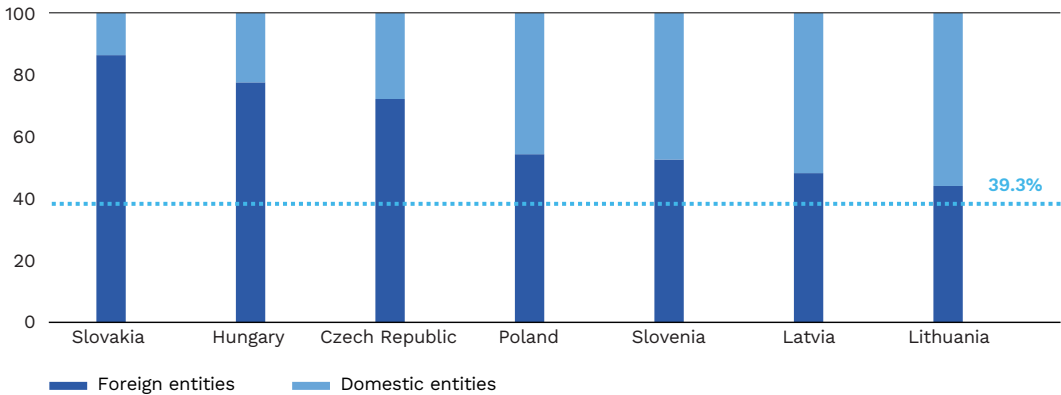


Note: for the Czech Republic and Slovakia, data for 2021 (latest available).

Source: prepared by PEI based on WIIW data (2024).

**The inflow of FDI into the region has - in addition to increasing consumption, among other things - helped to boost exports (Hanzl-Weiss, Jovanović, 2022).** This is reflected in the growing position of foreign-owned companies in export turnover. In almost all countries in the region, the share of such firms in exports is well above the EU average. The effects of FDI also include technology transfer and diffusion, which has contributed not only to productivity growth in the Eight Countries (Bijsterbosch, Kolasa, 2009; Szent-Iványi, Vígvári, 2012), especially within global value chains (Hagemejer, 2015), but also to a transformation of the export structure towards products with higher technological intensity (see above).

Figure 28. Share of domestic and foreign players in EU-8 exports in 2021 vs. EU average



Note: no data available for Estonia.  
Source: prepared by PEI based on UNCTAD (2024).

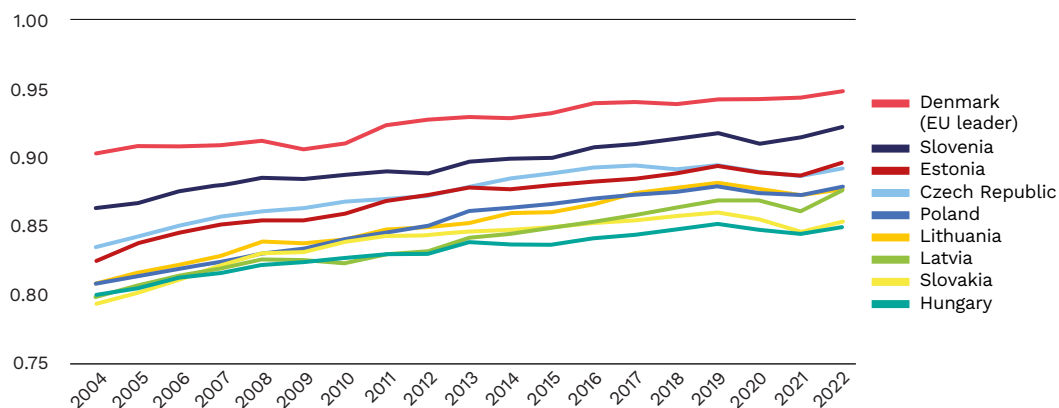


# Social development

## Standard of living - HDI index

**Since accession to the European Union, indicators measuring quality of life have increased significantly in all eight countries of the region.** This includes life expectancy, school enrolment and per capita income levels. Slovenia currently has the highest HDI (23<sup>rd</sup> place) and Hungary the lowest (46<sup>th</sup> place). Poland's HDI score was 0.875, placing it 34<sup>th</sup> out of 191 countries assessed. Declines in HDI values in recent years are the result of the COVID-19 pandemic, which lowered life expectancy across the region - e.g. in 2021 Hungarians lived 2 years less compared to 2019, Lithuanians 2.5 years less and Slovaks as much as 2.8 years less.

**Figure 29. HDI values in Denmark and EU-8 countries, 2004-2022**



Source: prepared by PEI based on: Human Development Report (2024).

**The best performing countries are the Czech Republic, Estonia and Slovenia, with both the longest life expectancy and highest per capita income levels.** Particularly noteworthy is Slovenia, which was already characterised by a relatively high human development index at the time of its accession to the EU, close to the EU average. Slovenians lived an average of 77.5 years in 2004 (after 18 years of integration, only the Czechs were able to achieve such a result).

Table 2. Comparison of HDI components in EU-8 countries in 2004 and 2022

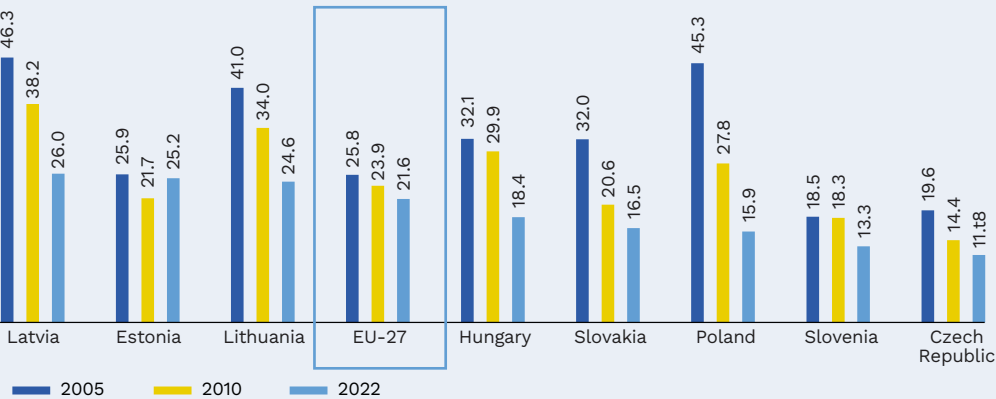
State	2004			2022		
	Life expectancy	Number of years at school	Income per capita (2017 PPP USD)	Life expectancy	Number of years at school	Income per capita (2017 PPP USD)
Czech Republic	75.9	14.6	27,987	78.1	16.3	39,945
Estonia	72.6	15.9	19,903	79.2	15.9	37,152
Lithuania	72.2	16.0	18,470	74.3	16.4	38,131
Latvia	70.9	15.7	16,863	75.9	16.6	32,083
Poland	75.0	14.8	17,708	77.0	15.9	35,151
Slovakia	74.2	13.9	19,792	75.3	14.7	32,171
Slovenia	77.5	16.3	30,162	82.1	17.4	41,587
Hungary	72.9	15.0	22,622	75.0	15.1	34,196

Source: prepared by PEI based on: Human Development Report (2024).

# Combating poverty

**In five out of eight central European countries that joined the European Union in 2004, the share of people at risk of poverty or social exclusion in 2022 was lower than the European average.** Only in two countries was the decline in the rate during membership smaller than in the EU as a whole. The risk of living in poverty fell most sharply in Poland - by 29 pp since 2005, i.e. to 16%. Alongside Poland, declines of more than 15 pp were recorded in Latvia, Lithuania, and Slovakia.

Figure 30. Share of people at risk of poverty or social exclusion in EU-8 countries in 2005, 2010 and 2022 (%)



Source: prepared by PEI based on Eurostat data (2024).

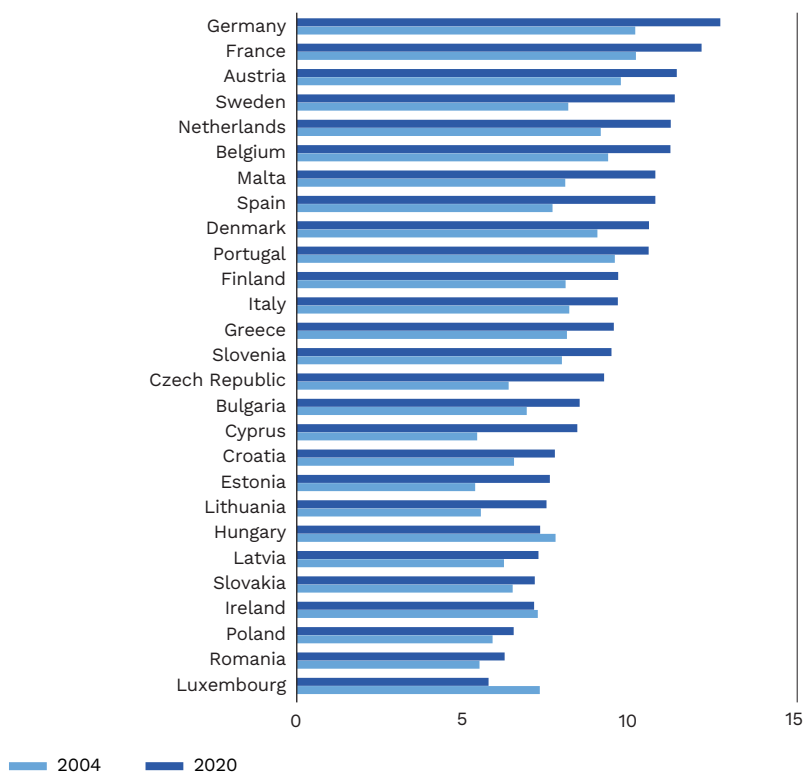
**In addition to the share of people at risk of poverty in the Group of Eight countries, the level of citizens' subjective sense of poverty also fell.** In the second decade of EU membership, the share of people considering themselves to be poor decreased in all countries of the region and, except Slovakia, fell more than in the EU as a whole between 2010 and 2022 (down 4 pp in Slovakia vs. 12 pp in the EU). At the same time, out of the analysed group, only in Slovakia did the level of subjective poverty exceed the European average in 2022 - i.e. 25%. The percentage of people considering themselves materially poor decreased most sharply in Hungary and Latvia - in both countries the indicator fell by more than 30 pp. In Poland, the level of subjective poverty was 15% in 2022, a decrease of 19 pp compared to 2010.

## Health protection

**At the threshold of accession, the new Member States faced the problem of chronic underfunding of their health care systems.** In 2004, they spent an average of 6.42% of GDP on health care, compared to 8.46% spent by the other countries. Although health care financing has increased since then, the road to convergence still seems long (8.73% vs. 10.37% in 2020), and this situation generally reflects the disparities in wealth within the Union. Slovenia and the Czech Republic have managed to get closest to the EU-14 average, spending 9.43 and 9.21% of GDP on healthcare in 2020 respectively, while the highest underfunding of healthcare is observed in Poland (6.49% of GDP).

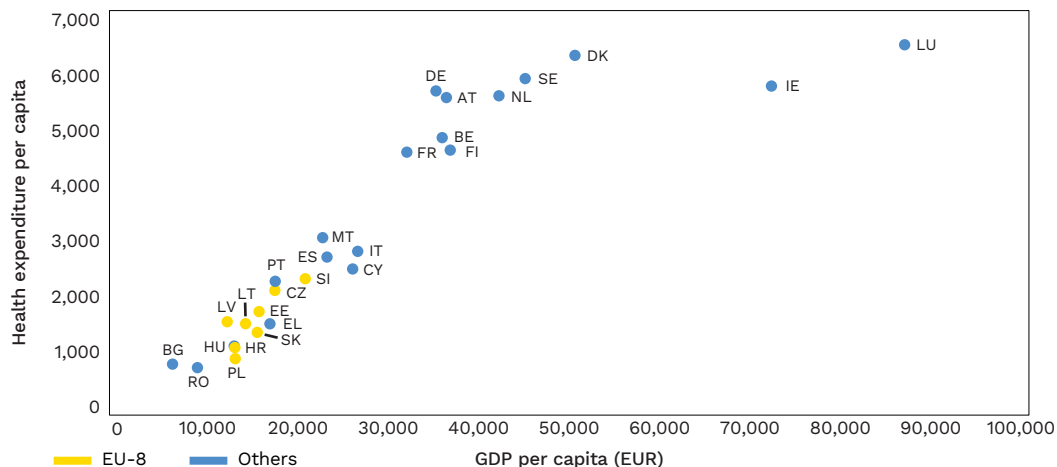
**On a per capita basis, the disparity in healthcare funding across the EU is even more pronounced.** In the EU-8, EUR 1629 is spent for this purpose compared to EUR 4578 in the rest of the EU, although when purchasing power parity is taken into account, the differences narrow slightly (EUR 2192 against EUR 3703). Hungary and Poland have the lowest per capita expenditure in the entire European Union, excluding Bulgaria and Romania - EUR 1170 and EUR 983 respectively, while the eight richest EU countries spend an average of EUR 5688 on healthcare. The closest to this ceiling is Slovenia, with an expenditure of EUR 2351 per person.

**Figure 31. EU-8 countries' health expenditure as a proportion of GDP in 2004 and 2020 (%)**



Source: prepared by PEI based on OECD data (2024).

**Figure 32. EU-8 countries' health expenditure and real GDP in 2021 (per capita, in EUR and at current prices)**



Source: prepared by PEI based on OECD and Eurostat data (2024).

**Inadequate investment in health care in the EU-8 has its consequences in poor health statistics.**

These include life expectancy, potential life years lost, mortality from selected diseases (notably cancer and ischaemic heart disease, which account for the largest number of deaths in the EU) or the so-called risk of death preventable by treatment and medical interventions. The residents of the countries analysed still have significantly shorter lifespans than the rest of the EU. Except for Slovenia, where life expectancy in 2022 was 82.1 years, people in the region live almost five years shorter than in the EU-14 countries - on average 77.1 years against 82.5 years (the shortest lifespan is in Latvia - 74.3, and the longest in and Estonia - 79.2 years). The second parameter that demonstrates the disparity is the Prematurely Lost Life Years (PYLL) indicator. This sums up the years of life lost for a given population, resulting from deaths at an age lower than the adopted limit. While in the first group of countries it is 2911 years (calculated per 100 000 population), in the EU-8 it is 5539 years on average (excluding Slovenia, where it is 2870 years). In the case of cancer mortality, the values of the indicator are more even across the analysed countries, with Hungary having the worst result in the EU (320.87 deaths per 100 000 population). However, significant differences are already visible in mortality from ischaemic heart disease. Except for Slovenia, where this indicator remains below the EU-14 average, its values are on average more than five times higher than in Western Europe, with the worst figures in Lithuania (455) and the best in Poland (119). There is limited convergence for the indicator measuring the risk of avoidable death. For as many as 5 countries (Lithuania, Latvia, Poland, Slovakia, Hungary) this indicator is twice as high as the average for the other countries (213). Slovenia (268), the Czech Republic (340) and Estonia (375) fare better.

**Table 3. Selected health outcomes in the European Union**

State	Life expectancy (years)	Prematurely lost life years (PYLL)	Mortality rate (cancer) (per 100 000 population)	Mortality rate (ischaemic heart disease) (per 100 000 population)	Risk of preventable death (per 100 000 population)
<b>EU-8</b>					
Czech Republic	78.1	3,914	267.20	222.64	340.00
Estonia	79.2	4,832	265.03	120.72	375.65
Lithuania	74.3	6,885	276.47	455.01	540.06
Latvia	75.9	6,787	296.52	291.55	502.57
Poland	77.0	5,712	279.72	119.54	418.88
Slovakia	75.3	5,050	301.78	334.68	431.28
Slovenia	82.1	2,870	290.66	31.37	268.30
Hungary	75.0	5,595	320.87	295.52	529.99

Other countries					
Austria	82.4	2,874	230.54	98.24	235.44
Belgium	82.3	3,165	223.18	23.76	239.84
Bulgaria	71.5	6,911	245.33	147.53	529.44
Croatia	79.2	4,300	303.87	130.69	395.15
Cyprus	81.9	2,607	205.55	49.42	182.65
Denmark	81.9	2,787	271.04	39.40	209.32
Finland	82.4	3,224	211.35	105.69	228.61
France	83.2	3,401	226.57	23.02	201.71
Greece	80.6	3,218	240.76	54.51	245.27
Spain	83.9	2,677	214.51	29.08	205.59
Netherlands	82.5	2,769	261.26	20.46	200.43
Ireland	82.7	2,871	255.45	68.52	211.42
Luxembourg	82.6	2,411	203.11	30.31	193.94
Malta	83.7	2,739	212.47	79.28	204.17
Germany	81.0	3,215	240.28	78.83	238.07
Portugal	82.2	3,377	240.46	23.27	224.82
Romania	74.1	6,814	260.34	202.37	593.20
Sweden	83.5	2,557	214.14	56.71	185.38
Italy	84.1	2,526	227.01	53.66	197.05

Source: prepared by PEI based on Eurostat data (2024).

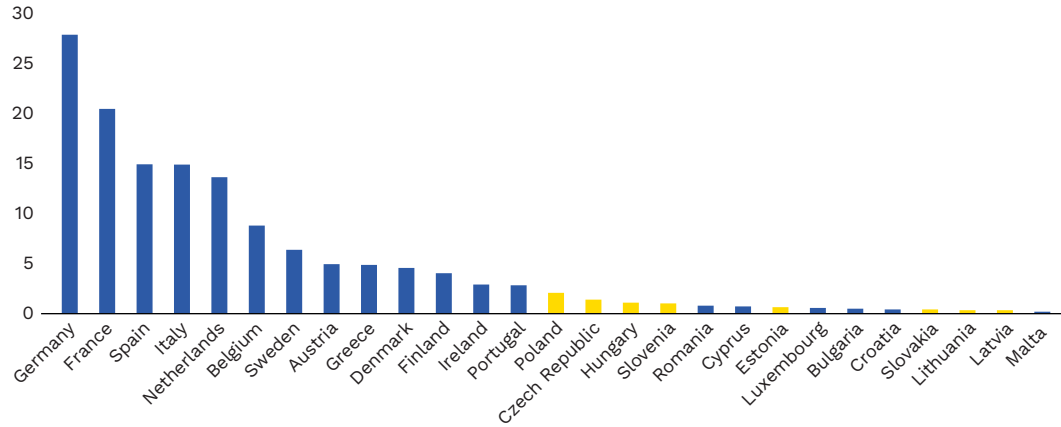
## Learning

### Resources for science

**The EU-8 countries signed 17,474 grant agreements totalling EUR 6.71 billion as part of EU support for science (FP5, FP6, FP7, H2020 and Horizon Europe programmes).** In comparison, the EU-14 received EUR 130.2 billion in this period from just over 78,000 signed grant agreements. In the analysed period, 381.1 thousand organisations on the EU-14 side and 34.1 thousand on the EU-8 side were involved in the implementation of grants. At the same time, the new Member States applied for European grants with a slightly lower success rate than the other EU members (16.47% against 18.63% for the EU-14).

**The existence of the disparity is due to the relatively low number of proposals (and therefore contracts signed) in the EU-8, which has a direct impact on the allocation of science funding.** For example, in Horizon 2020, the EU-14 received a total of 95% of all research funding, with 55% of the allocation going to the 25 large research institutions based in these countries (plus Switzerland and Israel) (Pazour, 2020). As many as 54.87% of the applications (number of participants) went to five countries - Germany, Spain, the UK, Italy, and France. As a result, the eight countries analysed received only 3.85% of research funding in Horizon 2020 (the total across all programmes, including Horizon Europe, was 3.83%).

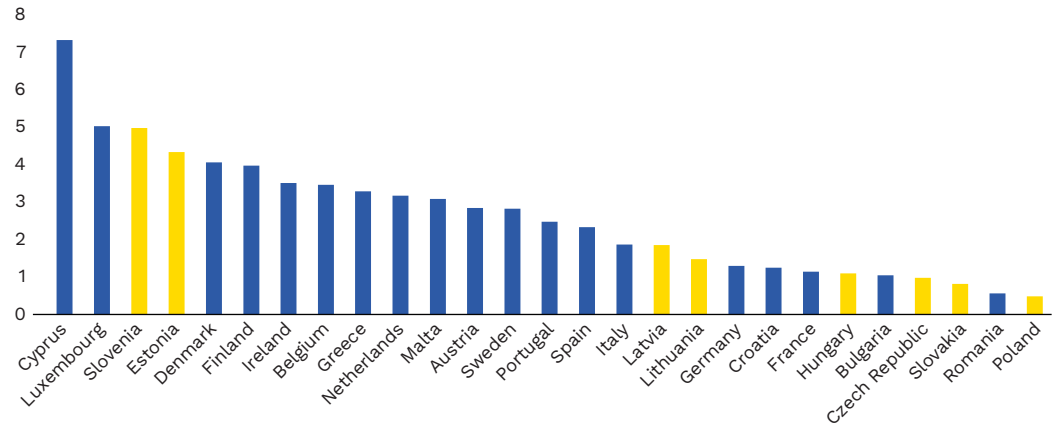
**Figure 33. Total net funding allocation under FP5, FP6, FP7, H2020 and Horizon Europe (billion EUR)**



Source: prepared by PEI based on data from the European Commission (2024b).

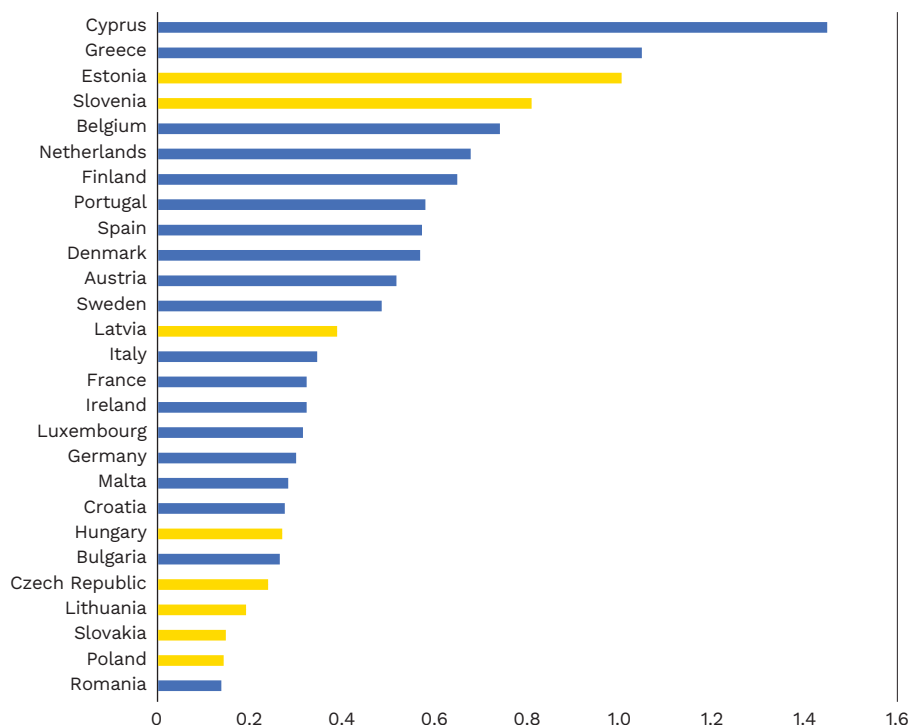
**Per 1,000 inhabitants, the EU-8 applies for research funds less frequently than Western Europe on average.** Slovenia and Estonia do better, ranking among the European leaders in terms of the number of applications. Poland, with 18 213 applications in Horizon 2020, ranked last with 0.48 applications per 1 000 inhabitants. A similar picture emerges if one compares the Horizon 2020 funding received with the size of the economies. Among the last seven places in the EU, five are occupied by EU-8 countries.

**Figure 34. Number of Horizon 2020 applications per 1,000 inhabitants**



Source: prepared by PEI based on data from the European Commission (2024b).

**Figure 35. Horizon 2020 funding as a proportion of GDP in 2022 (%)**

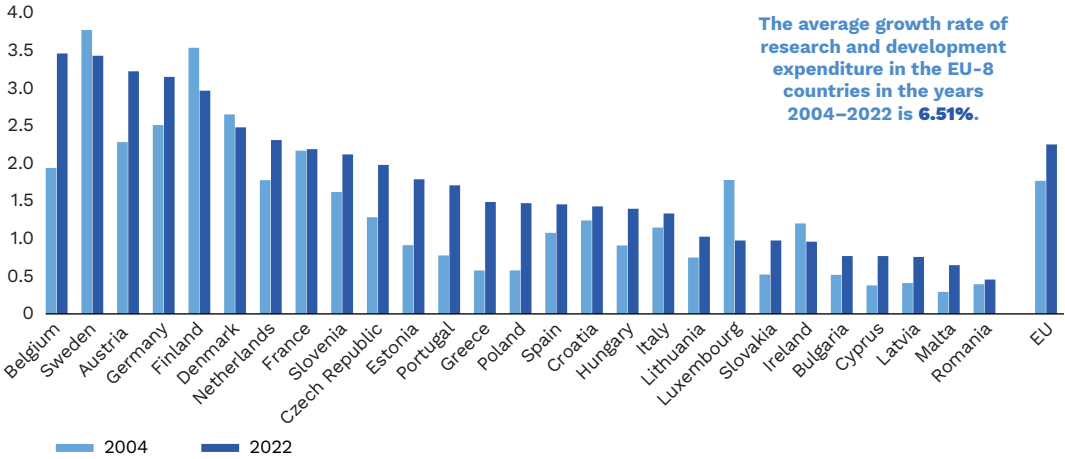


Source: prepared by PEI based on data from the European Commission (2024b).

**One of the main sources of the disparity in science funding received is the overall level of innovation in the economy as measured by the amount of national R&D expenditure.** In addition to this, one can mention the differences in the quality of research carried out and its innovation, the number of applications and the lower networking of universities in the countries analysed (Quaglio et al., 2020). Juxtaposed with the different level of R&D expenditure (1.43% for the EU-8 vs. 2.11% of GDP for the EU-14), the disparity in funding levels in the Central European countries relative to the EU average largely blurs and reveals a more complex picture of the region (Quaglio et al., 2020). Three countries in the region (Latvia, Estonia and Slovenia, which ranked higher in terms of funding relative to GDP) received more Horizon 2020 funding relative to R&D expenditure in nominal terms than most of the pre-enlargement EU countries.

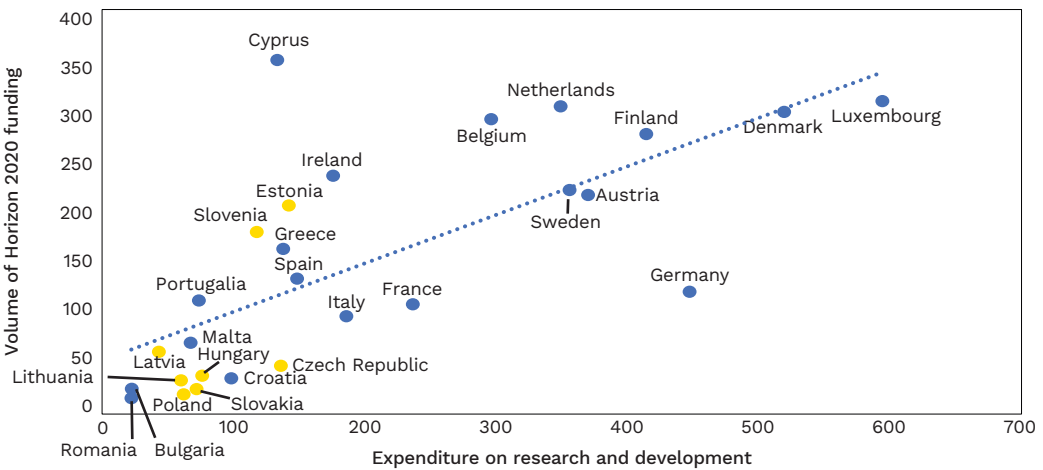


**Figure 36. R&D expenditure in relation to GDP in the EU in 2004 and 2022 (%)**



Source: prepared by PEI based on data from the European Commission (2024b).

**Figure 37. R&D expenditure in 2020 vs Horizon 2020 funding received per capita (EUR)**



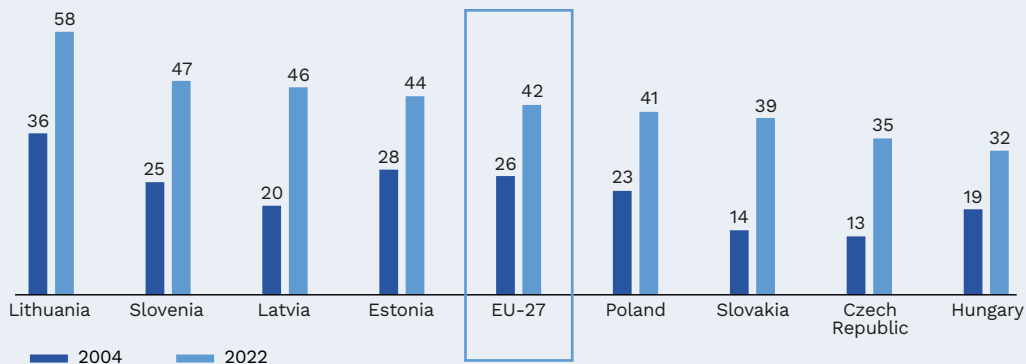
Source: prepared by PEI based on data from the European Commission (2024b) and Eurostat (2024).

## Universality of higher education

**Tertiary education has become more common among young people in Central Europe.** Between 2004 and 2022, the share of people with tertiary education in the 25–34 age group increased in every country in the group. Only in Hungary was the increase smaller than for the EU as a whole (13 pp in Hungary vs. 16 pp in Europe). Today, in all the eight countries, the share of young people with a university degree exceeds 30%. At the time of EU accession, only

Lithuania exceeded this level. Four countries: Lithuania, Slovenia, Latvia and Estonia are above the European average. Poland has a lower proportion of young people with tertiary education compared to the EU average (by 1 pp).

**Figure 38. Percentage of 25-34 year olds with a tertiary degree in EU-8 countries (%)**

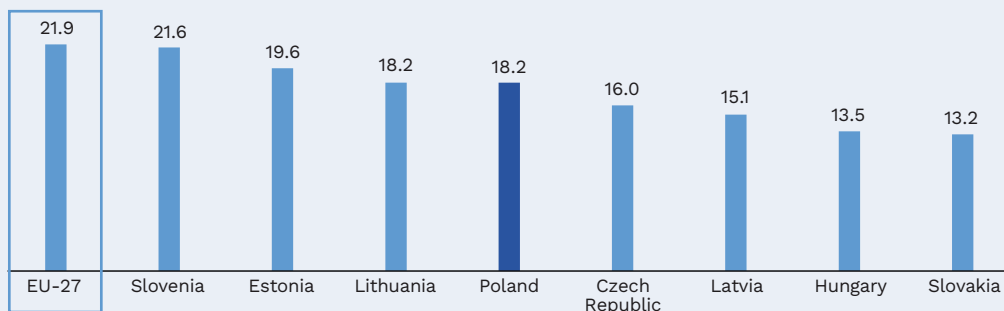


Source: prepared by PEI based on Eurostat data (2024).

#### Fewer technical and scientific graduates in the EU-8 than in the EU

All EU-8 countries have a lower share of new graduates in STEM (science, technology, engineering, and mathematics) subjects than the EU average. In 2021, out of the entire group, only Slovenia broke through the threshold of 21 graduates per 1,000 young people. In several countries, this figure has decreased in recent years. In Poland, the rate fell from 20.5 in 2014 to 18.2 in 2021. In Lithuania and Slovakia, the number of technology and science graduates per 1,000 young people decreased by 4 and 5 respectively, compared to 2013.

**Figure 39. Number of science and technology graduates in 2021 per 1,000 people aged 20-29 in EU-8 countries**

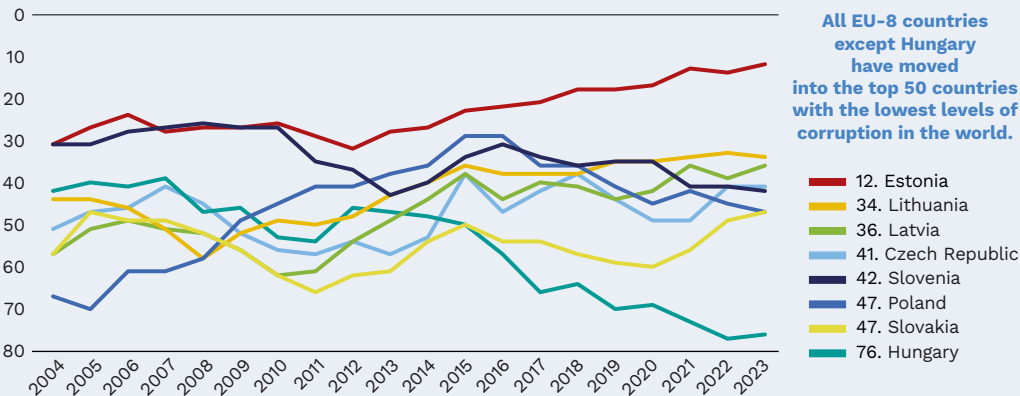


Source: prepared by PEI based on Eurostat data (2024).

# Combating corruption

**Data on the fight against corruption in Central Europe has also improved, although there are also examples of deterioration.** Six EU-8 countries improved in terms of corruption levels over the 20-year period. In the 2023 Corruption Perceptions Index (CPI), only Hungary and Slovenia had a worse position globally than when they joined the EU. The highest CPI (i.e. the lowest corruption score) was achieved by Estonia, which is the 12th least corrupt country in the world. Relative to 2012, since CPI values are comparable at<sup>2</sup> (Transparency International, 2021), the index worsened in Poland, Slovenia and Hungary. In the last of these countries, the increase in corruption was the strongest: between 2012 and 2023, the CPI fell by 13 points, and over the whole period 2004–2023, Hungary’s position dropped by 34 places.

**Figure 40. EU-8 countries' place in the world ranking of corruption levels (CPI) 2004–2023**



Note: the higher the ranking, the lower the level of corruption in the country.

Source: prepared by PEI based on Transparency International (2024).

**Also, data from the European Commission confirms positive trends among most of the EU-8 countries apart from Hungary and Slovenia, which are negative examples.** In a 2007 study (Eurobarometer, 2008), in all countries of the region the share of those who agreed with the statement that corruption is a serious problem was higher than the EU average (75%). At the same time, only in Poland and Estonia was the share of respondents who gave such an answer lower than 80%. In 2022 (Eurobarometer, 2022), when asked about the prevalence of corruption in their country,<sup>3</sup> the share of answers in these

<sup>2</sup> Due to a change in methodology

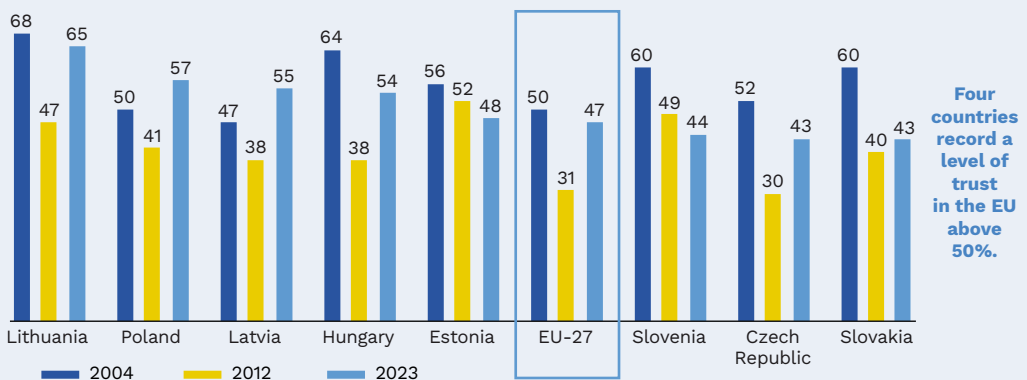
<sup>3</sup> In the Eurobarometer survey, the questions on corruption between 2004 and 2023 are dif-

two countries confirming the prevalence of corruption was lower than in the EU as a whole (68% vs. 55% in Poland and 43% in Estonia). Of the remaining countries in the region, the Czech Republic and Latvia were closest to the EU average with 78% each. The share of indications of the prevalence of corruption fell everywhere except Hungary between 2017 and 2022. The top 10 EU countries with the subjectively highest prevalence of the phenomenon besides Hungary were Slovakia and Slovenia.

## Trust in the Union – Eurobarometer

**Only in Poland and Latvia was confidence in the European Union in 2023 higher than in the year of accession.** In 2004, in seven of the eight countries, such confidence was declared by 50% or more of those surveyed. After 20 years, a level of trust of 50% or more is found in Lithuania, Poland, Latvia and Hungary. In addition to these four countries, Estonia (where 48% showed trust in the EU in 2023) ranks above the European average. In Slovakia, the Czech Republic and Slovenia, trust is below average, but only by 3-4 pp.

**Figure 41. Percentage of respondents in EU-8 countries trusting the EU (%)**



Source: prepared by PEI based on Eurobarometer data (2005; 2012; 2023).

ferent. Although the statements that 'corruption is a serious problem' and 'corruption is widespread' in a country are not the same, they are close enough to try to compare the situation in the two periods.

# Changing socio-economic situation in rural areas

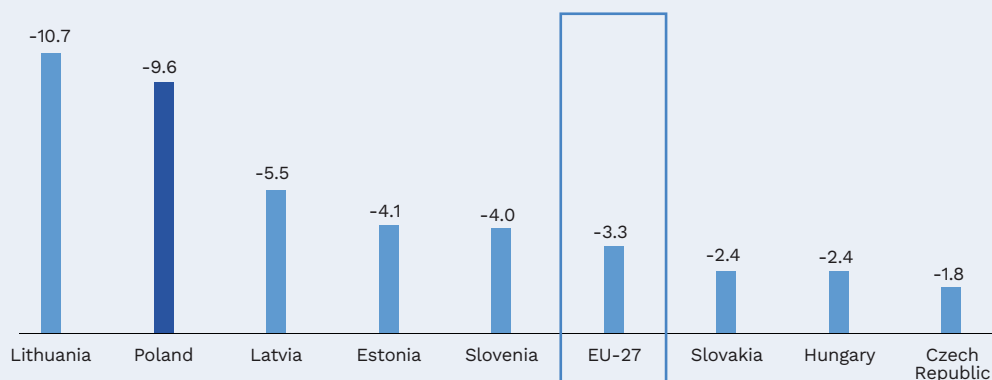
**Since the countries of the region joined the European Union in 2004, the socio-economic situation in rural areas has changed.** The employment structure in rural areas has been transformed and many indicators of the quality of life have improved. The inclusion of the Common Agricultural Policy has been an important factor in shaping the situation in these areas. From the European Fund for Rural Development alone, people from the region received more than EUR 50 billion from the EU budget between 2007 and 2020<sup>4</sup> (European Commission, 2020a; 2020b; 2020c; 2020d; 2020e; 2020f; 2020g; 2020h; CDR, 2024).

**One of the main changes since EU accession has been the transformation of the employment structure in the countries of the region.** Compared to the first years of membership, the share of employment in agriculture, forestry and the food industry declined in all Central European countries that joined the EU in 2004. The percentage of people employed in the agri-food sector fell most sharply in Poland and Lithuania, which, at the time, were the countries with the largest share of workers from this area of the economy in the whole group. In 2003, Poland's agri-food sector represented 21% of total employment, and by 2022 its share had fallen to 11%. In the group as a whole, only in Slovakia, Hungary and the Czech Republic was the rate of decline in the importance of the agri-food sector in employment lower than the EU average<sup>5</sup> (-3%). However, these countries were already characterised by a lower share of farmers and people employed in the food industry when they joined the European Union.

<sup>4</sup> According to the distribution assumptions at the beginning of the 2007-2013 and 2014-2020 programmes, the amount refers only to funds from the European Union budget.

<sup>5</sup> EU-27 from 2020.

**Figure 42. Change in the share of employment in the agri-food sector of EU-8 countries in the total employment structure between 2004 and 2022 (pp)**

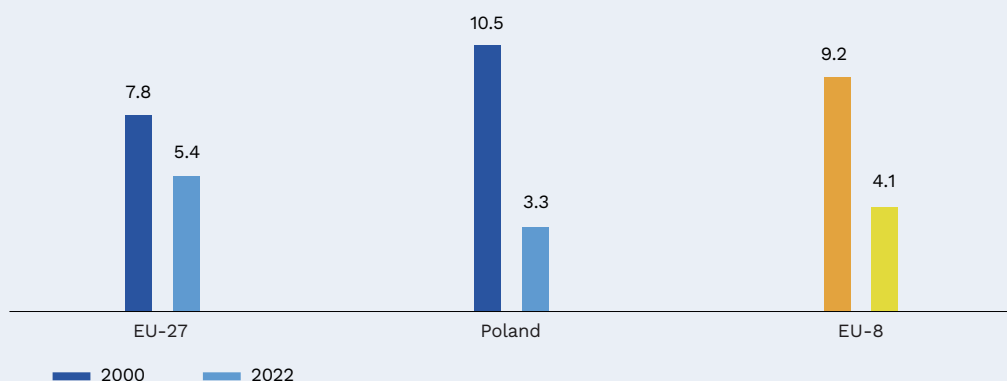


Source: prepared by PEI based on data from Eurostat (2024) and the European Commission (2024c).

**Alongside the declining share of agriculture and the food industry in the overall employment structure, unemployment in rural areas has fallen.**

For the eight countries, the proportion of those living in rural areas who cannot find a job has fallen by 5 pp since 2007. In Poland, the unemployment rate has fallen even more sharply, by 7 pp. Such a marked decline has taken place against a 35% increase in the number of economically active people in rural areas.

**Figure 43. Unemployment rate in rural areas of EU-8 countries (%)**

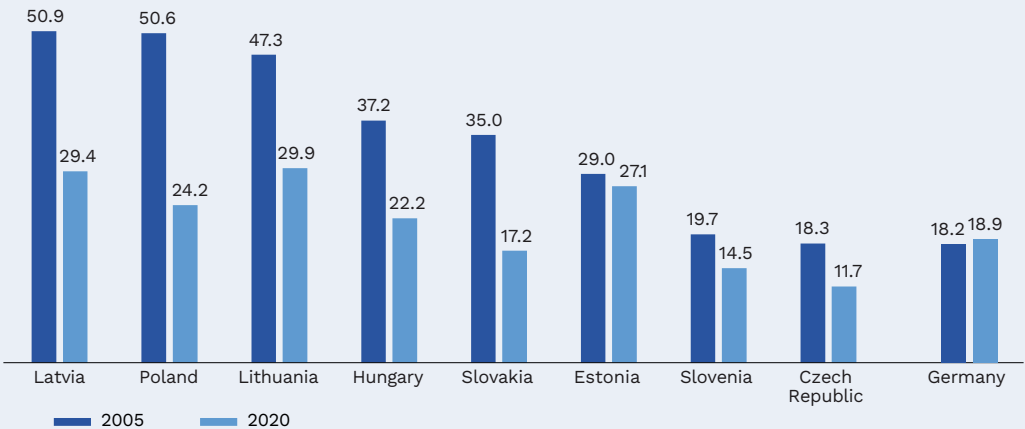


Source: prepared by PEI based on Eurostat data (2024).

**With decreasing unemployment, the share of people at risk of poverty or social exclusion has decreased.**

The sharpest decline took place in Poland, where the risk of poverty or social exclusion affected more than 50% of the rural population in 2005 and was 26 pp lower in 2020. Despite a marked reduction in the rate also in Lithuania and Latvia (by more than 17 pp), in 2020 in these three countries it was at a higher level than for the EU as a whole (23%). At the same time, the trend in all countries in the region was the opposite of that for Germany - the country with the largest rural population in Europe - where there had been a 0.7 pp. increase in the risk of poverty or social exclusion since 2005.

**Figure 44. Share of those at risk of poverty or social exclusion in 2005 and 2020 in rural areas in the EU-8 and Germany (%)**

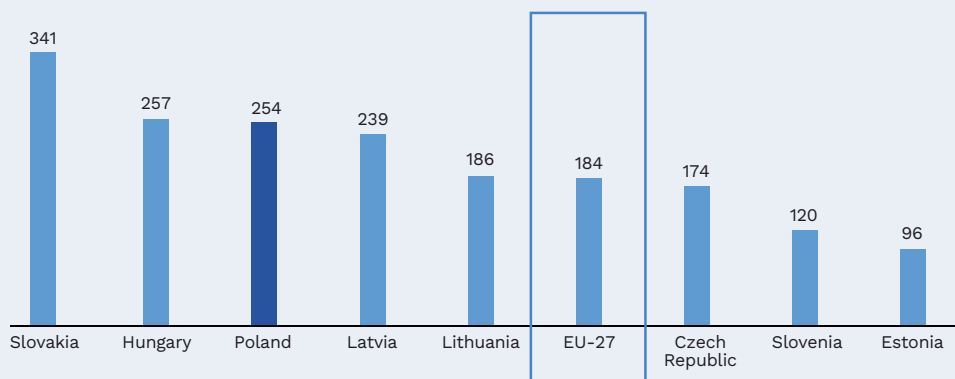


Source: prepared by PEI based on data from the European Commission (2024e).

**During EU membership, the productivity of agriculture and the food industry of the associated countries grew strongly.**

Agricultural productivity in five EU-8 countries grew more than in the EU as a whole. In three of them - Poland, Hungary, and Slovakia - the increase was more than 150%. The only country where productivity was lower in 2023 than in the first years of EU membership was Estonia. However, this was the result of a y/y decline in the EU as a whole (by 7%), which was strongest in Estonia (58% decline)

**Figure 45. Change in agricultural labour productivity in 2005 vs 2023 in the EU-8 (2005 = 100)**

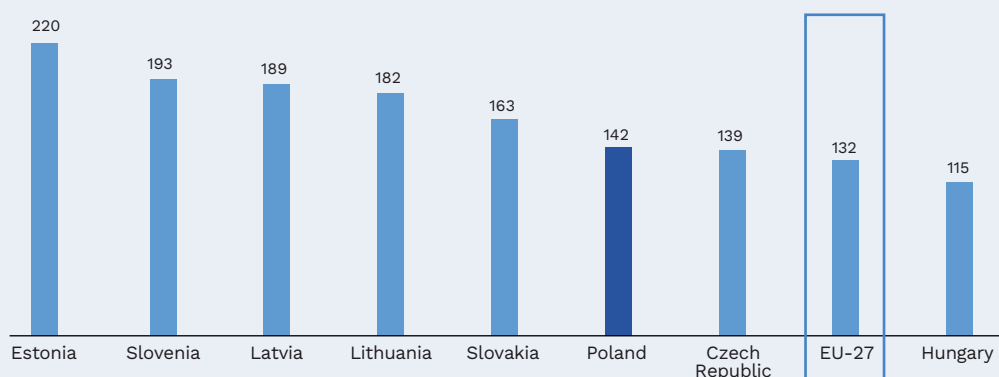


Note: change calculated as real factor income per annual unit of labour.

Source: prepared by PEI based on Eurostat data (2024).

**In the food industry, as in agriculture, the rate of productivity growth in most EU-8 countries was higher than in the EU as a whole.** The strongest growth took place in the smaller countries - Estonia, Slovenia or Lithuania. In Poland, the productivity of the food industry increased by 42% between 2008 and 2022.

**Figure 46. Change in food industry productivity 2008 vs 2022 in EU-8 countries (2008 = 100)**



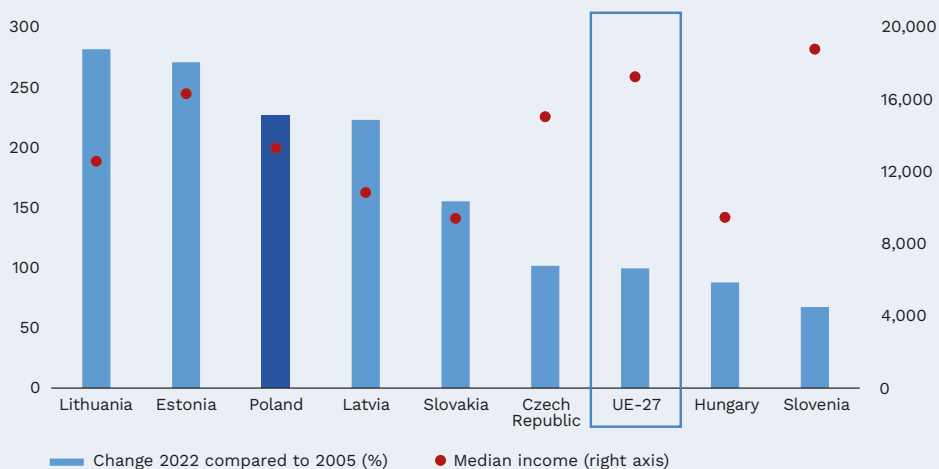
Note: change calculated as value added (GVA) of output per person employed in the sector.

Source: prepared by PEI based on data from the European Commission (2024d).



The result of positive economic and social changes in rural areas is that households are becoming richer. Since the Central European countries joined the EU in 2004, incomes in their rural areas have grown faster than the European average. Changes in the structure of employment, increases in labour productivity or investments carried out in rural areas in the entire group of eight countries contributed to an average increase in income of 149% between 2005 and 2022, compared to an increase of almost 100% in the EU. Incomes rose most strongly in Lithuania and Estonia, where they were more than 270% higher than in 2005, and by 227% in Poland. Only Hungary (88%) and Slovenia (67%) were below the EU average.

**Figure 47. Increase in rural median income in 2022 vs 2005 (in purchasing power standard) and its level in 2022 in EU-8 countries**



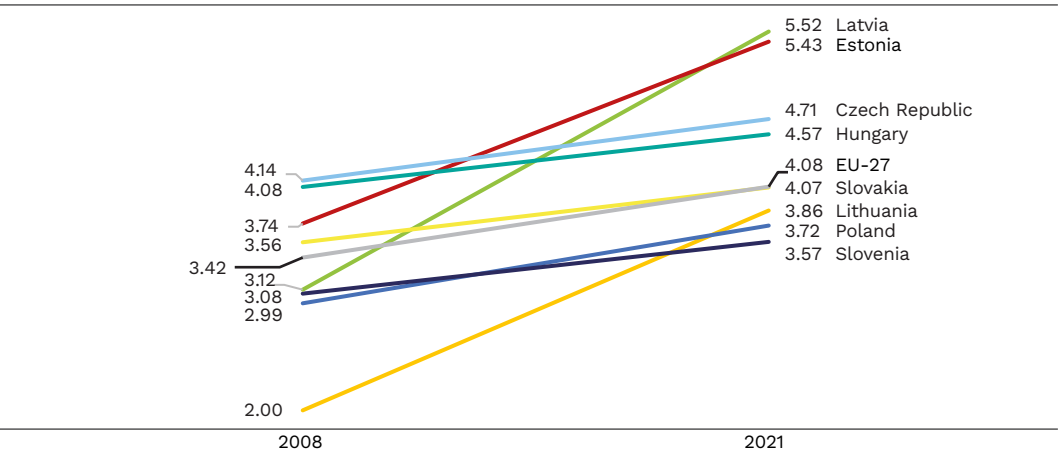
Source: prepared by PEI based on Eurostat data (2024).

# Digital transformation

## ICT services

**The countries of the region almost doubled the value added generated in ICT services between 2008 and 2021, from EUR 24.4 billion to EUR 45.1 billion.** In relation to the total GDP of the countries in question, there was an increase from 3.4% to 4.1%. The same increase in the share of ICT services in value added was also observed at the level of the EU as a whole (3.4% in 2008, 4.1% in 2021). It is worth noting that the share of ICT services from the EU-8 countries in ICT services created in the EU-27 as a whole increased from 7.2% to about 8.4%, as a result of faster GDP growth in the EU-8; however, the growth was not evenly distributed.

**Figure 48. Change in the share of the value added of ICT services in the national value added of the EU-8 countries from 2008 to 2021**



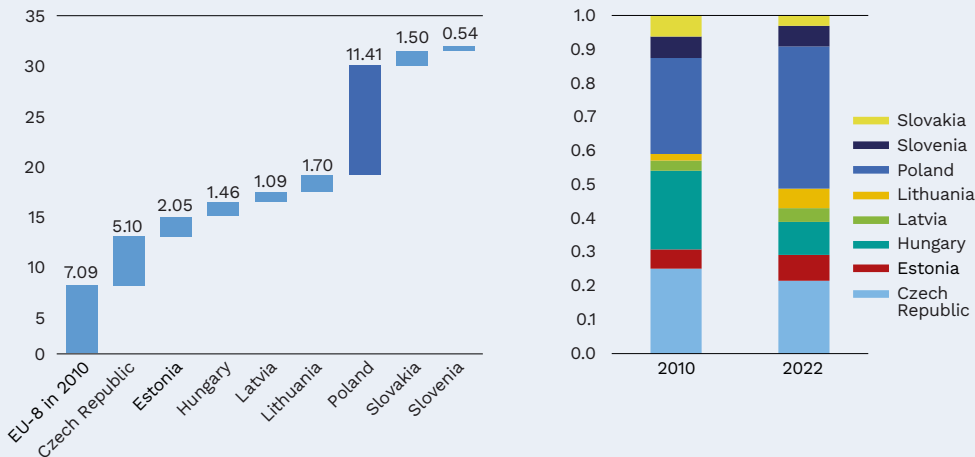
Source: prepared by PEI based on Eurostat data (2024).

**The ICT services sector is the largest in Poland and the Czech Republic and together accounts for almost two-thirds of the total value added** (in absolute terms, EUR 18.6 billion and EUR 10.2 billion respectively in 2021). It is, however, worth noting that in Poland the value generated by this sector almost doubled over the period under review. In turn, in terms of contribution to GDP, the leaders are the two Baltic states - Latvia and Estonia.

The former is particularly interesting, where the share of ICT services was below the average for the countries in the region in 2008 and is now the highest.

**IT services have developed particularly rapidly.** The Central European region has become a magnet for the location of IT centres of multinational corporations, and has developed its own specialisations, among which software development – both in-house and by numerous software houses<sup>6</sup> – plays an important role. The share of IT services in the revenues of the entire ICT sector in Poland increased from 19.9% in 2011 to 40% in 2022, and employment from 75,500 to over 221,000 in the same period.

**Figure 49. Increase in value of ICT services exports from individual EU-8 countries from 2010 to 2022 (in USD billion, left chart) and comparison of export structure (right chart)**



Source: prepared by PEI based on UNCTAD (2024).

**The EU-8 countries are also steadily increasing the value of ICT services exports, particularly IT (information technology) services.** Since 2010, the value of exported IT services has increased four and a half times, from USD 7.1 billion to USD 31.9 billion. In contrast to the share of value added generated, this value has grown faster than in other EU countries, and the region's share of EU exports of IT services (intra-EU and to third countries combined) has increased by over 2 pp between 2010 and 2022, being about 4.8% in 2010, about 5.5% in 2013 and about 6.9% in 2022. Poland is the largest exporter of services in the region, followed by the Czech Republic and Hungary in third place.

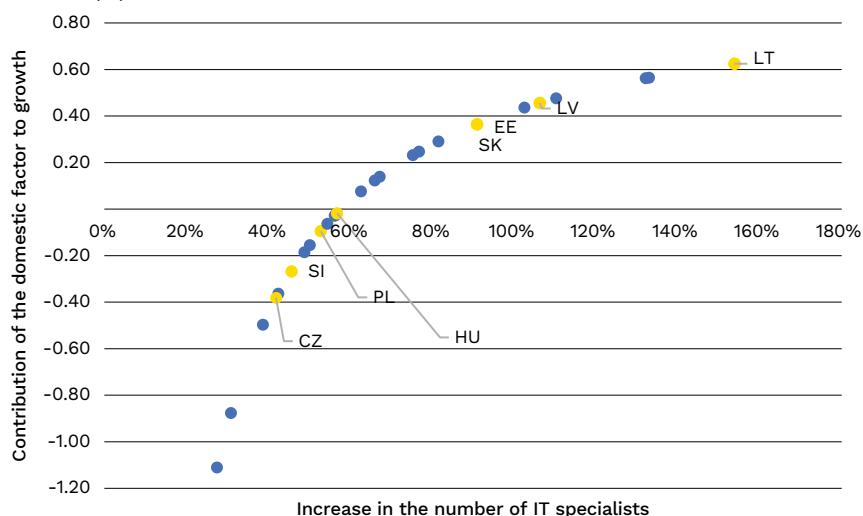
<sup>6</sup> Software house refers to a company that develops bespoke software. It is an external company that implements digital solutions and these software solutions are made and tailored entirely to the company's specifications.

# ICT specialists

The share of ICT professionals among all the employed, which indicates not only the level of development of the ICT sector but also the digitalisation of companies and the potential for digital development, is in all countries of the region (except Estonia) lower than the EU average. Closing this gap, as well as meeting the relevant target of the digital decade strategy (doubling the share of ICT professionals by 2030) will be very important challenges for the EU-8.

In addition, although the countries in question have been increasing the share of ICT services in their economies and in EU output, regional specialisation in terms of above-average growth in the number of ICT specialists in the economy is not evident. Only in Lithuania, Latvia, Estonia and Slovakia can specialisation in ICT be detected, i.e. the number of professionals in these countries is growing faster than would be suggested by the overall economic development and growth of the ICT sector observed in the EU as a whole. In contrast, in the Czech Republic and Slovenia, the country factor, which determines whether the number of ICT professionals in a country is changing faster than the EU trend, took on a significant negative value, meaning that the number of IT professionals grew more slowly than would be suggested by broader economic trends. In Poland and Hungary, the country factor is close to zero, so they do not seem to create specific national advantages in this respect.

Figure 50. Relation of the growth in the number of IT professionals between 2012 and 2022 and the importance of the country factor in this growth in the EU-8 countries compared to the other EU Member States (%)



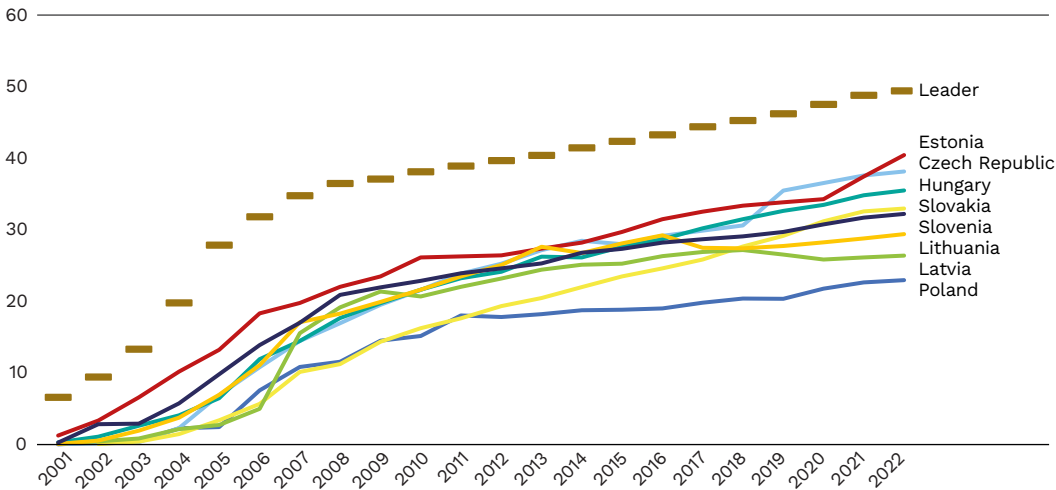
Source: prepared by PEI based on Eurostat data (2024).

# Digital infrastructure

**Central European countries were lagging behind in terms of cable infrastructure (telephone lines), which formed the basis for the development of broadband in its early years.** Only in Slovenia was the number of such lines per 100 inhabitants above the EU average, while in the other countries it was between 20% and even 50% lower.

**Since joining the EU, the new Member States have been catching up dynamically, in part due to the ability to use EU funds to build broadband infrastructure.** The pace of development can be seen in the percentage of fixed broadband subscriptions, which clearly accelerated after accession. Of course, there are more factors behind this acceleration, including the development of the technology itself. The result is characterised by a significant divergence in saturation levels between countries due to factors such as geography (dispersed development significantly increases network construction costs), demographics (household size - important for this type of measure) or technological preferences (e.g. use of mobile broadband as a substitute for fixed line).

**Figure 51. Number of fixed broadband subscriptions per 100 inhabitants in the EU-8 countries and the leader (in a given year) among the EU-27 countries, 2001-2022**



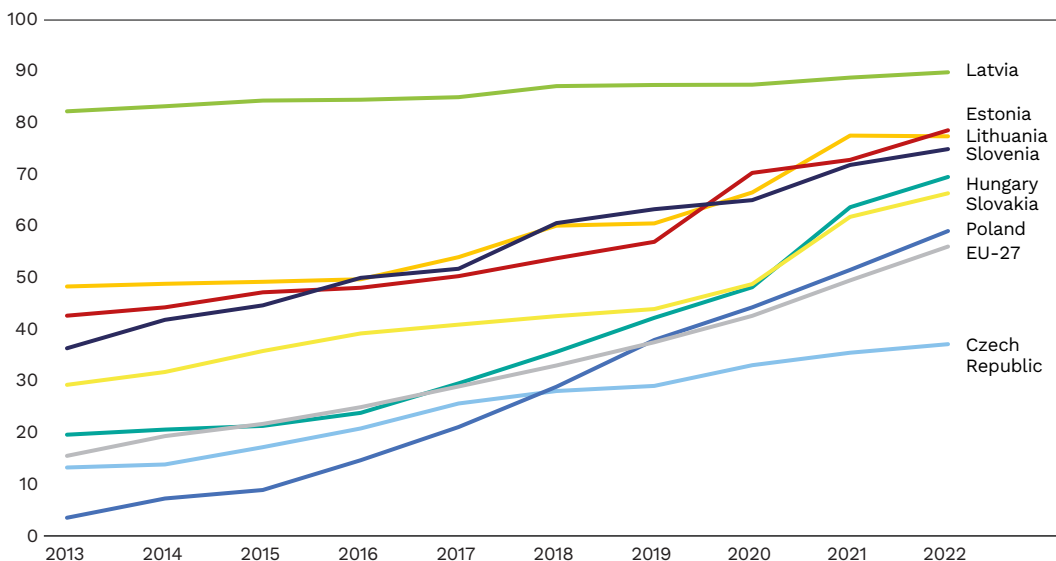
Source: prepared by PEI based on World Bank data (2024).

**Apart from the Czech Republic, the entire region is also rapidly building state-of-the-art infrastructure that offers speeds of 100 Mbps or 1 Gbps - in line with the** European Union's strategic goals outlined in the Digital Decade programme. Today, in Latvia, more than 90% of households have access to this type of connection (placing it second in the EU). In Estonia it is almost

80%, and only the Czech Republic has a value lower than the average for the entire European Union (56% in 2022).

**The mere presence of a modern infrastructure is not enough** - in terms of the percentage of subscribers using lines with speeds above 1 Gbps, only Hungary is among the EU leaders (30%, ranking it second in the EU), while, according to 2022 data, in six of the eight countries in question the percentage was below 5%. The situation is slightly better for businesses. In five of the countries in the region, more than 10% of companies use lines with speeds above 1 Gbps. Interestingly, Estonia and Latvia, which are the leaders in household connection speeds - are at the bottom of the list.

**Figure 52. Percentage of households in EU-8 countries with fibre-to-the-premises (FTTP) coverage 2013-2022**



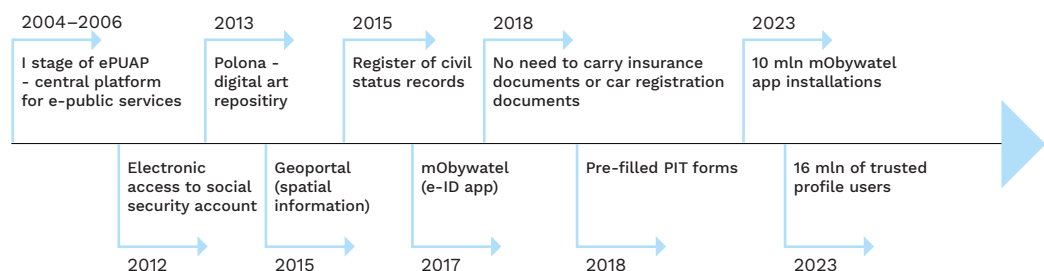
Source: prepared by PEI based on Omdia (2024).

## Digital public services

**In Poland alone, more than EUR 12 billion has been allocated to the development of digital public services** (cohesion policy funds from 2007-2027 and planned spending under the RRF). The other countries in question have also invested in solutions of this type, with good results. Estonia and Latvia, for example, are among the European leaders in terms of the sophistication of e-services for citizens. Poland - thanks to its policy of opening up data - has risen to second place in the Open Data Maturity ranking.

**More than 16 million Poles have a trusted profile (a tool to verify one's identity online) and 24 million taxpayers can use the annual PIT returns prepared by National Tax Authority).** These figures show that the funds allocated for the digitalisation of public services have had a tangible effect in the form of an increasingly wide range of matters that can be dealt with electronically, as well as an increasing number of citizens using e-administration services.

### Infographic 2. Timeline of e-government solutions



Source: PIE own study.

**The level of digitalisation of public services varies among the countries in the group.** The Baltic states stand out in this regard, with their solutions having been followed by others - the e-Seimas platform for consulting and submitting civic projects in Lithuania or the Latvian eParaksts mobile application for confirming identity on mobile devices as well as the Polish mObywatel service. Poland, Slovakia, and Hungary are among the countries with the most catching up to do in terms of the overall level of e-government services (although, at the same time, it should be emphasised that the gap in this area is smaller than in other pillars of digitisation - digital skills or digitisation of business).

# Environmental and climate protection

Joining the EU meant profound changes in the energy sector and climate and environmental policies for the EU-8 countries. Both environmental and climate standards, the structure of energy production and the carbon intensity of the region's economies have changed. Despite these changes, there is still a lot of work to be done, and in many areas the pace of energy transition in the EU-8 remains noticeably slower than in other EU countries.

**Between 1990 and 2022, the European Union reduced its greenhouse gas emissions by 31%.** A clear decline in emissions began after 2008, linked to the ambitious development of EU climate policy and the reform of the EU-ETS. **In the EU-8 countries, the magnitude of emission reductions between 1990 and 2022 was slightly higher than in the EU, at 33.8%.** In contrast to the EU as a whole, in Central Europe emission reductions took place primarily as a result of the 1989-1991 transition rather than after 2008. In contrast, between 2021 and 2022, GHG emissions in both the EU and the Central European region increased by around 4% and 4.5%, respectively, due to the economic rebound after the COVID-19 pandemic, the war in Ukraine, and the energy crisis. In 2022, the EU's emissions started to fall again, but efforts will have to be significantly increased in order to achieve net zero emissions by 2050, as stipulated in the European Green Deal.

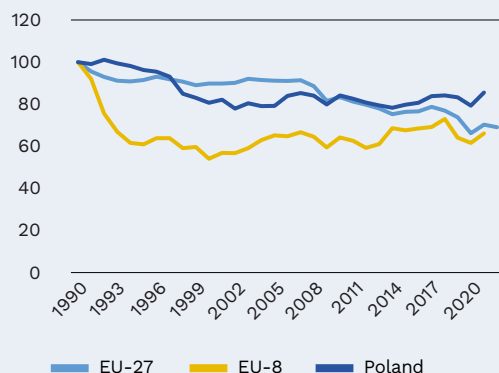
**Poland reduced its greenhouse gas emissions by 14.5% between 1990 and 2022.** The reductions in Poland's emissions occurred despite dynamic economic growth over the period and an increase in energy consumption of almost 25%. However, there has been an increase in emissions of 8 pp since 2014, slower than the growth rate of the economy, only possible thanks to the modernisation of the energy sector, including by increasing the share of RES in the electricity mix.

Accession accelerated RES development in the EU-8 countries. **In gross final energy consumption, it was significantly higher than in the EU, reaching more than 28% in 2022.** However, due to a higher base, the growth rate between 2004 and 2022 was lower at 83% compared to 140% for the EU as a whole. Among the EU-8 countries, Latvia had the highest share of RES in electricity production in 2022 with 53%, Slovenia had 39%, while Hungary had the lowest with 15%.

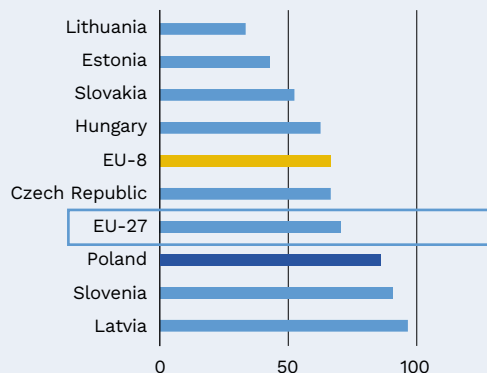
**Between 2004 and 2022, the share of renewable energy sources in Poland's final energy consumption increased by 2.5 times to reach 16.9%. In turn, the share of RES in Poland's electricity production reached 21% in 2022, an increase of more than 10 times compared to 2004.** Despite such dynamic growth, the share of RES energy in gross final energy consumption in Poland was lower than in the European Union, where it reached 23% in 2022.



**Figure 53. Change in annual greenhouse gas emissions from 1990 to 2022 as CO<sub>2</sub> equivalent in the EU-27, EU-8 and Poland compared to 1990 (1990 = 100)**

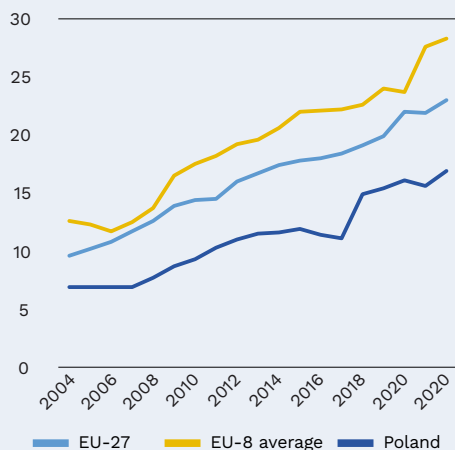


**Figure 54. Annual greenhouse gas emission reductions in the EU-27 and EU-8 from 1990- 2021 (%)**

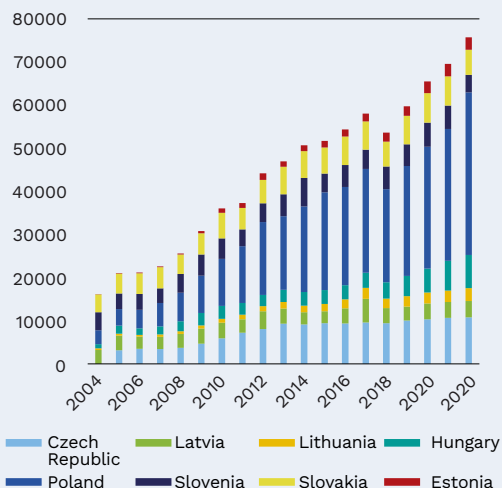


Source: prepared by PEI based on Eurostat data (2024).

**Figure 55. Share of RES in gross final energy consumption in the EU-27, EU-8 and Poland (%)**



**Figure 56. Electricity production from RES (GWh) in the EU-8 countries**

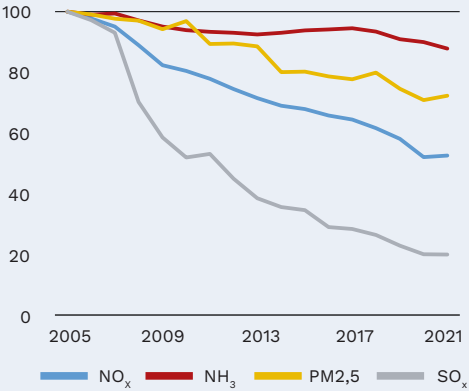


Source: prepared by PEI based on Eurostat data (2024).

**Between 2005 and 2021, the number of premature deaths related to fine particulate air pollution across the EU fell by 75% (www2).** The improvement in air quality was made possible by the transformation of the energy, transport, and heating sectors. Air pollution in the EU for PM<sub>2.5</sub> particulate

matter fell by 28%, nitrogen oxides by 47%, sulphur oxides by 80% between 2005 and 2021. **These changes also had a positive impact on air quality in the EU-8 countries, where PM2.5 pollution fell by 31%, nitrogen oxides by 15%, sulphur oxides by 51%.** Among the EU-8 countries, the largest reductions in air pollution in terms of sulphur oxides and nitrogen oxides occurred in Slovenia: 90% and 53% respectively, and for PM2.5 particulates in Slovakia - 48%. **Poland achieved the largest reductions for sulphur oxides emissions - 65%, which are mainly generated during the combustion of solid fuels, and for nitrogen oxides - 31%, the source of which is transport and industrial processes** (www3).

Figure 57. Change in emissions of the main air pollutants in the EU from 2005 to 2021 (2005 = 100)



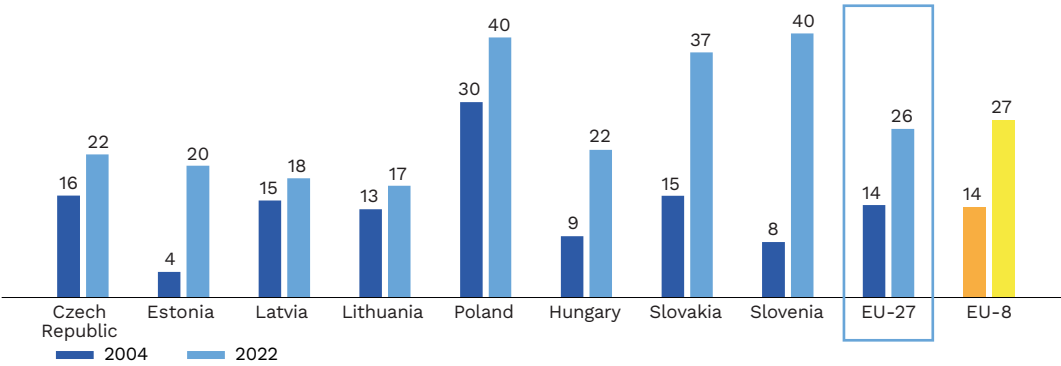
Source: prepared by PEI based on EEA data (2024).

Table 4. Change in emissions of major air pollutants in the EU-8 in 2021 compared to 2005 levels (%)

State	Ammonia NH <sub>3</sub>	Nitrogen oxides NO <sub>x</sub>	Particulate matter PM <sub>2,5</sub>	Sulphur oxides SO <sub>x</sub>
Slovenia	-11	-53	-38	-90
Poland	-10	-31	-8	-65
Slovakia	-23	-45	-48	-83
Hungary	-4	-39	-7	-67
Czech Republic	-10	47	-44	-67
Estonia	-2	47	-43	-84
Latvia	4	-27	-35	-58
Lithuania	-2	-18	-23	-59
EU-8 average	-7	-15	-31	-51
EU-27	-10	-48	-46	-76

**The total area of protected areas in the EU-8 countries has almost doubled since their accession.** Slovenia has the largest number of protected areas with 40.1% and Poland has 39.6%. **Since Poland's accession to the EU, the surface area of protected areas in the country has increased by 33%, but this lower rate is also due to the size of protected areas in the base year** (www1). Over the past two decades, both the number and size of protected areas have increased. In 2022, 25.6% of areas in the EU were protected, 84% more than in 2004. According to the European Commission, protecting biodiversity and habitat quality has a positive impact on the EU economy. According to calculations by the European Energy Agency, by reducing the exploitation of the oceans and protecting pollinating insects, a loss of EUR 820 billion could be avoided globally by 2050 (European Commission, 2023a).

**Figure 58. Protected area in 2004 and 2021 in EU-8 countries (%)**



Source: prepared by PEI based on OECD data (2024).

The European Union is taking extensive measures to preserve biodiversity and restore natural ecosystems. One of the most significant steps in this direction is the Natura 2000 programme, which was established in 1992 and now comprises the largest coordinated network of protected areas in the world. **In 2022, 18.5% of the European Union's areas were covered by the programme (EEA, 2024).** In the context of the European Green Deal in 2020, the European Commission presented the 2030 Biodiversity Strategy (European Commission, 2020i). This is a plan that aims to restore natural areas and biodiversity by 2030. It contains concrete commitments and actions to protect nature and reverse ecosystem degradation, based on existing nature legislation, such as:

- introducing legal protection for at least 30% of land areas and 30% of marine areas (in 2023, 26% of land areas and 12% of marine areas were protected in the EU),
- allocating 25% of agricultural land in the EU to organic farming (in 2021, the share of organic farming in the EU was 9.9%, in Poland 3.8%),
- a 20% reduction in the use of mineral fertilisers,
- a 50% reduction in the use of chemical pesticides,
- planting of 3 billion additional trees by 2030 (12.5 million planted by 2023),
- restoring the free flow of 25,000 km of rivers.

In addition, on 22 June 2022, the European Commission presented a proposal for a regulation on nature restoration (European Commission, 2022). Among other things, the regulation will set targets for peatland restoration, increased biodiversity, and pollinating insect populations. The document's objectives also include the restoration of 30% of areas in poor condition by 2030 and 90% by 2050.

# Perspectives

**The development paths of the eight Central European countries analysed testify to the enormous socio-economic success that has been achieved through membership of the European Union.** Without question, opting for the direction of European integration in the 1990s gave these countries a very positive impetus for transformation, that was reinforced by financial resources and cooperation with more advanced countries in the post-accession period. At the same time, Central Europe was not, and is not, homogeneous – the countries started integration in 2004 from different starting points, and their achievements in particular areas were also uneven.

However, the closing of the income gap with Western Europe is accompanied by a feeling of insufficient convergence within the higher value-added and high-tech sectors as well as an insufficient share of resources allocated to research and development or health care. These issues point to the need for further efforts to ensure convergence with the leaders. This task should be understood no longer as purely income convergence or narrowing of the gap in the complexity of industrial production, but also should cover an improvement of the quality of health care, education, the introduction of innovations to the market, or the protection of the environment and the health of the region's inhabitants through further reductions in pollutant emissions.

Good examples from the region, in terms of introducing significant qualitative changes in the functioning of institutions, are the conditions for the development of e-government in, for example, Estonia or Poland. It is worthwhile continuing and developing such initiatives and to use them as positive examples of change, allowing the region to rise above the level achieved in Western European countries.

# Annex 1. Synthetic control method

In this case, the synthetic control method consists in constructing a counterfactual model of a country's economy based on assembling that economy from other economies that have not joined the EU. With this method, a counterfactual scenario is determined based on the actual data of several to a dozen countries. The selection of countries for such a scenario is based on the similarity of the structure and level of development of the economies of other countries that did not join the EU after 2004 or were not in it during the period under study. Individual countries are assigned appropriate weights which, multiplied by the indicator under consideration - in our case, PPP GDP per capita at constant 2017 prices - give the score of the country under study. The weights are assigned in such a way as to minimise the error function, i.e. the squared difference between the weighted average of several variables intended to represent the society, economy, and level of development of the donor countries, and the average values of these variables for the countries under study in the years before accession. In this way, the weighted average of the GDP per capita of these countries can be expected to show similar development to the EU-8 country in question, had it not joined the EU. To reduce the vulnerability of the survey to the choice of base year, in the PIE calculations we considered the average performance of the variables over the period 1998-2004 (i.e. from the start of accession negotiations to EU accession). Many of the changes associated with EU entry were anticipatory.

We considered the following variables in the analysis, which determined the similarity weights for the countries analysed:

- mentioned GDP per capita (in 2017 USD at PPP),
- the share of value added generated in agriculture in GDP,
- the share of value added generated in industry in GDP,
- share of investment in GDP,
- GDP (2015 USD),
- population growth,
- estimated length of study,
- share of people with tertiary education.

Apart from the estimated length of learning, we obtained the remaining data from the World Bank's World Development Indicators. The data on estimated

length of learning comes from the indicators considered for the Human Development Index (UNDP).

Within the framework of the presented method, one should try to make sure that several important assumptions are met (Abadie, 2021; Abadie, Vives-i-Bastida, 2021). First, the weights forming the synthetic version of a given country must add up to unity. Second, in the counterfactual scenario, the country should develop similarly to the actual scenario in the pre-intervention period. Several methods are used for this purpose, including a similarity test based on the average of the pre-intervention period rather than just one year. The authors of the method also draw attention to the issue of the number of donor countries considered in the similarity calculation and the number of variables taken into account. According to the study, an increase in the number of variables or the number of units taken into account does not increase the accuracy of the calculation, quite the opposite. It is also important that the number of donor countries determining the counterfactual is not too large, in fact, that it is smaller than the number of variables taken into account.

In the PIE study, we have tried to follow the above principles in developing counterfactual scenarios for individual Central European countries. For this reason, we limited the number of countries considered in the study to 36. Compared to other studies, e.g. Hagemejer, Michalek and Svatko (2021), we expanded the group of countries to include several at a lower level of development and at the same time removed Russia and Ukraine due to the possible effects of Russia's invasion of Ukraine. The full list of donor countries and the weights assigned to them in the study can be found in the table below. We used the R package proposed by Abadie, Diamond, Hainmueller (2011) in the study.

The method was proposed by Abadie and Gardeazabal (2003). It was originally used to estimate the impact of terrorist attacks in the Spanish Basque Country on its development or, in 2007, - the impact of a nicotine reduction programme in California (Abadie, Diamond, Hainmueller, 2007). The three of them in 2015 produced a study on the impact of German reunification in 1990 on West Germany's GDP per capita (Abadie, Diamond, Hainmueller, 2015). Like any method that creates hypothetical scenarios, this one too has its shortcomings. First and foremost, the method does not take into account many factors that affect the economy or social development. However, it is one possible way of measuring - in this case - the benefits of European integration. In contrast to simple extrapolation, significant events are taken into account, such as a financial crisis or a pandemic, because the method is based on actual data from other countries. At the same time, it tries to limit the effect specific to one country only by assembling a counterfactual scenario from the development path of several countries.

The result for Poland in the study indicates a GDP per capita PPP 39% higher by 2022 compared to the counterfactual scenario. In analogous studies using the synthetic control method, the results indicated a 20% higher GDP per capita growth between 2004 and 2017 (Czernicki et al., 2019), 22-53% between 2004 and 2019 (Hagemejer, Michalek, Svatko, 2021) or 6% between 2004 and 2018 (Campos, Coricelli, Moretti, 2019).

**Table 5. Donor country weights for the counterfactual scenario**

State	CZE	SVK	SVN	LVA	LTU	EST	HUN	POL
ALB	0	0.333	0.093	0.061	0	0.004	0.265	0
ARG	0	0	0	0	0	0	0	0
AUS	0.029	0.112	0	0.161	0.001	0	0.170	0.113
BLR	0	0.111	0.018	0.757	0.822	0.297	0.422	0.554
BRA	0	0	0	0	0	0	0	0
CAN	0	0	0	0	0.155	0	0	0
CHE	0.124	0.118	0.002	0	0.022	0	0.143	0.044
CHL	0	0	0	0	0	0	0	0
CHN	0	0.128	0	0	0	0	0	0
COL	0	0	0	0	0	0	0	0
DZA	0	0.002	0.157	0	0	0	0	0
ECU	0	0	0	0	0	0	0	0
EGY	0	0	0	0	0	0	0	0
GTM	0	0	0	0	0	0	0	0
IDN	0	0	0	0	0	0	0	0
ISL	0	0	0.405	0	0	0	0	0
ISR	0	0	0	0	0	0	0	0
JPN	0.289	0	0	0	0	0	0	0.001
KAZ	0.527	0.135	0	0	0	0	0	0
KOR	0.031	0	0.325	0	0	0.699	0	0
MAR	0	0	0	0	0	0	0	0
MDA	0	0	0	0	0	0	0	0
MEX	0	0	0	0	0	0	0	0
MKD	0	0	0	0	0	0	0	0
MYS	0	0	0	0	0	0	0	0
NZL	0	0	0	0	0	0	0	0
PER	0	0	0	0	0	0	0	0
PHL	0	0	0	0	0	0	0	0
PRY	0	0	0	0	0	0	0	0
SRB	0	0	0	0	0	0	0	0
THA	0	0	0	0	0	0	0	0
TUN	0	0	0	0	0	0	0	0
TUR	0	0	0	0	0	0	0	0
URY	0	0	0	0	0	0	0	0.278
USA	0	0	0	0.021	0	0	0	0.010
VNM	0	0.061	0	0	0	0	0	0

Source: PIE's own development.

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