Structural Challenges

2024

NÁRODNÁ
BANKA
SLOVENSKA
EUROSYSTÉM

This report was discussed by the Bank Board of Národná banka Slovenska on 9 July 2024.

Contents

Abbreviations

5G	fifth-generation cellular network technology
A8	The 'Accession Eight' countries, comprising the eight central and eastern European countries that joined the EU in 2004
AMECO	The annual macroeconomic database of the European Commission's Directorate General for Economic and Financial Affairs
AMI	acute myocardial infarction
AWG	Ageing Working Group (of the ECOFIN Economic Policy Committee)
BMI	body mass index
B-O	Blinder-Oaxaca (decomposition)
CBR	Council for Budget Responsibility
CO2	carbon dioxide
CT	computed tomography
DG ECFIN	The European Commission's Directorate-General for Economic and Financial Affairs
EC	European Commission
ECB	European Central Bank
EIB	European Investment Bank
EIS	European Innovation Scoreboard
ESA	European System of National and Regional Accounts
EU	European Union
EU27	The 27 Member States of the European Union
EU SILC	European Union Statistics on Income and Living Conditions
Gbps	gigabits per second
GDIM	Global Database on Intergenerational Mobility
GDP	gross domestic product
GFC	the global financial crisis
ICT	information and communications technology
IDEA	Institute for Democracy and Economic Analysis
IFP	Institute for Financial Policy (at the Slovak Finance Ministry)
IGM	intergenerational mobility
IMD	International Institute for Management Development
IMF	International Monetary Fund
ISCED	International Standard Classification of Education
ISCO	International Standard Classification of Occupations
max	maximum
Mbps	megabits per second
MRI	magnetic resonance imaging

NACE	Statistical Classification of Economic Activities in the European Community (Rev. 2)
NBS	Národná banka Slovenska
OECD	Organisation for Economic Co-operation and Development
OLS	ordinary least squares
PISA	Programme for International Student Assessment
pp	percentage point(s)
PPP	purchasing power parity
PM2.5	particulate matter with diameters of 2.5 microns or less
PPI	producer price index
R&D	research and development
ROE	return on equity
RRF	Recovery and Resilience Facility (of the European Union)
RRP	recovery and resilience plan (of the Slovak Republic)
S2	A long-term indicator of fiscal sustainability, measuring the structural primary balance adjustment that would be required to stabilise public debt over the long term
SES	Structure of Earnings Survey
SIA	Social Insurance Agency / Sociálna poisťovňa
SMEs	small and medium-sized enterprises
SODB	Population and Housing Census / Sčítanie obyvateľov, domov a bytov
SO SR	Statistical Office of the Slovak Republic
SPB	structural primary balance
UNDP	United Nations Development Programme
USD	US dollar
V4	Visegrad Four (a cultural and political alliance of four countries: Czechia, Hungary, Poland and Slovakia)
VAT	value-added tax

1 Structural challenges summary

Despite moderate improvement on the productivity front, Slovakia is still lagging behind more advanced countries. The key challenge for the Slovak economy is to accelerate productivity growth and revive convergence with more advanced countries. This will require shifting to an innovation-based economic model. Fundamental reforms are needed to improve the education system, the business environment, the quality of public institutions, and the financing and organisation of research and development. It is likewise important to stem the outflow of domestic talent and, conversely, to step up efforts to attract skilled labour from abroad.

Public finances remain a significant vulnerability for the Slovak economy. The pandemic, the Ukraine war and the energy crisis, together with government measures taken in response, have impaired the sustainability of public finances. Moreover, from a long-term perspective, an ageing population will put significant upward pressure on public finances through higher government spending on pensions and, to a lesser extent, on healthcare and long-term care. To reduce the economy's vulnerability related to public finances, it is necessary to implement a credible consolidation plan that not only stabilises public debt in the medium term, but prepares public finances to face unexpected future shocks and the challenges of an ageing population.

Postponing consolidation results in its 'backloading', with an excessively high cost burden placed on future generations. Success in riding the demographic wave can be supported by policies that mobilise available labour market resources, leading to higher labour market participation, especially among older people and young women. Migration can also help in this regard; indeed, a significant inflow of young skilled workers from abroad would be necessary to stem adverse demographic trends. In the context of the working age population's shrinking share, the need to accelerate labour productivity growth is becoming ever more important. What can help to achieve this, besides the transition to an innovation-based economy, is the creation of a businesses environment conducive to investment in productive capital and in production automation. In this regard, advances in artificial intelligence present both a challenge and an opportunity.

Poor health outcomes remain a major challenge, reducing the quality of life in Slovakia. Among the issues of concern are the relatively unfavourable infant mortality trend and the rate of self-reported unmet healthcare

needs. Another risk for the future is the declining vaccination rate in the population. In addition to addressing the acute shortage and inadequate structure of healthcare staff, it is necessary to strengthen outpatient and preventive care, as well as to continue improving the efficiency of the health system. An opportunity to reduce the investment gap in the health system and increase the system's quality is provided by resources from the EU's Recovery and Resilience Facility (RFF) obtained though the implementation of Slovakia's recovery and resilience plan (RRP); however, the disbursement of these funds remains subject to high risks. At the same time, the Slovak health system is also confronted by a great challenge due to an ageing population.

Besides population ageing, other long-term challenges that Slovakia must tackle include the green transition and adaptation to climate change. The country must therefore combine the green transition and economic convergence. This transformation requires accelerating the energy renovation of buildings and decarbonising industry and transportation, as well as reducing fossil fuel dependence in other areas. To this end, it is necessary to increase the use of renewable energy sources as well as to invest in modernising the energy system. In this area, too, the effective use of RFF funds represents both a challenge and an opportunity.

Slovakia's social inclusion score deteriorated in 2023, with a marked increase in the material deprivation rate. Inflation in Slovakia peaked in early 2023, but the indexing of the minimum subsistence amount, social benefits, and (in January) pensions was insufficiently prompt to take full account of inflation, impairing the ability of many population groups to cover basic needs. What could help going forward are measures that would provide an exceptional indexing of pensions and establish full linkage of the minimum subsistence amount with the increase in living costs of low-income households. Overall, however, it would be beneficial if fiscally costly across-the-board measures were replaced with a social policy more targeted on the most vulnerable groups.

In addition to addressing the current situation of vulnerable groups, greater attention should also be paid to intergenerational mobility. This is important for ensuring long-term economic growth as well as social cohesion. Comparing former Eastern bloc countries and western European countries, there continue to be long-term differences in terms of how far the living standards of one generation – measured by educational level – exceed those of the previous generation (absolute mobility) as well as the extent to which individuals' socio-economic status depends on the status of their parents. Data also indicate that a poverty trap may be emerging in Slovakia for parents with no higher than lower-secondary education.

The good news remains that high productivity and private returns to investment in tertiary education are still preserved for younger and better educated cohorts in Slovakia. The key to supporting intergenerational mobility in the future is to focus on mitigating and compensating for initial disparities at birth, so that individuals have equal opportunities regardless of where and in what social conditions they were born. Other necessary measures should include, for example, policies aimed at reducing inequalities in education, reducing economic segregation, investing in social services, and supporting the public health and education systems.

2 Economic convergence and structural challenges

As in last year's report, the main challenges for Slovakia remain low productivity, poor health outcomes, and the economy's vulnerability in regard to the sustainability of public finances. If living standards are to converge towards the level of Western countries, it is essential to accelerate labour productivity growth. This will require fundamental reforms in the areas of education, business environment quality, public institutions, and innovation capacity. The Slovak economy's high vulnerability stems from the state of public finances, which are burdened by large fiscal deficits as well as by the expected future costs related to an ageing population. Another major challenge is significant underperformance in health outcomes and related problems in the health system. Although Slovakia scores relatively well in terms of social inclusion and the environment, it has the challenge of integrating marginalised communities and of aligning climate goals with economic convergence.

Chart 1
Outcome indicator scores vis-à-vis the benchmark
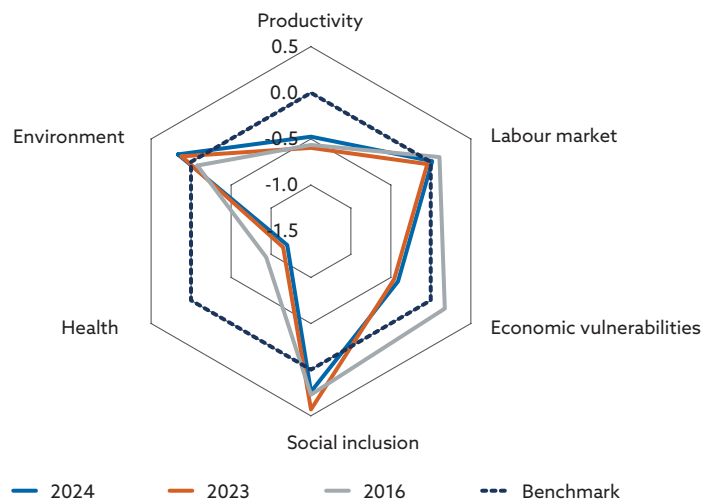
Sources: Eurostat, OECD, ECB, and NBS calculations.
Notes: The scores denote the difference between the indicator value for Slovakia and the average of the reference countries normalised by the standard deviation. Positive values denote above-average outcomes For productivity, the outcome indicator is GDP per hour worked at purchasing power parity; for the labour market, the employment rate. On other dimensions, composites of outcome indicators were used. The scores for 2023 and 2024 represent the most recent values available when producing the Structural Challenges report for the given year; the score for 2016 refers to the indicator values for that year. A more detailed description of the methodology can be found in NBS's 2021 Structural Challenges report.

Scores are changing only slightly over time. Compared with the situation described in last year's report, the country's productivity score has improved modestly. On the other hand, although social inclusion indicators

are still relatively favourable, the risks of poverty, social exclusion and material deprivation have increased further in comparison with the EU average. Compared with 2016, there has been a marked deterioration in health outcomes, the economy's vulnerability related to the state of public finances, and social inclusion outcomes. By contrast, productivity and environmental trends have been favourable.

Last year saw Slovakia's GDP per capita converge slightly towards the EU27 average. Slovakia's per capita GDP at constant prices increased by 0.8% in 2023, while the EU average remained flat. This increase was the second fastest among the A8 countries[1] (after Slovenia), reflecting the positive impact of ongoing generous energy price compensation measures and an overall loose fiscal policy, albeit at the cost of an adverse impact on the long-term sustainability of public finances. Overall, however, the average growth in Slovakia's per capita GDP growth during the crisis years of 2020–23 was at the EU level, while compared with the A8 countries, it was the third slowest, ahead of Czechia and Estonia. It is too early to assess whether last year's modest improvement in performance vis-à-vis the EU27 marks a reversal of the long-term, post–financial crisis trend of a slowing growth differential against the EU27 (Chart 3).

Chart 2
Growth in per capita GDP at constant prices (percentages)
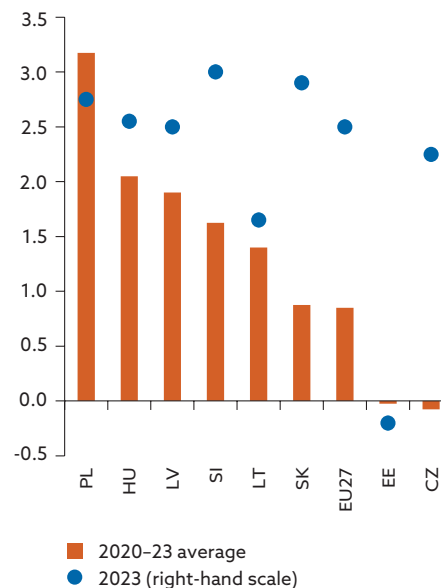
Chart 3
Gap with the EU27 in terms of average per capita GDP growth (five-year moving average differential in percentage points)

■ 2020–23 average
● 2023 (right-hand scale)

Sources: Eurostat, and NBS calculations.

— CZ   — EE   — LV   — LT
— HU   — PL   — SI   —◆— SK
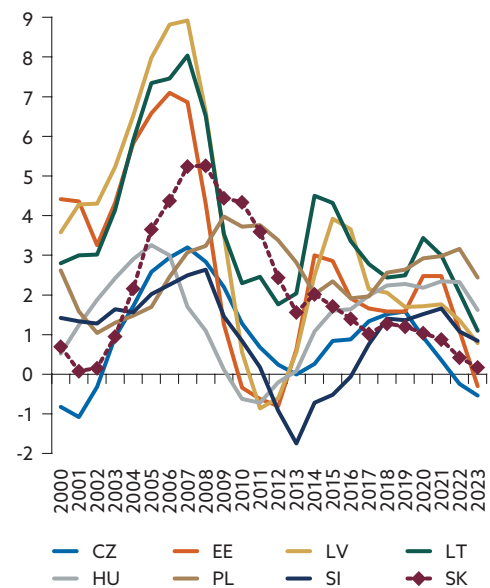
Sources: Eurostat, and NBS calculations.

[1] A group comprising the eight central and eastern European countries that joined the EU in 2004.

Last year's more positive developments do not, however, alter the overall picture of slow to stagnating convergence in recent years. The longer-term assessment of the Slovak economy's convergence, as well as its level relative to the EU27, is complicated by methodological issues and by breaks in the official data on purchasing power parity.[2] Even so, alternative estimations[3] (Chart 4) also confirm convergence stagnation related to the pandemic and Ukraine war crises. The slowdown in convergence with Western countries caused by Slovakia's growth model hitting its limits was, however, already apparent in the period following the global financial crisis.

Chart 4
GDP per capita in Slovakia (percentage of EU27 average)

— Evolution of real GDP per capita at the 2016 PPP level   — Purchasing power parity
— Optimistic estimate by Hlaváč (2023)
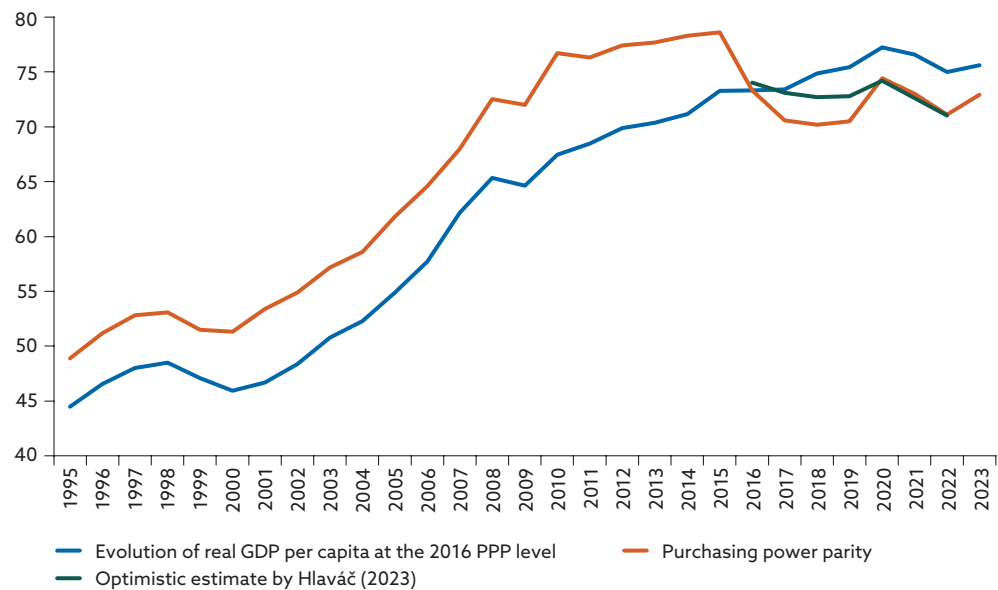
Sources: Eurostat, Hlaváč (2023), and NBS calculations.

---

[2] There is a break in the time series where post-2015 data are inconsistent with older data. Moreover, the more recent data may overstate housing prices in Slovakia. The issue is examined in, for example, Hlaváč, M., "Dobieha slovenské HDP na obyvateľa v parite kúpnej sily bohatšie krajiny EÚ?" (Is Slovakia catching up with richer EU countries in terms of per capita GDP at purchasing power parity?), Institute for Social Policy at the Ministry of Labour Social Affairs and Family of the Slovak Republic, October 2023 (in Slovak only). Similarly, compared with last year's report, the data on per capita GDP at PPP for 2020–22 have been revised closer to the estimates of Hlaváč. There has, however, been a further post-2020 data break.

[3] The view of convergence over time through the evolution of per capita GDP at constant prices should be taken as indicative given the conceptual differences between this indicator and per capita GDP at PPP. One difference is that per capita GDP at constant prices expresses the economy's productive capacity, while per capita GDP at PPP expresses people's purchasing power. Hence, the evolution of GDP at constant prices may give a more positive picture when the terms of trade are developing less favourably, i.e. when import prices are rising faster than export prices. This issue, as well as other conceptual differences, between the two indicators are highlighted in Dujava, D., "O dvoch hrubých domácich produktoch" (On two gross domestic products), Institute for Financial Policy at the Ministry of Finance of the Slovak Republic, October 2023 (in Slovak only).

While price convergence is progressing, low productivity is reflected in relatively low incomes and consumption. Despite improvements in recent years, Slovakia's major challenge remains low labour productivity, which has a direct impact on compensation per employee and household incomes. These are therefore still lagging far behind the EU27 average and are also reflected in a low level of consumption. On the other hand, prices are converging more quickly towards the EU level, with last year seeing the comparative price level reach 81% of the EU27 average. On the positive side, however, the gap between Slovakia and the EU27 in terms of compensation per employee and individual consumption per capital narrowed slightly even during the crisis years.

Table 1 Economic convergence indicators (percentage of EU27 average; PPP)								
Indicator	2016	2017	2018	2019	2020	2021	2022	2023
Gross domestic product per capita	73.3	70.6	70.2	70.5	74.4	73.0	71.2	72.9
Labour productivity per hour worked	72.9	70.5	70.0	70.6	76.1	78.6	76.5	78.7
Gross adjusted disposable income per capita	68	66	67	68	71	71	72	
Actual individual compensation per capita	69.8	68.7	68.7	70.1	76.0	75.1	77.9	76.7
Compensation per employee	63.7	63.1	63.3	65.2	69.5	70.5	69.1	70.7
Compensation per hour worked	60.1	60.3	60.8	63.0	68.3	71.3	69.2	70.6
Comparative price level of GDP	72.4	75.2	77.6	78.4	76.6	77.2	79.3	81.0
Comparative price level of actual individual consumption	72.3	75.7	78.5	78.9	76.6	77.2	80.2	
Comparative price level of household final consumption	78.0	82.4	84.6	86.1	83.2	83.9	86.4	

Sources: Eurostat, and NBS calculations.
Notes: Eurostat data at (nominal) purchasing power parity may in recent years have been affected by issues with the estimation of PPP for Slovakia. PPP represents an artificially constructed common currency that eliminates price level differences across countries and therefore allows volume indicators of different countries to be compared.

Slovakia's international ranking for competitiveness has declined further in 2024. In the World Competitiveness Ranking produced by the Institute for Management Development (IMD), Slovakia fell six places from its position in 2023, to lie 59th out of the 67 countries surveyed. The only factor in which Slovakia did not decline was economic performance. On the other hand, its largest deterioration was in the government efficiency factor through worsened performance in the public finance, institutional framework and business legislation sub-factors.

Slovakia is also continuing to underperform in terms of innovation. In the 2023 European Innovation Scoreboard (EIS), Slovakia maintained its ranking of 23rd out of 27 EU countries. Its biggest score improvement was in the area of human resources, through indicators such as the percentage of people participating in lifelong learning and the number of students

from other countries who are pursuing doctoral degrees within the country's universities. The largest decline was in its score for collaboration of small and medium-sized enterprises in innovative projects. Czechia significantly improved its EIS ranking last year, rising by three places.

Table 2 V4 countries in rankings of competitiveness and innovation									
IMD – World Competitiveness Ranking									
	2016	2017	2018	2019	2020	2021	2022	2023	2024
Slovakia	–	–	55	53	57	50	49	53	59
Czechia	–	–	29	33	33	34	26	18	29
Hungary	–	–	47	47	47	42	39	46	54
Poland	–	–	34	38	39	47	50	43	41
European Innovation Scoreboard									
	2016	2017	2018	2019	2020	2021	2022	2023	2024
Slovakia	21	20	22	22	22	23	23	23	-
Czechia	16	16	17	18	18	17	17	14	-
Hungary	20	21	20	21	21	21	22	21	-
Poland	24	24	23	24	24	24	24	24	-

Sources: IMD, and EC – EIS.

2.1 Economic performance

As regards productivity, Slovakia's score has improved slightly year-on-year, but the task of accelerating labour productivity remains a major challenge. After falling in 2022, hourly labour productivity made a positive contribution to Slovakia's economic growth in 2023 (Chart 5). Furthermore, productivity growth was higher than the EU27 average, as reflected in a slight narrowing of the respective productivity gap. Overall, Slovakia's economic growth over the period 2020–23 was slightly higher than the EU27 average (Chart 6). Slovak GDP growth in this period was supported by hourly labour productivity growth. At the same time, hours worked per employee declined sharply. This trend was out of line with developments at the EU27 level and in other V4 countries. Another factor that had a positive impact on GDP growth was the increasing number of people in employment relative to the working age population, though to a much lesser extent compared with EU27 and with other V4 countries. In Slovakia, as in other countries, population ageing is having a negative impact in this regard, and this issue is addressed in more detail in Section 3.

Chart 5

Contributions to real GDP growth in Slovakia (percentage point contributions; percentages)

- ■ Hourly labour productivity
- ■ Hours worked per employee
- ■ Employment (ESA 2010) in the working age population
- ■ Working age population as a share of total population
- ■ Total population
- ● Gross domestic product
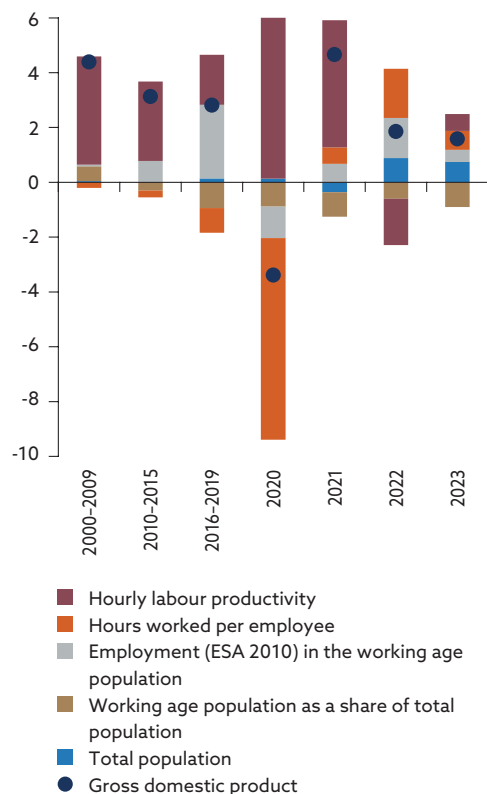
Sources: Eurostat, and NBS calculations.

Chart 6

Contributions to real GDP growth in V4 countries and the EU27 (average growth for 2020–23)

- ■ Hourly labour productivity
- ■ Hours worked per employee
- ■ Employment (ESA 2010) in the working age population
- ■ Working age population as a share of total population
- ■ Total population
- ● Gross domestic product
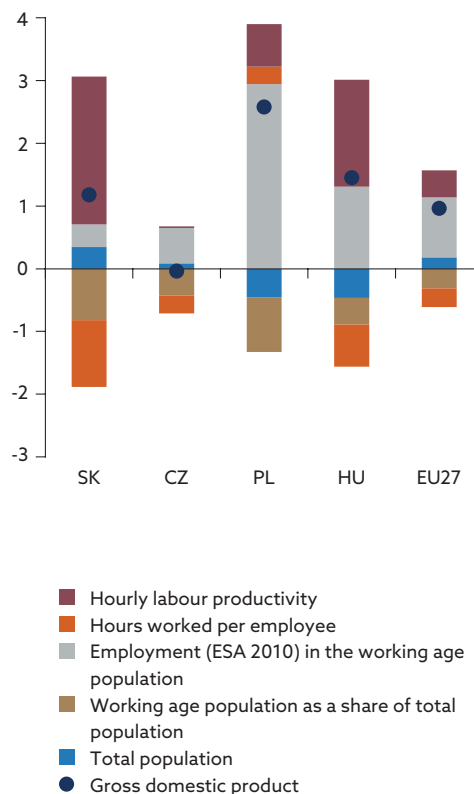
Sources: Eurostat, and NBS calculations.

The growth in hourly productivity during the pandemic crisis may be permanent, but the need to accelerate its growth remains a challenge for the future. Hourly productivity growth during the pandemic was partly caused by a reallocation of hours worked in favour of more productive firms,[4] while in the first year it was accompanied by a sharp decline in hours worked. In 2022 there was already a recovery in hours worked and a decline in labour productivity. In 2023 growth in hourly labour productivity picked up slightly, and hours worked per employee also increased. Overall, however, hourly labour productivity increased by almost 10% from 2019 to 2023, the fourth highest rise among EU countries (Chart 7). Given the decline in hours worked per employee, the increase in labour productivity per employee was around half as large; even so, it was ten times higher than the EU27 average. But although the Slovak economy managed to increase productivity more substantially compared with most EU countries, productivity growth was relatively low, especially in the case of productivity growth per employee. In the long term, particularly in the context of an

---

[4] The pandemic's impact on the Slovak economy is examined in more detail in NBS's 2022 Structural Challenges report.

ageing population, it is necessary to reverse the slowing trend in labour productivity growth (going back to before the pandemic) and to ensure sustained dynamic growth in productivity.

Chart 7
Productivity growth from 2019 to 2023 in EU countries (percentages)
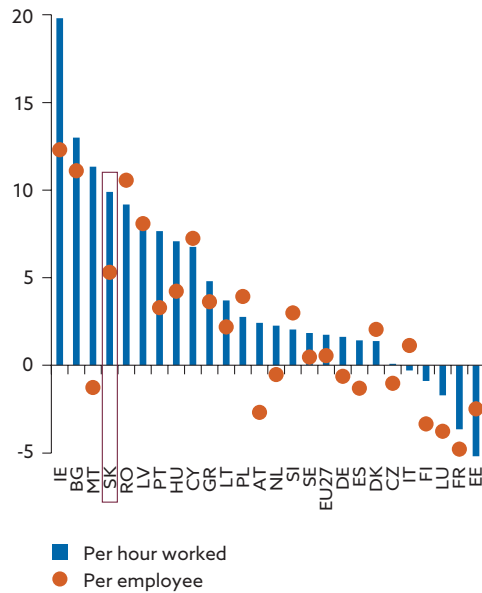
Sources: Eurostat, and NBS calculations.

Chart 8
Average growth in labour productivity per hour worked and per employee (percentages)
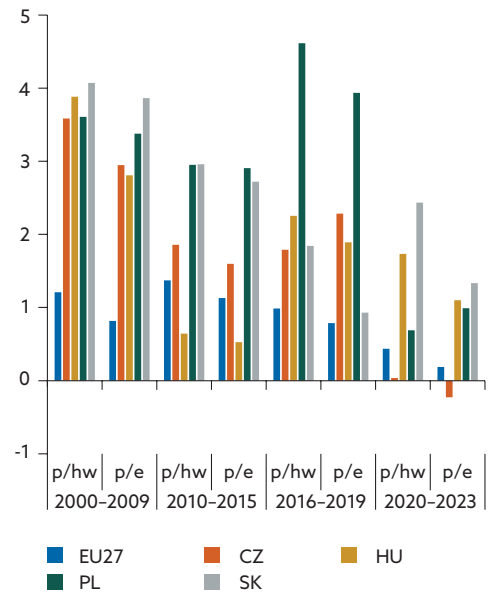
Sources: Eurostat, and NBS calculations.
Note: p/hw – per hour worked; p/e – per employee.

If Slovakia is to accelerate productivity growth, its economy must become more innovation-based. However, according to the European Innovation Scoreboard (EIS), the country continues to underperform in many areas and is not managing to reduce these deficiencies. Slovakia is lagging significantly behind not only in respect of private investment in R&D, but also in terms of collaboration in innovation and research between different actors, such as firms, research institutions, universities, and public sector entities. Another key area in which Slovakia is underperforming is the innovation activity of small and medium-sized enterprises (SMEs). Although these firms form the backbone of the Slovak economy, their innovation potential often remains untapped. Equally concerning are the results of Slovak pupils in the international PISA assessment. Although results across OECD countries have declined in the wake of the pandemic, Slovakia is still not managing to close the gap with the OECD average (Chart 9).

Chart 9

PISA results – performance of Slovak pupils vis-à-vis the OECD average

- Science
- Reading
- Mathematics
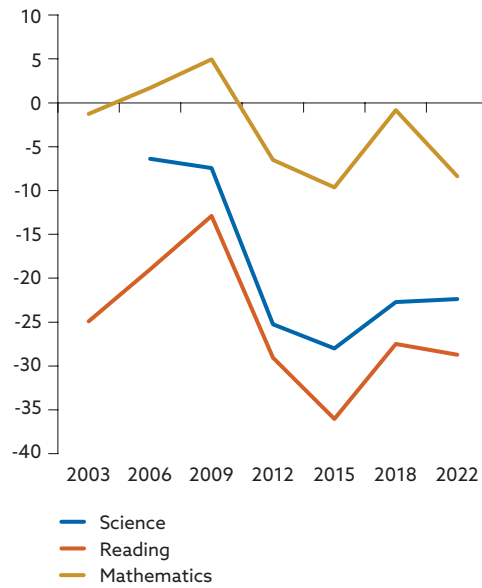
Sources: OECD, and NBS calculations.

Chart 10

European Innovation Scoreboard (index: EU 2016 = 100)

- EU 2016
- SK 2016
- EU 2023
- SK 2023
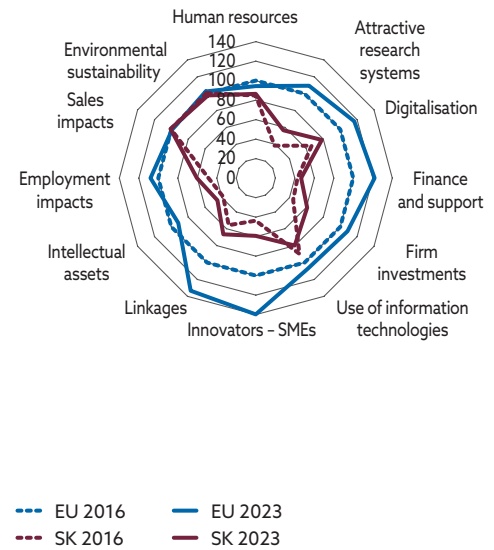
Sources: European Commission.

Chart 11

Employment rates in EU27 countries (percentages)

- 2019
- 2020
- 2021
- 2022
- 2023
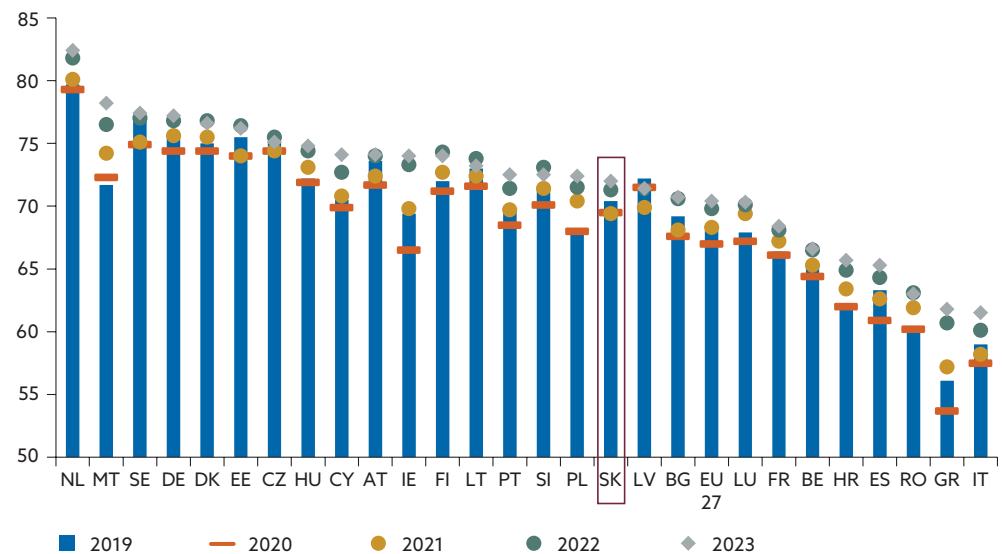
Source: Eurostat.

Slovakia's labour market score has improved slightly, given the employment rate's ongoing favourable trend. The country's employment rate continued rising in 2023, reaching 72% (Chart 11). In Slovakia and most other EU countries, the employment rate has significantly exceeded its pre-pandemic level. Compared with the EU27 average, the Slovak employment rate is 1.6 pp higher, though compared with the EU countries with the highest employment, the domestic labour market appears to still have some slack. As discussed in more detail in Section 3.2, the ageing popu-

lation will necessitate the mobilisation of all available labour market resources in the future.

The greatest impact on employment developments in Slovakia has again been the extension of the retirement age. Employment in the oldest, 55–64 cohort of the working age population increased by 2.5 pp in 2023. Although employment of both sexes in this cohort increased, the increase among women was almost twice as high, at 3.4 pp. This was because men exercised the right to take early retirement after 40 years of work far more than women did. A gender gap was also apparent among the youngest, 15–24 cohort. While male employment in this cohort fell by 1.2 pp, female employment increased by 2.0 pp. The share of young people not in employment, education or training declined by 0.9 pp and reached the EU27 average for the first time.

Table 3 Selected employment rate indicators									
Indicator		2016	2017	2018	2019	2020	2021	2022	2023
Employment rate	SK	66.7	68.1	69.5	70.4	69.5	69.4	71.3	72.0
(percentage)	EU27	65.2	66.4	67.3	67.9	66.9	68.3	69.8	70.4
Employment rate of age group 15–24	SK	25.3	27.0	27.6	25.0	22.8	20.8	21.3	21.7
(percentage)	EU27	31.1	32.2	33.0	33.4	31.4	32.7	34.8	35.2
Employment rate of age group 55–64	SK	50.5	54.6	55.9	58.8	60.2	60.6	64.1	66.6
(percentage)	EU27	53.5	55.5	57.3	58.6	58.9	60.4	62.3	63.9
Part-time employment rate	SK	4.1	4.2	3.5	3.2	3.2	3.1	3.1	3.3
(percentage)	EU27	19.6	19.5	19.3	19.3	17.8	17.7	17.6	17.8
Fixed-term employment rate	SK	5.7	5.4	4.7	4.5	3.7	3.5	3.6	3.6
(percentage)	EU27	13.7	13.8	13.7	13.2	11.9	12.1	12.1	11.6
Employment rate of persons with less than upper-secondary educational attainment	SK	15.2	16.5	16.2	15.9	13.9	13.7	15.4	16.3
(percentage)	EU27	42.6	43.6	44.4	44.9	43.6	44.1	45.9	46.4
Employment rate of persons with tertiary educational attainment	SK	82.5	83.8	84.7	85.9	85.5	85.4	86.9	87.9
(percentage)	EU27	83.0	83.8	84.3	84.8	83.8	85.0	86.0	86.3
Young people aged 15–29 not in employment, education or training	SK	15.9	16.1	14.6	14.5	15.2	14.2	12.3	11.2
(percentage)	EU27	13.6	12.8	12.2	11.7	12.8	12.3	10.9	10.4

Source: Eurostat.

2.2 Economic vulnerabilities

The Slovak economy has shown considerable resilience to negative shocks resulting from the pandemic crisis, the war in Ukraine and, to a lesser extent, the energy crisis, while its Achilles heel continues to be the state of public finances. Recent crises necessitated the introduction of several

support schemes financed by domestic public funds or EU funds,[5] resulting in an increase in public finance risks. According to the European Commission's S2 indicator,[6] Slovakia's debt sustainability risk is the highest in the EU, despite improving slightly year-on-year. With the link between the retirement age and life expectancy having been reintroduced, the expected adverse impact of population ageing has been mitigated. This positive effect has, however, been partially cancelled out by a further deterioration in current fiscal performance. The Slovak economy is therefore confronted by the major challenge of restoring public finances and stabilising public debt growth in the medium term, while becoming prepared for the future fiscal costs of an ageing population. These fiscal costs are examined in more detail in Section 3.4.

Chart 12

Decomposition of the S2 fiscal sustainability gap indicator (2023)

Initial budgetary position — Pensions
Long-term care — Other
Healthcare — S2
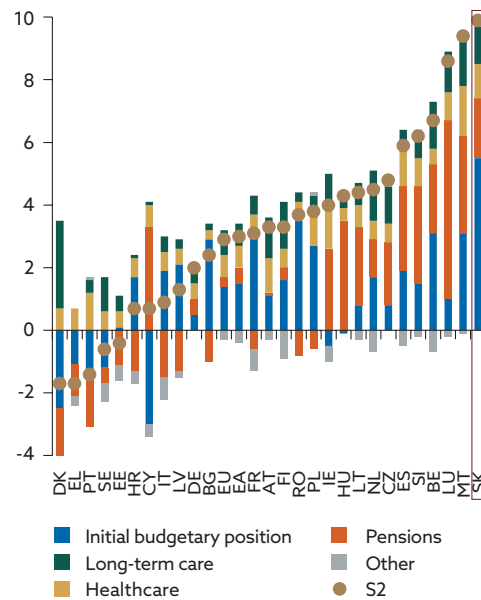
Source: European Commission.

Chart 13

Change in the S2 indicator between 2022 and 2023

Initial budgetary position — Pensions
Long-term care — Other
Healthcare — S2
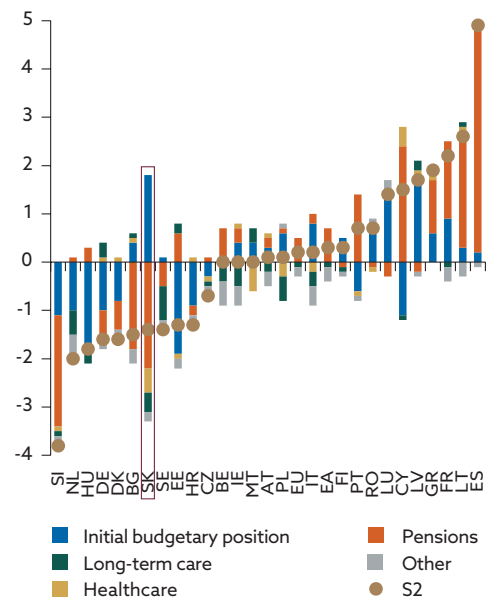
Source: European Commission.

The Slovak economy has also largely coped with negative shocks related to trends in external imbalance indicators, although risks persist in this area. With Slovakia experiencing higher consumer price inflation than its trading partners, the country has seen appreciation of its real effective exchange rate (REER) calculated on the basis of consumer price developments (Chart 15). In respect of manufacturing producer prices, however, the REER remains relatively favourable, indicating the preservation of the Slovak economy's competitiveness in industrial products. An improvement after the fading of the

---

[5] Although the use of EU funds for compensation schemes does not, unlike domestic funding, increase public debt, it has reduced funding for the country's long-term development.

[6] The S2 indicator shows the adjustment to the current structural primary balance required to stabilise public debt.

energy shock has also been seen in Slovakia's trade balance, which moved into surplus in 2023 (Chart 14). The current account balance is expected to remain in deficit despite having improved. There are less favourable developments in unit labour costs, whose growth is exceeding the EU average, and in the terms of trade and the market shares of Slovak exports (Table 10). The risks associated with Slovakia's inflation differential vis-à-vis trading partners and with its external imbalance have been highlighted in a European Commission report.[7] Moreover, according to that EC report, Slovakia's long-term competitiveness is being adversely affected by its economic model, which depends on the major contribution of large multinational corporations – especially in the automotive industry – to productivity growth.

Chart 14
Balance of payments current account (percentages of GDP)
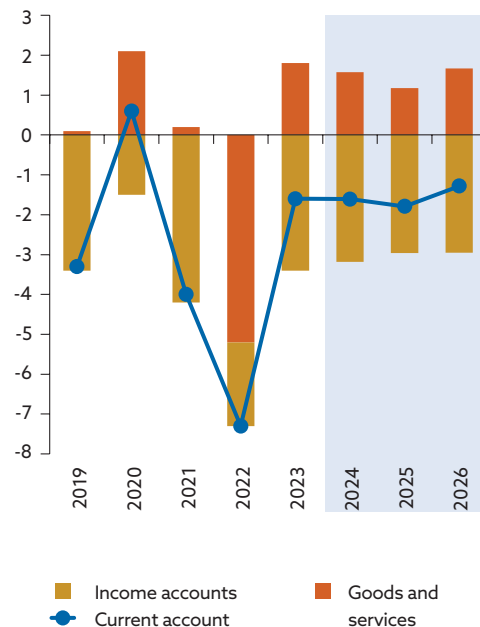
Sources: Eurostat, and NBS's Summer 2024 Economic and Monetary Developments report.

Chart 15
Real effective exchange rate (index: December 2019 = 100)
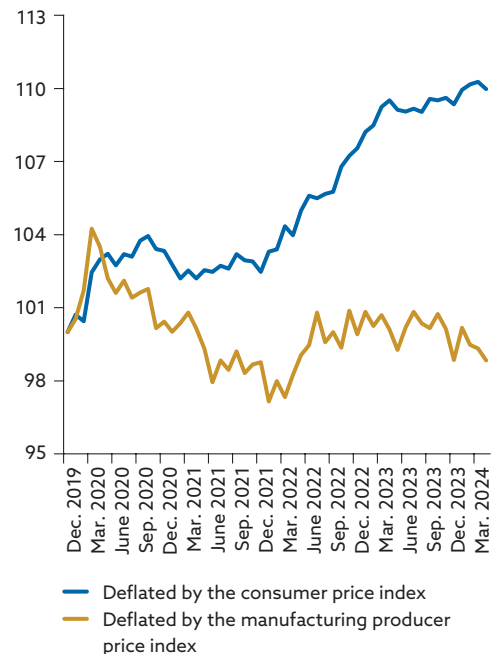
Sources: NBS calculations.[8]
Notes: Real effective exchange rate growth expresses the real appreciation of the exchange rate.

The Slovak financial sector remains stable and the financial cycle is gradually stabilising.[9] Domestic banks are able to manage risks even under an adverse scenario of economic and financial developments.[10] After its ex-

---

[7] European Commission, Commission Staff Working Document: 2024 Country Report – Slovakia.

[8] A detailed description of the methodology can be found on the NBS website.

[9] Financial sector developments are described in more detail in NBS's May 2024 Financial Stability Report.

[10] Domestic banks have increased their capital strength over the past year, and their total capital ratio reached 20.4% in the first quarter of 2024. Banks' capital headroom, i.e. surplus

pansionary trends eased significantly last year, the financial cycle is gradually stabilising.[11] Current elevated interest rates should not translate into a significant increase in non-performing loans (NPLs) unless the economic situation deteriorates. Despite facing higher debt servicing costs, borrowers are so far continuing to make their loan payments without major difficulties, and NPL ratios remain low. The burden of rising interest costs is heaviest in the commercial real estate (CRE) sector, which at the same time is facing a number of structural challenges. If the current higher interest rates were to combine with an adverse economic scenario, the CRE sector could become a source of significant credit losses, especially in its office and retail segments.

2.3   Social inclusion

Slovakia's social inclusion score has continued deteriorating year-on-year, owing to the social consequences of high inflation on vulnerable groups. In Slovakia, early 2023 saw the peak of a period of elevated inflation that has been highly challenging, especially for the most socially vulnerable groups of the population. The indexing of the minimum subsistence amount, as well as various social benefits, has proved very slow, and many of the most at-risk groups in society have become less able to meet their basic necessities.

This trend has been reflected in the material deprivation rate,[12] which in 2023 increased by 3.5 pp year-on-year, more than in any other EU27 coun-

---

of capital resources above minimum regulatory requirements, amounts to almost 3% of risk-weighted assets. Their ability to absorb losses, even in the event of an economic or financial shock, remains high. Banks' liquidity positions have also improved over the past year, owing to growth in household deposits and a slowdown in lending activity. The Slovak banking sector is thus able to fulfil all its core functions, and its lending to firms and households is not constrained by regulatory requirements. In addition, banks are reporting historically high profitability that gives them a strong basis for maintaining capital adequacy. Like the banking sector, the insurance sector has seen its profitability increase. Insurers are able to cope even under adverse scenarios of economic and financial developments. Both pension funds and investment funds have improved their performance over the past year, owing mainly to upward trends in financial markets. Under an adverse scenario, the value fluctuations of assets managed by asset management entities are directly proportional to the equity component of their portfolios.

[11] Loans to households are maintaining stable growth, and housing prices have remained largely unchanged since the summer of last year. The slowdown in lending to non-financial corporations continued in the first part of 2024, as firms' demand for loans weakened, largely as a result of elevated interest rates. Private sector indebtedness, measured as the ratio of loans to GDP, has thus been falling and ended the first quarter of 2024 at 60.4%, representing a drop of more than 6 pp over the previous year and a half. After the private debt ratio was rising sharply in previous years, its current downtrend, not accompanied by an increase in NPLs, may be considered favourable.

[12] Material deprivation is defined as a situation where an individual cannot afford goods or services considered by most people to be necessary to lead an adequate life. It therefore

try. The sharp increase in the material deprivation rate in Slovakia was accompanied by an inflation rate that was only around the 2022 EU average;[13] hence, the increase was far higher than inflation developments would imply and may be indicative of insufficiently targeted social policy (Chart 16).[14] In this context, it is worth noting the example of Romania, which despite experiencing inflation similar to that in Slovakia, managed to reduce its material deprivation rate by five percentage points. Similarly, Latvia and Estonia were able to reduce their material deprivation rate despite having the highest inflation rates in the EU (approaching almost 20%).

Chart 16
Change in the material deprivation rate and inflation in EU27 countries
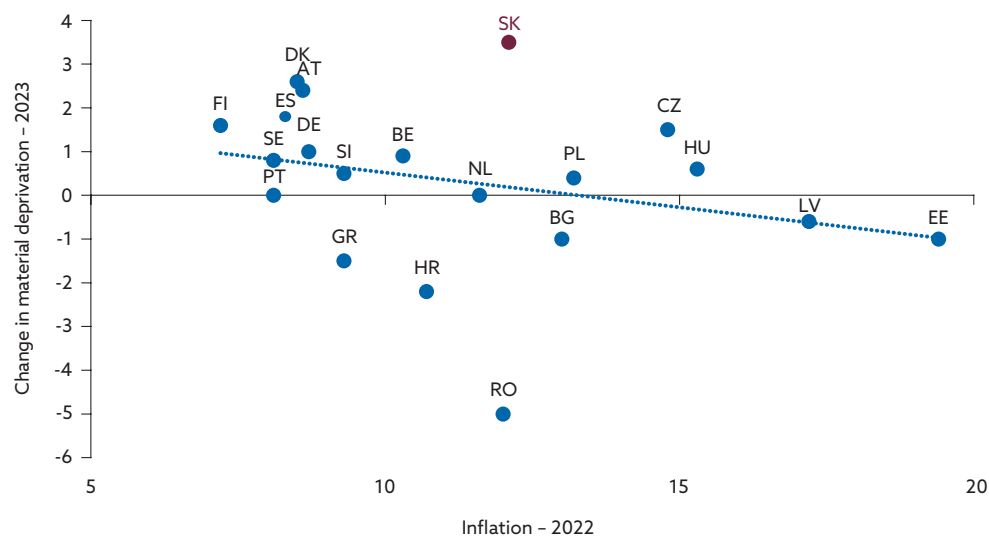
Source: Eurostat.

---

refers to the enforced inability (rather than the choice not to do so) to pay unexpected expenses, afford a one-week annual holiday away from home, a meal involving meat, chicken or fish every second day, the adequate heading of a dwelling, durable goods like a washing machine, colour television or car, being confronted with payment arrears (mortgage or rent, utility bills, hire purchase instalments or other loan payments).

[13] Material deprivation was measured in the 2023 EU statistics on income and living conditions (EU-SILC) survey, the fieldwork for which took place between February and July 2023. On the horizontal axis, we chose to present the inflation figure for 2022, because it directly preceded the EU-SILC date collection survey and it is a complete year. It is likely that some respondents answers were affected by price developments in the first half of 2023, but assessing their weighting is difficult.

[14] A chart plotting the change in material deprivation and the inflation rate in the previous period shows, counterintuitively, that when inflation is higher the material deprivation rate is lower.
It should be noted, however, that this is a case of apparent correlation, not causality. For converging countries, both the price level and the ability to afford basic necessities are converging in parallel. At the same time, in a high inflation environment, the difficulties of the most vulnerable social groups become more acute and far more attention is paid to addressing them than during relatively calm periods of low inflation.

The share of people at risk of poverty or social exclusion (AROPE) did not rise as dramatically in 2023. Overall, the AROPE rate increased by 1.1 pp, largely because of the rate increases for single-person households aged over 65 and for households with two adults and two dependent children. The share of single pensioners at risk of poverty or social exclusion was 6.8 pp higher in 2023 than in 2022. With an AROPE rate of 36.8%, they were among the most at-risk groups of the population, along with single-parent households with one dependent child and households with two adults and three or more dependent children. For these latter groups, the AROPE rate did not increase, and in the case of households with two adults and three or more dependent children, it improved significantly, rising by 6.7 pp back to its 2017 level.

Pensions have not gone unnoticed by policymakers. In 2023 considerable resources were allocated to pension indexation, thirteenth pensions, parental pensions, and the unfreezing of minimum pensions. Although many of the measures were already having an effect in the first half of last year, there was no reduction in the AROPE rate or material deprivation rate for pensioners. On the contrary, the rates increased more for this group of households than for any of the others surveyed. An across-the-board increase in pensions may not necessarily be enough to protect the most vulnerable citizens, thus it is important to make social policy more targeted.

The failure to adequately target social policies at the most vulnerable groups is further evidenced by the year-on-year trends in the AROPE rate and material deprivation rate. In 2023 the AROPE rate increased year-on-year for two of the surveyed population groups: households with two adults and two dependent children, and single households aged over 65. The material deprivation rate, which primarily shows whether a household is able to afford all basic necessities, increased for all but one of the six monitored groups, the only exception being two-parent households with three or more dependent children.

The only group for which the AROPE rate increased faster than the material deprivation rate was households with two adults and two dependent children. This means that their income after taxes and transfers from the state increased more slowly than the median household income. At the same time, however, a much larger proportion of these households did not fall into a situation where they could not afford basic necessities.

Chart 17

Change in the material deprivation rate and AROPE rate by type of household (percentage point change between 2022 and 2023)
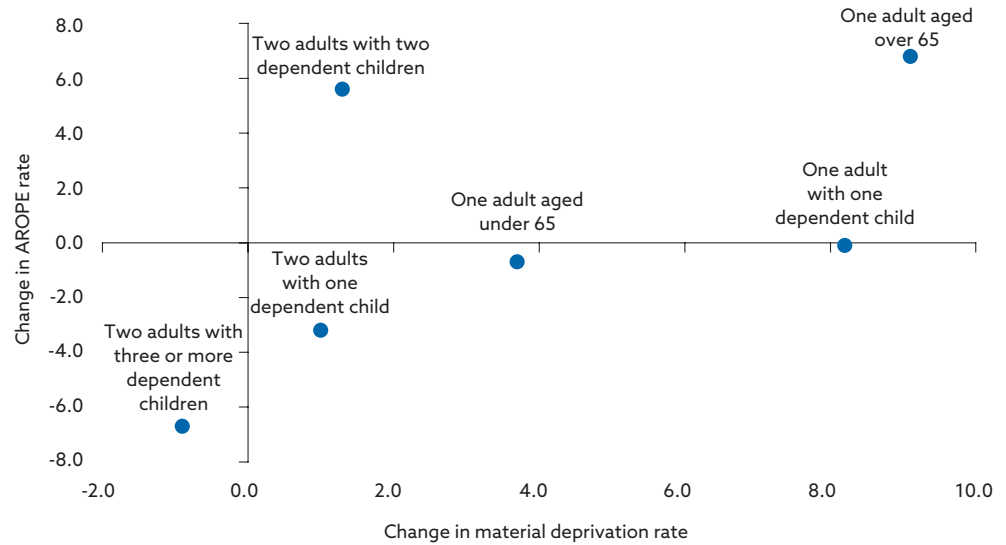
Source: Eurostat, and NBS calculations.

Future periods of high inflation should be easier to cope with, thanks mainly to the introduction of an exceptional indexation of pensions and to the linking of the minimum subsistence amount exclusively to the increase in living expenses of low-income households. Before this change, the minimum subsistence amount was raised by either the increase in living expenses of low-income households or the increase in net household income per person, whichever was lower. During the period of low inflation, this formulation contributed to an increase in the tax wedge and meanwhile did nothing to brace the most vulnerable household groups for the headwinds of high inflation. Indeed, the level of most social benefits is linked to the level or increase of the minimum subsistence amount. Meanwhile, the pension indexing system did not respond promptly enough. The annual inflation rate passed the 5% level back in October 2021, but its acceleration was not reflected in pension indexation until January 2023. In that period, the price level increased by a cumulative 19.1%.

The gender pay gap has again increased slightly. In 2022, the most recent year for which data are available, the gender pay gap in Slovakia widened for a second successive year. This may be because the gaps were low in previous years as a result of various crises, not because the structural reasons for the differences were no longer present. A similar trend is observed in most EU countries, although Slovakia is among those with the largest increase in inequality. In Box 1 we look at the gender pay gap in more detail.

Box 1
The gender pay gap in Slovakia is stubbornly high[15]

The gender pay gap in Slovakia is among the highest in the EU (Chart A), with women earning around 20% less per hour of work than men. In Italy and Belgium, by contrast, the average wages of men and women are virtually the same. Such considerable heterogeneity between European countries may be caused by various cultural and historical factors, as well as by institutional and legislative conditions and the settings of social and family policy.

Chart A
The ratio of women's average hourly wage to men's average hourly wage by EU country (percentages)
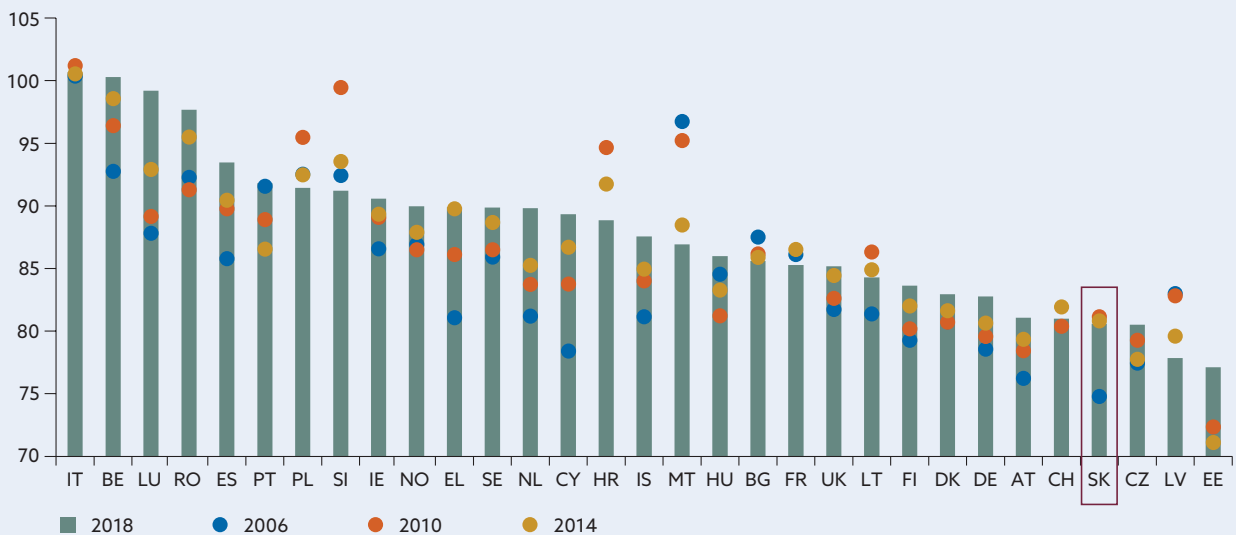
Source: Structure of Earnings Survey (survey waves in 2006, 2010, 2014 and 2018) – Eurostat database.

What explains gender pay gap differences between European countries?

Using a regression analysis, we examined the **most relevant measurable factors** that may be related to gender pay gaps.[16] Our analysis was based on a panel of 31 countries observed

---

over four waves of the European Commission's Structure of Earnings Survey (SES waves in 2006, 2010, 2014 and 2018).[17] The results show that three main institutional factors are related to gender wage gaps. The first is the **tertiary education rate among women**, as tertiary education makes women more competitive in the labour market. The second factor relates to public policy settings in the area of maternity and parental allowances and education and childcare services (nurseries and kindergartens). These policies can help women return to work sooner after giving birth. The third factor we identified was the **collective agreement coverage of employees**, which we interpret as a potential protective function of trade unions against gender discrimination.

The results of the regression model estimates are shown in Table A. The columns differ in the chosen dependent variable for particular regressions, i.e. the ratio of women's average hourly wage to men's average hourly wage for full-time work, in the whole economy and in selected subgroups: employers in industrial sectors, employers in services, non-manual occupations, and manual occupations. The positive and increasing dummy variable coefficients for the survey years confirm the gradual trend of a diminishing gender pay gap in Europe. Negative coefficients of differences in labour market participation rates indicate that countries with higher female participation have higher pay gaps. This may be because the additional group of economically active women comprises mostly lower-skilled individuals in occupations with higher gender gaps. In terms of education, the gender pay gap is lower where the ratio of women with tertiary education to men with tertiary education is higher. Where the median paid maternity and parental leave is longer, the gender pay gap tends to be higher, albeit not to a statistically significant extent. Countries which have a higher rate of nursery attendance for children aged 0–3 have slightly lower gender pay gaps. In countries where the collective agreement coverage of employees is higher than 16%, the gender pay gap is a few percentage points lower.

---

a value of 1 if the length of paid maternity and parental leave exceeds the median value of 120 days; the nursery attendance rate for children aged 0–3; and a dummy variable with a value of 1 if the collective agreement coverage of employees is higher than 16% (the first quartile in the sample). As part of the sensitivity analysis, we included additional potential explanatory variables in the model, such as the age of women at the birth of their first child, the average age of women at marriage, the fertility rate, the difference in life expectancy between women and men, and the gender unemployment gap. However, once the model accounted for the gender gap in labour market participation, the other indicators were not statistically significant. Furthermore, when selecting different cut-off values for the dummy variables related to the length of paid maternity and parental leave and the collective agreement coverage rate, the results were not as robust across model specifications. We applied similar considerations when selecting the age group of children attending formal education and childcare facilities. For older age groups, no statistical relationship between attending educational facilities and gender pay gaps was confirmed.

[17] Aggregate average wage data comes from the SES survey, while other variables were taken from other publicly available sources (e.g. the OECD database).

Table A Socio-economic and institutional determinants of wage gaps between women and men					
Dependent variable: ratio of women's hourly wages to men's hourly wages	**(1)** Whole economy	**(2)** Industrial sectors	**(3)** Services	**(4)** Non-manual occupations	**(5)** Manual occupations
Years (base: 2006)					
2010	1.906**	2.072***	5.598***	3.368***	0.574
2014	3.316***	3.719***	7.050***	4.899***	2.318**
2018	4.424**	5.081***	8.486***	6.082***	3.327**
Difference in labour market participation rate (female–male)	-0.630***	-0.165	-0.263**	-0.599***	-0.295**
Difference in tertiary education rate (female–male)	0.313*	0.089	0.220	0.373**	0.028
Length of paid parental leave >120 days	-0.829	-2.102	0.419	-0.951	-0.347
Nursery attendance rate for children aged 0–3	0.116	0.181***	0.030	0.140***	0.144***
Collective agreement coverage for employees >16%	4.276**	3.526*	3.163	4.318**	2.475
R^2	0.376	0.397	0.289	0.474	0.336
Number of observations	116	115	115	116	112
Number of countries	31	31	31	31	31

Sources: Eurostat, OECD, and own processing.

Notes: Coefficient estimates were made using the OLS method. An intercept was included in each equation. *, **, and *** denote statistical significance at the level of 10%, 5%, and 1% respectively, based on standard errors clustered by country. Industrial sectors: mining and quarrying, manufacturing, and construction. Services: other sectors excluding public administration, defence, and activities of households. Non-manual occupations comprise managers, professionals, technicians, and clerical support workers (groups 1, 2, 3 and 4 according to the ISCO classification); manual occupations comprise craft and related trades workers, plant and machine operators, and elementary occupations (ISCO groups 7, 8 and 9).

What characteristics of individuals are related to pay gaps in Slovakia?

Overall, the results for Slovakia show that women earn less than men, especially in larger and more productive firms and in the sectors of industry and public services. Furthermore, women are at a greater pay disadvantage in medium-skilled blue-collar occupations as well as among employees with no higher than secondary vocational education. Pay gaps also widen where women remain in a particular job for a longer period. As for gender pay gaps across age groups, the gap is largest in the 30–49 age group, when women are most involved in childcare.

The decomposition results[18] show that the **overall pay gap[19] was considerably lower from 2010 than in the previous decade, but has largely stagnated since 2010** (see columns 1-2 and 3-5 in Table 17). The most significant contributor to the overall gap is the so-called unexplained component stemming from different regression coefficients for the female and male parts of the sample. As for the gender pay gap in relation to employer characteristics, the gap is wider at the largest firms with at least 250 employees and at private sector firms. These firms, being more productive, have higher average wages, most of which are earned by men rather than women. In the sectoral breakdown, the most pronounced gender pay gaps are in public services and, to a lesser extent, in industrial sectors. The positive effects of collective agreements were greatest in 2002, but by 2018 they had dissipated.

Regarding the gender pay gap by type of occupation, women are disadvantaged only in medium-skilled blue-collar occupations, which are stereotyped as predominantly male occupations. The number of years of employment at a firm also has an adverse impact on women's wages. In other words, men occupying the same position have faster wage growth on average. Comparing the gender pay gap by age group, woman in the age group 30-49 fall furthest behind in relative earnings, since it is between these ages that women are most likely to be having and raising children. As for education, women with no higher than secondary vocational education are at a far greater wage disadvantage relative to men of the same educational level than are women with tertiary education.

---

[18] In the empirical analysis, we used the Blinder-Oaxaca (B-O) decomposition method, based on a regression equation of the logarithm of hourly wages and the independent socio-economic characteristics of individuals. The wage regression equation is estimated separately for the samples of women and men. Using the B-O decomposition, part of the average wage gap can be separated owing to the so-called composition effect, i.e. the different composition of the female and male samples according to individual characteristics. The residual part of the unexplained gap is the 'discrimination gap', which, however, cannot be entirely attributed to gender discrimination. The main reason for caution is that there are many immeasurable individual characteristics and general skills relevant to remuneration that we cannot account for in the regression analysis. Since the unexplained part of the wage gap arises from different regression coefficients estimated from the female and male samples, this part of the gap can be further decomposed into the effects of individual characteristics. For example, we can quantify the pay gap resulting from the same level of highest educational attainment for women and men. The results of the estimates of the two pay gap components and the effects of individual characteristics on the unexplained gap are presented in Table 17. Since the explained gap is relatively small, its decomposition by factors is not provided.

[19] We also examined gender pay gaps using SES microdata for Slovakia from the five SES waves between 2002 and 2018.

2.4 Health

Overall, health outcomes in Slovakia remain at unsatisfactory levels. Moreover, the country's percentage of self-reported unmet medical care needs has been rising for a long time,[20] in direct contrast with the evolution of the EU27 average (Chart 18). This problem is highly likely to be exacerbated by an ageing population and shortages of general practitioners, paediatricians and nurses. Long-term systemic measures are essential to reverse the deteriorating situation of healthcare demand exceeding supply. Key measures will include ensuring and stabilising outpatient care and preventive programmes, increasing public support for vaccination, and promoting a change in social attitudes in regard to the need to seek treatment from GPs and specialist doctors. In addition, EU funds (including RRF funds allocated according to Slovakia's recovery and resilience plan) will have to be used effectively and systematically to reduce the investment gap in the hospital sector, so that the outpatient and hospital sectors complement each other as efficiently as possible.

Chart 18
Self-reported unmet medical care needs (percentages)
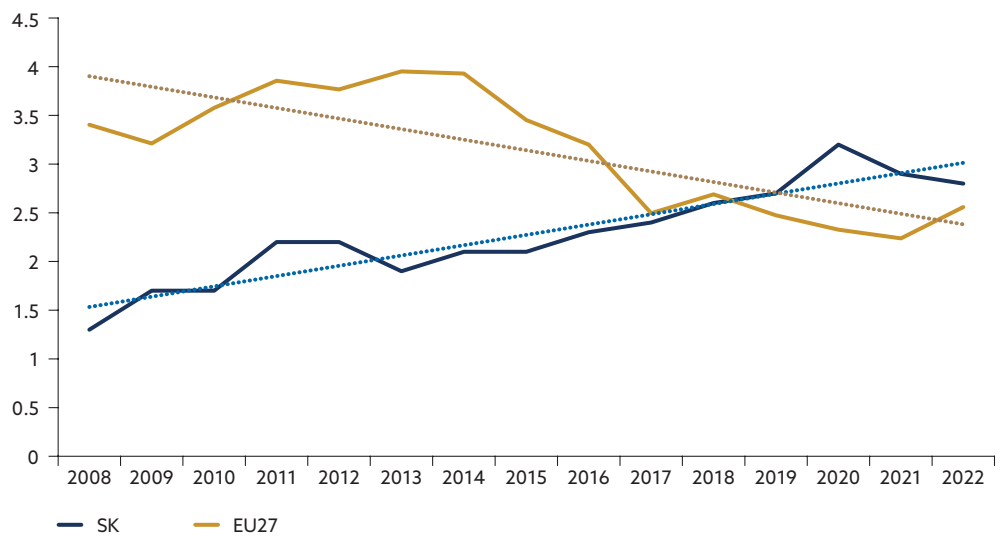
Sources: Eurostat, and NBS calculations.

In international comparison, infant mortality in Slovakia increased significantly in 2022, driven by increases in infant mortality in Eastern Slo-

---

[20] This indicator measures the share of persons aged over 16 reporting unmet needs for medical care for one of the following reasons: 'too expensive', 'waiting list', and 'too far to travel' (all three categories are cumulated). Self-assessment of an unmet need for medical care refers to the person's own assessment of whether they needed a medical examination or medical treatment (excluding dental care) but did not receive it or did not seek it. The data come from the EU statistics on income and living conditions (EU-SILC).

vakia and, to a slight extent, Bratislava Region. Overall, Slovakia's infant mortality rate rose to its 2016 level of 5.4 infant deaths per 1,000 live births. By comparison, the EU average for 2022 stood at 3.3 deaths per births. The increase in Slovakia is not fully explained by the effect of postponed pregnancies during the COVID-19 pandemic, since the infant mortality rate in Central Slovakia and Western Slovakia continued to decline. High infant mortality in Eastern Slovakia has long been a problem, and greater attention should be paid to addressing it. **If the infant mortality rate in Eastern Slovakia had been the same as in Western Slovakia over the past ten years, around one thousand more children would now be alive in Eastern Slovakia.**

Chart 19

Infant mortality (number of infant deaths per 1,000 live births)
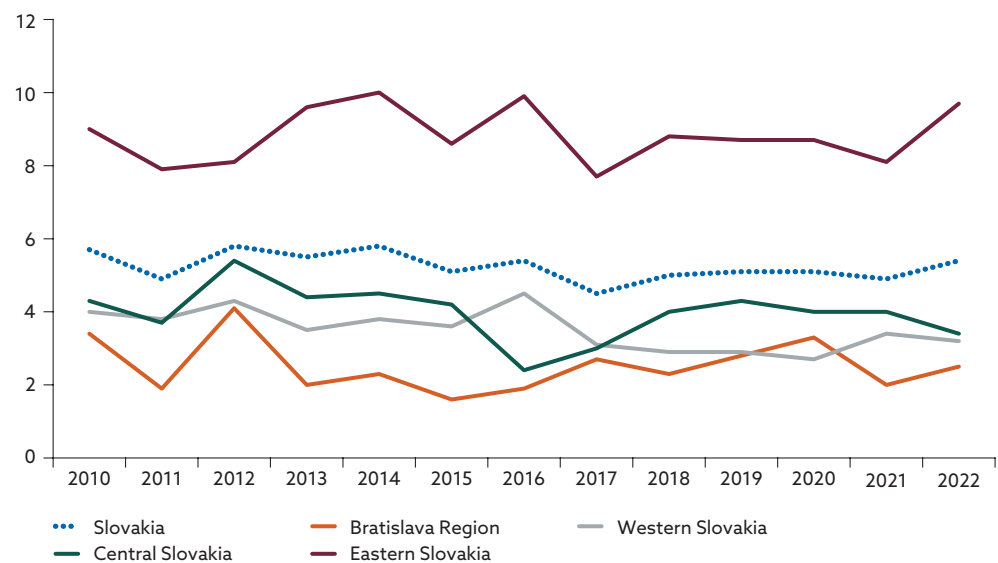
Sources: Eurostat, and own calculations.

Declining vaccination rates in Slovakia are a significant risk both to public health and to the country's health system. Although the situation in Slovakia may not appear alarming by international comparison, child vaccination rates in the country have been falling for a long time. As Slovakia's Public Health Authority has warned, [21] the vaccination rate for as many as four types of mandatory childhood vaccinations is below the 95% level that determines whether the herd immunity threshold has been met. Another consistently low trend is seen in the influenza vaccination rate for people aged over 65. Declining vaccination rates may have a negative impact on productivity and on the accumulation of human capital in the crucial years of preschool and school education. Furthermore, they pose another significant risk to the already heavily burdened health system in

---

[21] For more information, see their website.

Slovakia. A recent whooping cough epidemic in neighbouring Czechia may serve as a warning in this regard. Halting and possibly reversing this negative trend will require coordinated efforts across society. A first step in the current period of increased misinformation could be effective and scalable information campaigns.[22]

Chart 20

Comparison of vaccination rates for measles and for diphtheria, tetanus and pertussis (whooping cough) (percentages)
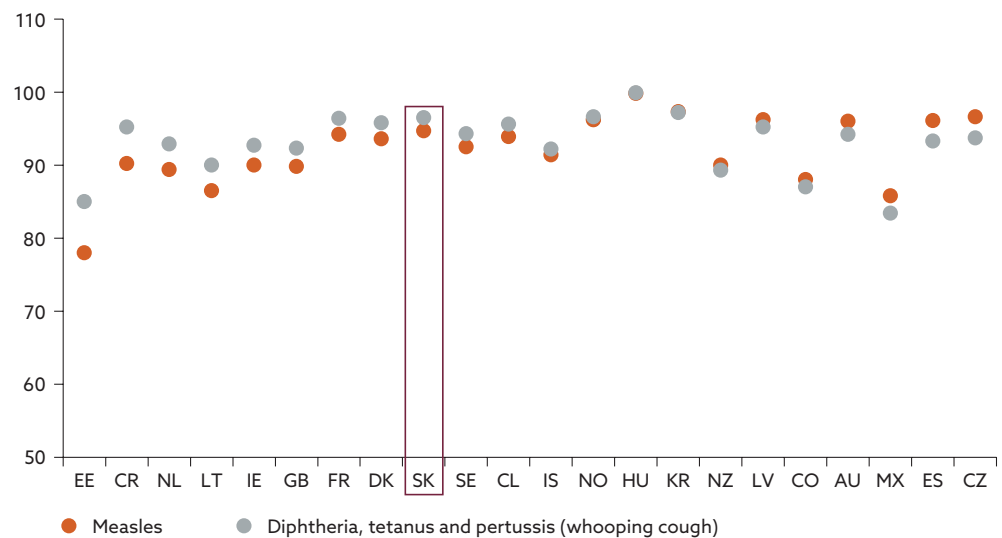
Source: Eurostat, and own calculations.

2.5 Environment

Slovakia's score on the environmental front has been slightly improved by developments in the area of greenhouse gas (GHG) emissions. These declined appreciably in 2022, falling to the 2020 levels that reflected the impact of the pandemic crisis (Table 22). The main contributors to the decline in GHG emissions were firms such as U.S. Steel Košice and its subsidiary Ferroenergy, as well as the combined cycle power plant Paroplynová elektráreň at Malženice. This trend is evident in the number of emission allowances surrendered between 2021 and 2022 (Chart 22). The decline in GHG emissions was likely driven by elevated energy prices. It may therefore be expected that the downtrend will be only temporary, although the available data for 2023 do not yet clearly confirm this.

---

[22] An example of such a campaign is provided in a study by Bartoš, Bauer, Cahlíková and Chytilová, published in Nature in 2022. It identified widespread misperceptions in Czechia about doctors' support for COVID-19 vaccination and subsequently showed that making known doctors' actual support for vaccination (90% of doctors trust the approved vaccines) results in a persistent increase in vaccine uptake.

Chart 21
Evolution of emission allowance surrenders in selected countries
(index: 2015 = 100)

Legend:
- AT
- CZ
- DE
- ES
- HU
- IT
- PL
- SK
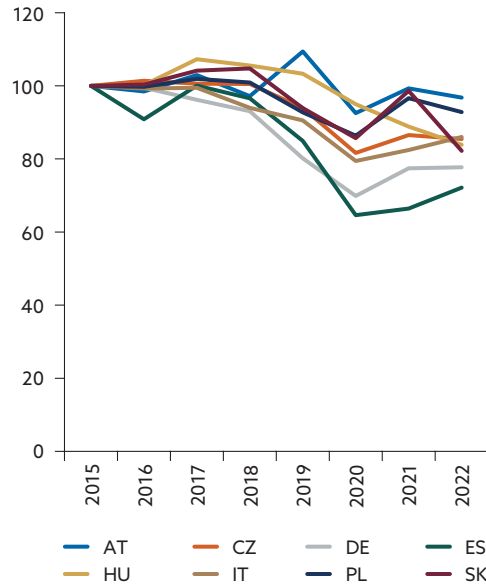
Sources: NBS, and NBS calculations.

Chart 22
Decomposition of surrendered emission allowances by polluting firm
(euro/tonne)

Legend:
- Other
- Bukocel
- Veolia
- Danucem Turna n/ Bodvou
- Carmeuse Košice
- Danucem Rohoznik
- Kompres. St. Velke Kapusany
- PPC Energy
- OFZ
- Vojany
- Novaky
- SPP Kompres. St. Trakovice
- Slovalco
- Duslo
- U.S. Steel Košice – Ferroenergy
- U.S. Steel Košice
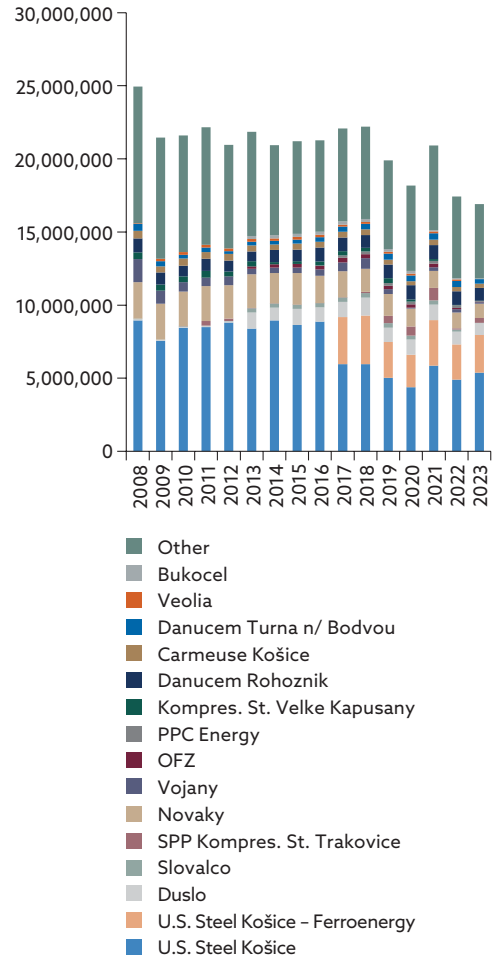
Sources: NBS, and own calculations.

Other ongoing positive trends include an increasing recycling rate of packaging waste and, in international comparison, an improvement in the connection of the population to waste water treatment systems. The uptrend in the recycling of packaging waste can be expected to continue, given that the most recent available data are for 2021 and that, for example, a compulsory PET bottle deposit system has been fully implemented only since 2022. As for the percentage of the population connected to waste water treatment systems, the improvement in Slovakia's relative position is in line with a long-term trend of steady progress in this area. It should also be noted, however, that the recent improvement in Slovakia's relative position is largely the result of downward revisions of corresponding data for certain other EU countries.

While as many as 60% of Slovak firms expect that their operations will be adversely affected by the physical impacts of climate change, only 43%

are investing in measures to build resilience to these risks. Preparing for the consequences of climate change will be the greatest challenge for Slovakia and its economy in the long term. Extreme weather events such as drought, floods, wildfires, and storms are becoming increasingly common, so it is no surprise that 60% of Slovak firms are now aware of physical climate risks. This makes the disparity between firms' awareness of these risks their investment in building resilience to them all the more striking. By comparison, in countries such as Czechia, Finland, Cyprus and Denmark, the percentage of firms investing in measures to prevent and mitigate physical climate risks is higher relative to the percentage that expect to be adversely affected by them.

Chart 23
Firms perceiving any impact of climate change (physical risk) on their business and firms investing in building resilience to physical risk (percentages of responding firms)
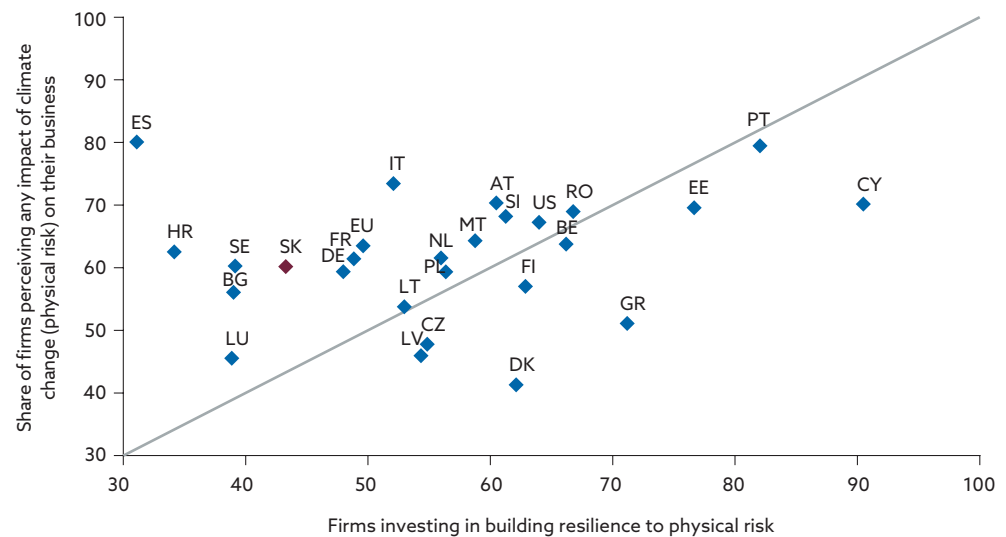
Source: EIB Investment Survey 2023.

Firms in Slovakia largely perceive the transition to a net-zero emission economy as a risk, not as a potential opportunity. The situation is very similar in Hungary and Lithuania, but it is the opposite in the Scandinavian countries, the Netherlands and Cyprus. Careful examination of the reasons giving rise to such perceptions could be vital for designing effective interventions to highlight the opportunities associated with economic transition, thus helping to improve the prospects for Slovak firms.

Chart 24

The impact of the transition to stricter climate standards over the next five years in terms of the share of firms that perceive it as an opportunity or risk (percentages)
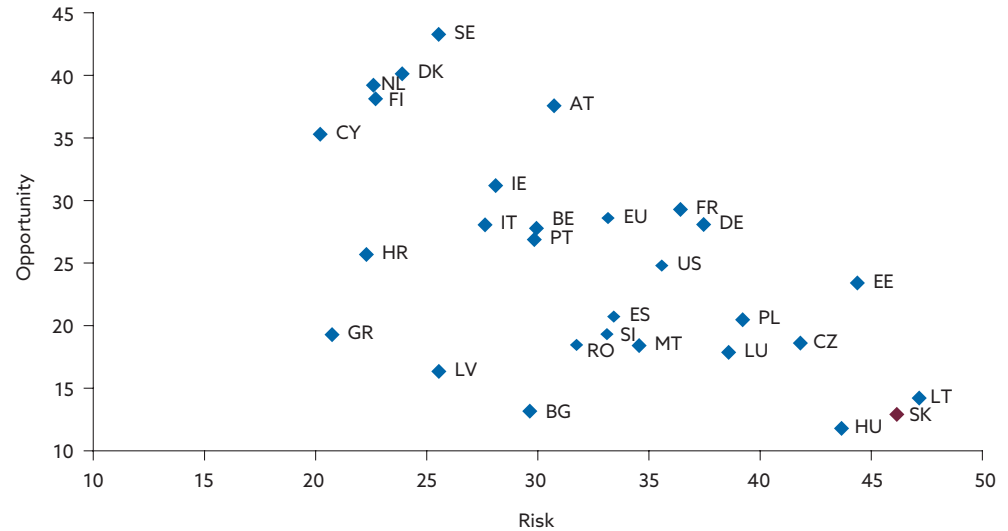
Source: EIB Investment Survey 2023.

2.6   Regional challenges

Regional disparities remain one of Slovakia's biggest challenges. Over the past year, the convergence of individual regions has been mainly economic. In terms of indicators such as unemployment rate, GDP per capita, and disposable income, regional disparities have moderated slightly but remain significant. As for the unemployment rate of young people aged up to 24 who are not in employment, education or training, disparities are increasing because of a deteriorating situation in Eastern Slovakia.

In Bratislava Region, the gap between rich and poor is narrowing, while in other regions it has widened slightly. In Bratislava Region the earnings of the wealthiest 20% were more than 2.7 times higher than the earnings of the poorest 20% in 2023, while in Eastern Slovakia, the ratio is 4.2 times. Interestingly, as recently as 2017 there was no difference between these regions in terms of this ratio, which in that year stood at 3.5 times. Since these regions are converging economically, the stronger growth in Eastern Slovakia is occurring at the price of greater inequality, with the wealthier benefiting more.

Further evidence of the decline in living standards of the poorest in society is provided by the severe material deprivation rate in Eastern Slovakia, which in 2023 increased by 2.7 pp to 11.5%. Like income distribution, the evolution of this rate has been a point of divergence between Bratislava Region and Eastern Slovakia since 2017. In 2017 the difference between each

region's severe material deprivation rate was 1.8 pp, while in 2023 it was up to 9.8 pp.

Life expectancy increased across the country in 2022, owing to the fading of the COVID-19 pandemic. Regional differences in life expectancy trends are underscored by comparing the situation in 2022 and 2016. The national average in 2022 was 0.3 years lower compared with 2016. In Bratislava Region the average was already 0.2 higher than in 2016, while in other regions the average was lower: by 0.1 years in Western Slovakia, by 0.3 years in Central Slovakia, and by 0.8 years in Eastern Slovakia.

Chart 25
Selected indicators for Slovak regions
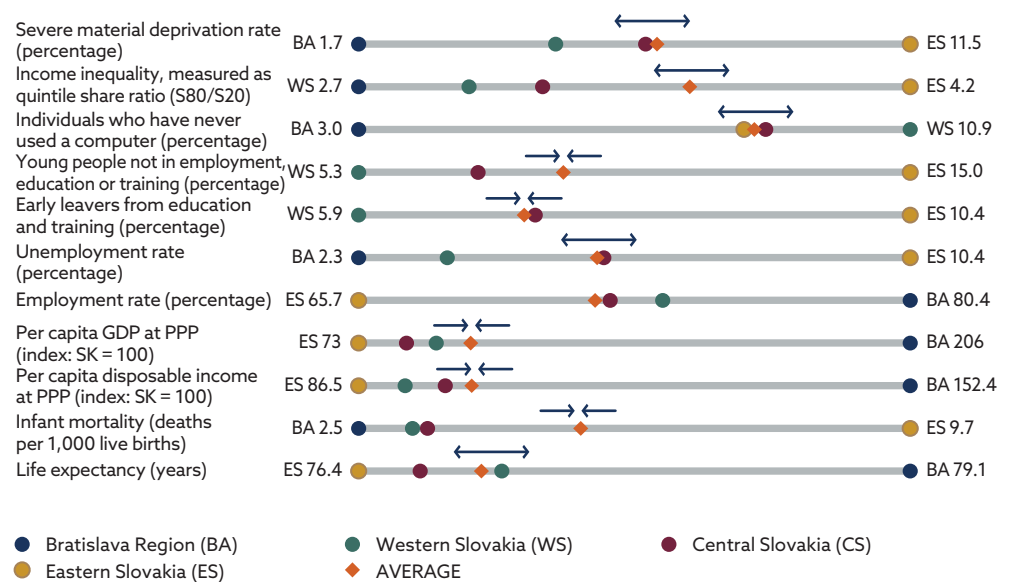
Source: Eurostat, and NBS calculations.
Note: BA – Bratislava Region, WS – Western Slovakia, CS – Central Slovakia, ES – Eastern Slovakia.

3 Population ageing and its challenges

In Slovakia – as in other countries – the challenges associated with an ageing population are becoming increasingly pronounced. With life expectancy increasing and the birth rate falling, the cohorts retiring are larger than those entering the labour market, resulting in a reduction of the working-age population. This demographic shift poses significant economic and social challenges, including a reduced labour supply, a potential decline in productivity, and increased pressure on public finances as a result of higher expenditure on pensions, healthcare and social care. Addressing these problems requires policies to ensure fiscal sustainability and maintain economic growth.

Slovakia's population peaked in 2021. According to Eurostat's official long-term population projections (EUROPOP 2023), Slovakia's population will no longer grow. This is because the numbers of deaths per year will exceed the number of births, and this trend will not be reversed even by net migration.[23] The fertility rate, i.e. the average number of children born per woman, fell significantly between 1960 and 2000, from 3.0 to 1.2, and it did not move above 1.5 over the next 15 years. It now seems that the fertility rate in Slovakia, as in the other EU27 countries, has stabilised on a very slightly upward trajectory. However, the problem in Slovakia remains the low number of women of reproductive age, which has decreased compared with the turn of the millennium, resulting in a lower absolute number of births. Although the fertility rate at the EU27 level is projected to increase slightly, it will not rise above 1.7 even by 2100. This means that Europe is unlikely to able to halt the natural decline of its population in the long term.[24]

---

[23] Net migration is the difference between the number of people entering Slovakia and the number of people leaving the country over a specific period.

[24] In general, a fertility rate of 2.1 children per women ensures a stable population in the long run.

Chart 26

Decomposition of the population projection into births and deaths (thousands of inhabitants)

Births ■ Deaths ■ Population (left-hand scale) —
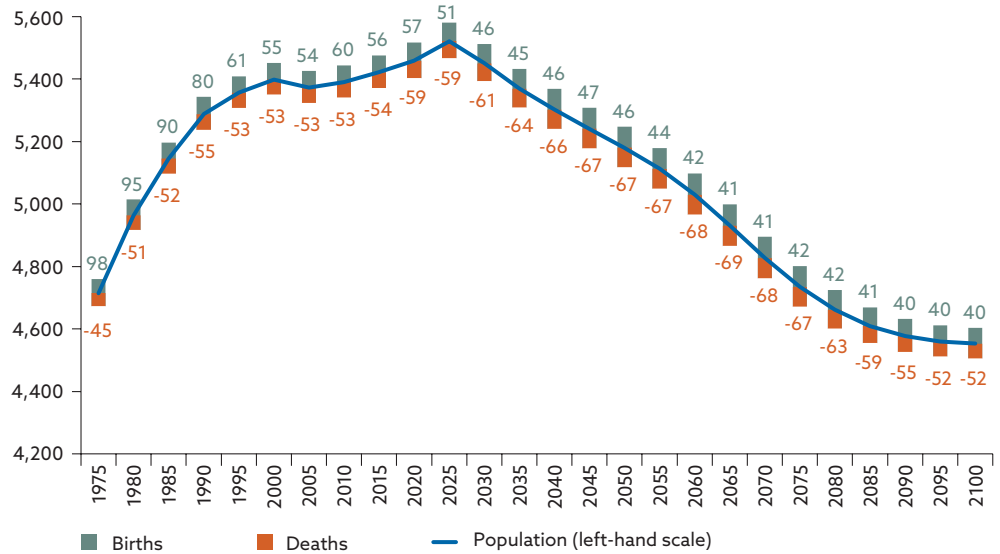
Sources: Eurostat, and NBS calculations.
Note: The numbers of births and deaths are for the given year, not for the whole five-year period. The chart presents a connection of two different data sources. Until 2020 the source is historical notified data, and from 2025 it is the baseline scenario of the European Commission's EUROPOP 2023 forecast. The latter, however, is based on older data, and we now know that it is slightly overestimated.

Population decline would be even more rapid were it not for rising life expectancy. Life expectancy growth in Slovakia only started accelerating after 1990. Before then, it remained largely unchanged, and the other countries that, like Slovakia, are now part of the EU27 were clearly outperforming Slovakia on this measure. Indeed, projections indicated that the gap would not be closed even by the end of the century.

Chart 27

Life expectancy and fertility in Slovakia and in the EU27

SK – life expectancy (left-hand scale) —
EU27 – life expectancy (left-hand scale) —
SK – fertility rate (right-hand scale) —
EU27 – fertility rate (right-hand scale) —
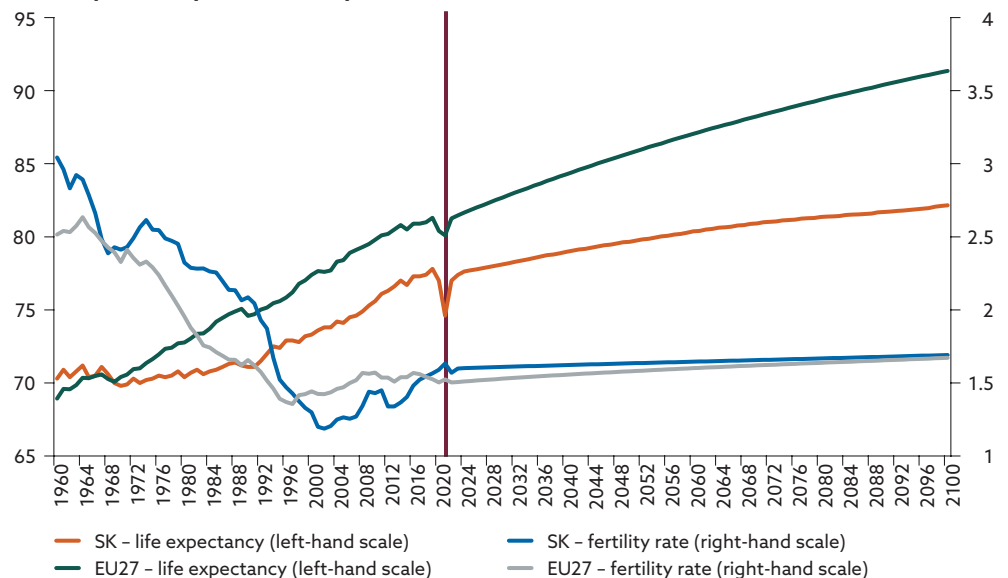
Source: Eurostat, and NBS calculations.
Notes: Until 2002, the chart shows the weighted average of the EU27 countries for which data for the given year were available.

However, population ageing represents a major challenge, particularly in regard to its impact on the age structure of the population. The old-age dependency ratio, defined as the ratio of people aged over 65 to people of working age (15–64), determines how many productive people are able to generate the value needed to ensure a decent life for those who have already made their contribution to society. Until 2015, this ratio was very favourable, and in 2000 it was lower in Slovakia than in any other EU27 country, at 0.16, which translates into six people of working age per elderly person. Over time, however, this ratio has deteriorated and it continues to do so at an accelerating pace. The old-age dependency ratio fell from 5:1 in 2015 to 4:1 in 2020 and is projected to be as low as 2:1 in 2050.

Chart 28

Slovakia's population and its old-age dependency ratio

Working-age population (over 65)
Working-age population (15–64)
Pre-working-age population (0–14)
Dependency ratio (right-hand scale)
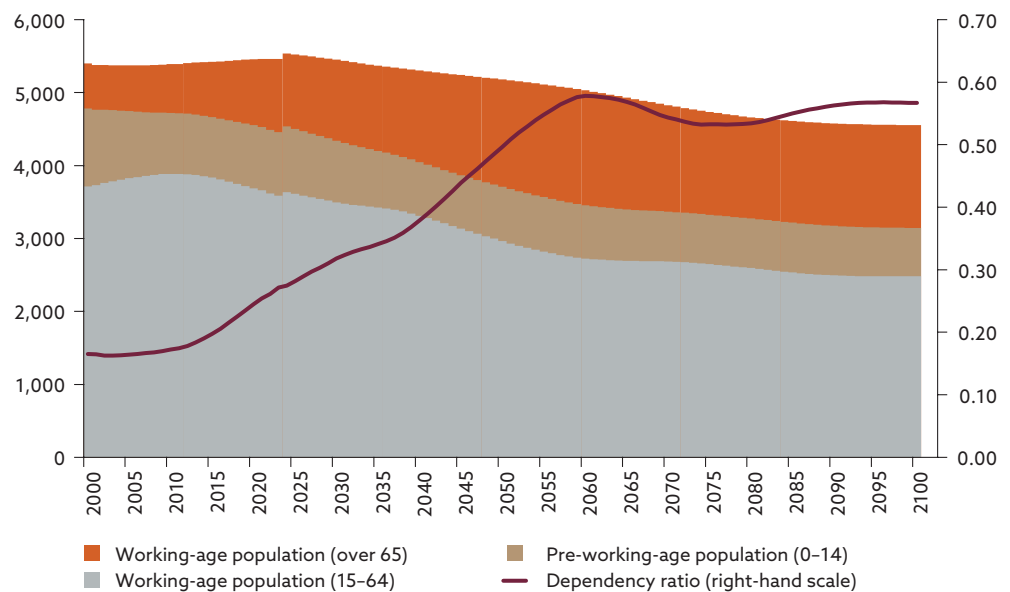
Source: Eurostat, and NBS calculations.

Slovakia is expecting one of the highest increases in the old-age dependency ratio. The ratio's increase in Slovakia between 2022 and 2070 will be the sixth fastest among EU27 countries, at a projected 28 percentage points. Among neighbouring countries, only Poland is forecast to surpass Slovakia, with a very similar increase of 29 percentage points. At the other end of the spectrum are the other two V4 countries – Czechia and Hungary – with, respectively, the second lowest and fifth lowest projected increases. The old-age dependency ratio will, however, increase in all EU27 countries.

Chart 29

Change in the old-age dependency ratio between 2022 and 2070

■ 2022   ■ 2070
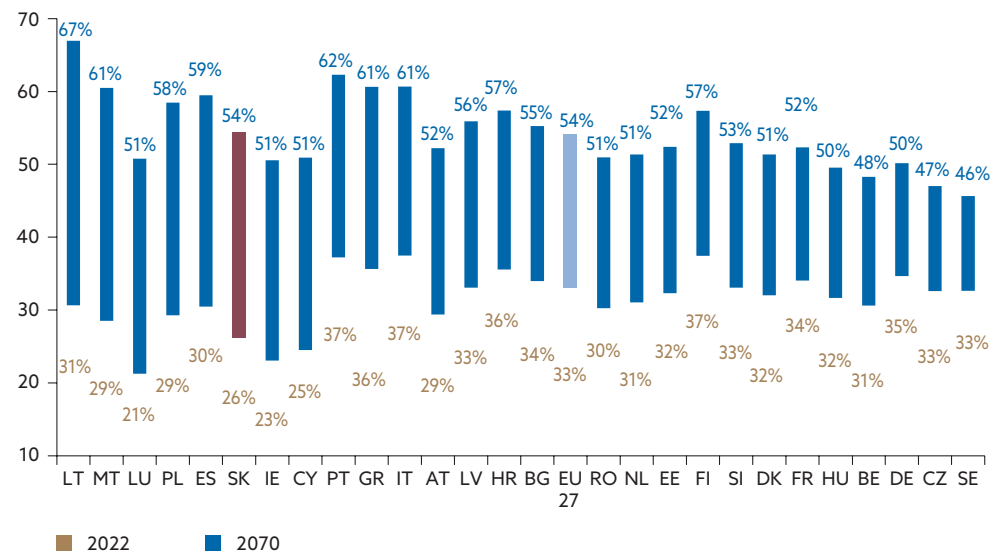
Source: Eurostat, and NBS calculations.

Demographic changes can be mitigated by migration, but to halt them solely in this way would require unrealistic levels of migration. The working-age population in Slovakia is projected to decline by around 280,000 over the next 15 years. This implies the old-age dependency ratio falling from the current 3.7 to 2.8. In a hypothetical scenario (Scenario 1), stabilising the old-age dependency ratio would require accepting almost 1.2 million migrants over 15 years, which would equate to around 18% of the total population. An alternative scenario (Scenario 2) focused on preserving the size of the working-age population would require accepting 280,000 migrants over the same time horizon. Halting the demographic changes would therefore necessitate very high inflows of migrants. Besides the practical problems associated with integrating migrants into the labour market, such migrant inflows are also unrealistic given that demographic changes are a global phenomenon, which will make attracting young skilled workers increasingly difficult.

Chart 30

Migration scenarios (additional net migration – number of persons)

1,160,655

280,111

Scenario 1 – maintaining the old-age dependency ratio at its 2023 level

Scenario 2 maintaining the working-age population (15–64) at its 2023 level
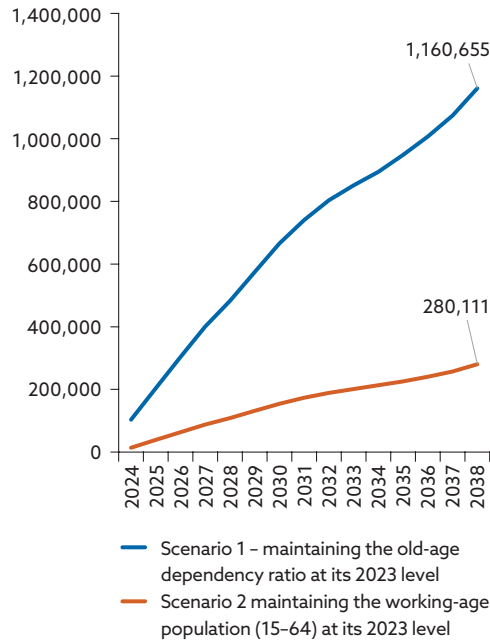
Source: Eurostat, and NBS calculations.

Chart 31

Migration scenarios (additional net migration – percentage of population)

17.9%

5.0%

Scenario 1 – maintaining the old-age dependency ratio at its 2023 level

Scenario 2 maintaining the working-age population (15–64) at its 2023 level
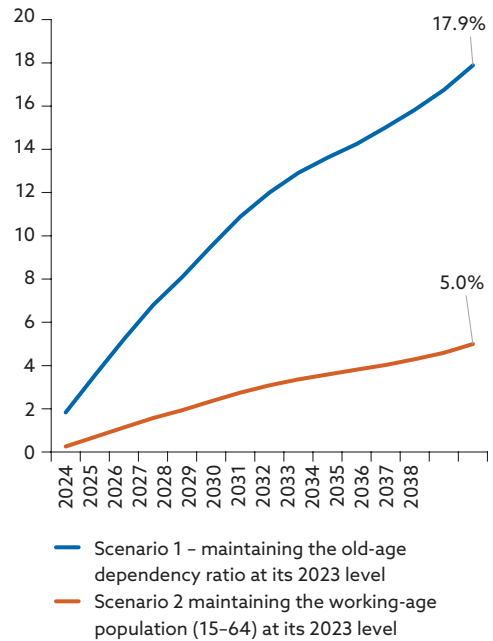
Source: Eurostat, and NBS calculations.

The impact of population ageing will be amplified by its regional dimensions. Although Slovakia's population increased between 2011 and 2021, this growth was largely concentrated in Bratislava Region (Chart 32). In other Slovak regions, the population either fell or grew only marginally. At the same time, where the population declined, the proportion of elderly people in the population increased significantly. In all regions except Bratislava, the working-age population was in decline from 2011. The number of elderly people increased in all regions, and in Trnava and Žilina regions, this trend helped prevent a decline in the population. Only in Bratislava Region did the number of children aged up to 15 change appreciably, though in Trnava and Trenčín regions it was at least slightly positive. At the district level, only 18 out of 72 districts recorded population growth between 2013 and 2023 (Chart 33).

Chart 32
Population change by age group (2011–2021)
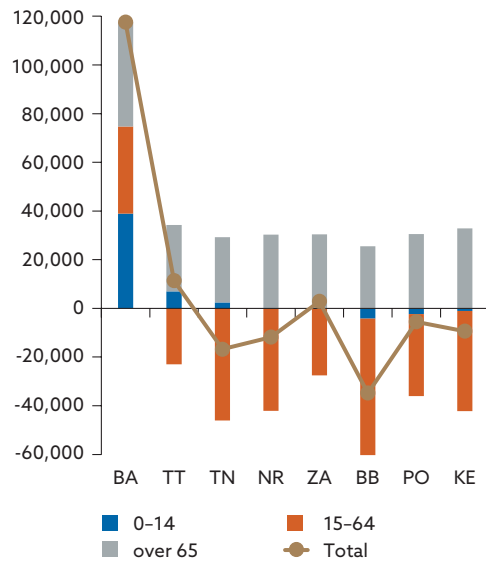
Sources: SODB 2021, SODB 2011, and NBS calculations.

Chart 33
Population growth in Slovak districts (percentage changes between 2013 and 2023)

■ Districts with positive population growth

Percentage change in population between 2013 and 2023   -5.0   0.1
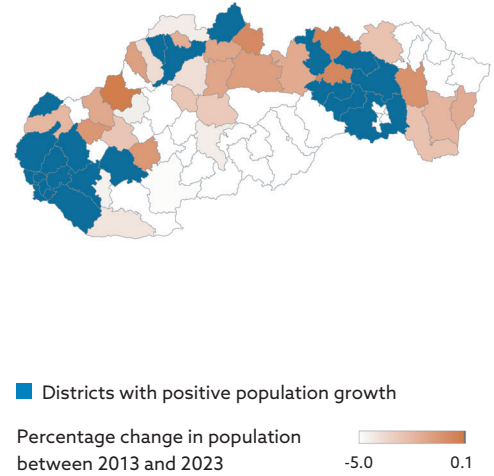
Sources: SO SR, and NBS calculations.
Notes: Bratislava is treated as a single district.

3.1   The economic impact of population ageing

The outlined demographic changes have direct and indirect impacts on gross domestic product (GDP) per capita, not all of which are entirely negative. GDP per capita *(Y/N)* can be decomposed into the impact of labour productivity *(Y/L)*, the employment rate *(L/N$_P$)*, and the ratio of the working-age population to the overall population *(N$_P$/N)*, where *Y* is GDP, *L* is the number of workers, *N$_P$* is the working-age population, and *N* is the overall population (André, Gal and Schief, 2024).[25]

GDP per capita		Labour productivity		Employment rate		Working-age share
$\dfrac{Y}{N}$	$=$	$\dfrac{Y}{L}$	$*$	$\dfrac{L}{N_P}$	$*$	$\dfrac{N_P}{N}$

Population ageing has a clear and direct negative impact on the level of GDP owing to the declining ratio of the working-age population to the overall population, the last term in the equation. The impact on the other terms in the equation is less clear. On the one hand, older workers tend to have a lower employment rate, so an increase in their share in the labour force would reduce the overall employment rate (second term). On

---

25   André, C., Gal, P. and Schief, M., "Enhancing productivity and growth in an ageing society: Key mechanisms and policy options", *OECD Economics Department Working Papers,* No 1807, OECD, Paris, 2024.

the other hand, government policy focused on increasing the employment of older people could partially mitigate this effect. Similarly unclear is the impact of population ageing on labour productivity.

Population ageing also has major redistributive or fiscal implications. Pensioners who are no longer participating in the labour market do not contribute significantly to their country's economic output. As a population ages, a declining percentage of workers must support a rising percentage of pensioners. The costs associated with this burden are reflected in the taxes and social contributions through which pensions and healthcare are funded, but they can also take the form of the time and money that households spend on caring for parents. A higher tax and social contribution burden can also weigh on economic growth.

3.2   Labour market activity

The negative direct impact of demographic changes on labour supply can be compensated for by improving the population's labour market participation. As people live healthier and longer lives, it is expected that they will work longer, mitigating the decline in labour supply. Because of an increase in the labour market participation rate, especially among older workers as well as women of all age groups, most euro area countries have seen their labour supply increase since 2000 despite the ageing of their populations (Bodnár and Nerlich, 2022[26]). This increase has been largely due to better health, higher life expectancy, improved levels of education (especially among women) and pension reforms aimed at raising the retirement age.

Slovakia's labour market has also benefited from a considerable increase in the labour market participation rate. Charts 34 and 35 show a significant increase in the male and female participation rates in older age categories between 2000 and 2023. For men in the 55–59 and 60–64 age cohorts, the participation rate increased by 20.1 pp and 48.3 pp respectively; for women in these cohorts, the corresponding increases were 67.2 pp and 43.9 pp. As in other euro area countries, this trend was driven mainly by life expectancy growth coupled with raising of the retirement age, as well as by a gradual improvement in the labour market situation, which created more job opportunities for older workers.

---

[26]   Bodnár, K. and Nerlich, C., "The macroeconomic and fiscal impact of population ageing", *Occasional Paper Series,* No 296, ECB, Frankfurt am Main, June 2022

Chart 34

Activity rate of men in Slovakia by age group (percentages)

— 2000 — 2023
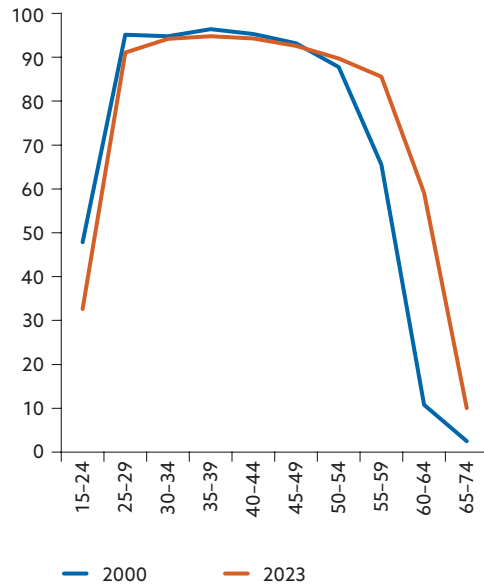
Source: Eurostat.

Chart 35

Activity rate of women in Slovakia by age group (percentages)

— 2000 — 2023
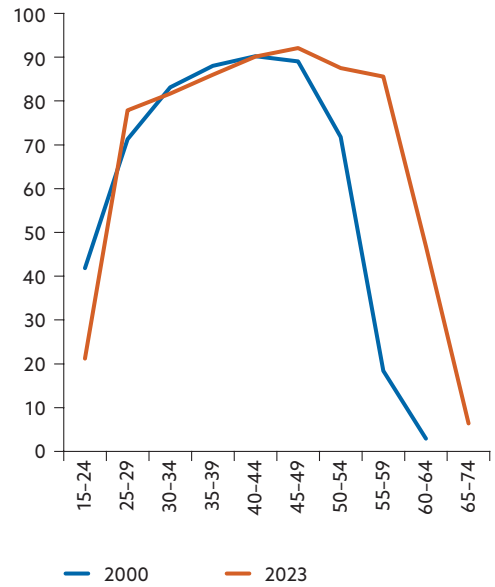
Source: Eurostat.

Despite these trends, it is doubtful whether there is potential for any further significant increase in the labour market participation rate of older workers. Charts 36 and 37 compare the 2023 participation rates of men and women of different age cohorts with the EU27 average and with the Netherlands, which last year had the highest overall labour market participation rate in the EU. The comparison shows that Slovakia, despite having a relatively younger population, has an overall level of labour market participation similar to the EU27 average, while in respect of the rate for working-age women other than young women, it markedly exceeds the EU27 average. Unlike the Netherlands (but similar to the EU27), Slovakia has potential to increase the labour market participation of younger people and, to a lesser extent, of the over-60 population. For women aged 35–59, the participation rate in Slovakia is higher than in the Netherlands.

Chart 36

Activity rate of men by age group (percentage in 2023)

Legend: — EU27 — NL — SK

Source: Eurostat.

Chart 37

Activity rate of women by age (percentage in 2023)

Legend: — EU27 — NL — SK

Source: Eurostat.
Note: The Netherlands had the highest labour market participation rate in the EU in 2023.

Despite the limited and shrinking pool of labour, government policies should maximise efforts to exploit untapped potential, as well as to attract workers from abroad. Reintroducing the link between life expectancy and the retirement age, as well as reducing incentives to take early retirement[27] are measures that would not only have important fiscal effects (examined in Section 3.4), but also positively impact the labour market. Further reforms could make later retirement more attractive through higher pension benefits. It is likewise important to support lifelong learning, advisory services for older workers, and flexible working arrangements that could delay workers complete exit from the labour market. Also crucial are efforts to encourage the return of Slovaks from abroad and to attract foreign talent.

---

[27] The number of people newly applying for early retirement after 40 years of work surged at the end of 2023, mainly due to a combination of factors: high initial indexation of pensions caused by elevated inflation; and a lowering of the percentage reduction in early retirement pension benefits, to 0.3% per month remaining until retirement age instead of the previously standard 0.5%. By reducing incentives, we mean resetting the pension reduction at 0.5% and also increasing the number of qualifying years by the increase in life expectancy. The relatively high initial pension indexation of 14.5% has made early retirement attractive also in 2024, but according to macroeconomic inflation forecasts, this incentive is not expected to continue in the future.

3.3   Labour productivity impact

With the decline of the working-age share of the population, labour productivity is key to improving the standard of living. However, productivity itself can be affected by population ageing. Population ageing could undermine productivity growth and thus amplify the direct negative impact on GDP per capita through the declining working-age share of the population. At the same time, however, the academic literature on the economic consequences of population ageing offers a more nuanced perspective, suggesting that while ageing may hinder productivity growth through certain channels, it may actually have a positive impact through others. The overall impact of population ageing is therefore less clear-cut.

André et al. (2024) identify six main channels through which population ageing affects productivity, and they summarise the conclusions of the literature (Figure 1). Regarding worker productivity by age, it is assumed that worker productivity increases with age owing to experience but decreases in older workers because of their poorer health or loss of skill relevance due to technological progress. On the other hand, cooperation between workers from different age groups brings productivity benefits, likely due to the positive complementarities between their different strengths and skill-sets (OECD, 2020).[28] **Overall, therefore, population ageing has a mixed impact on productivity at the individual level.**

Figure 1
Channels through which population ageing affects productivity and their projected direction

Source: Adapted from André et al. (2024).

The literature concludes that population ageing adversely affects productivity through multiple channels. One negative channel is the reduction in business dynamism and innovation. According to Hopenhayn et

---

[28] *Promoting an Age-Inclusive Workforce: Living, Learning and Earning Longer*, OECD, OECD Publishing, Paris, 2020.

al. (2022),[29] a decrease in population growth explains certain aspects of reduced business dynamism, including lower firm entry and exit rates and increasing concentration. The associated rise in market power may reduce innovation and slow productivity growth. The slowdown in firm entry rates may be partly related to increased consumer inertia, making it more difficult to introduce new products and services (Bornstein, 2019[30]). Similarly, shifts in demand towards services with less potential for productivity growth, such as healthcare and recreational services, have a negative impact, as do increases in ageing-related expenditure, which crowd out productive investments or imply a higher tax burden to cover it.

Population ageing can stimulate greater automation and robotisation in the economy, as well as lead to an increase in the capital stock per worker; these effects can mitigate ageing's negative impact on productivity. A labour-scarce environment can encourage firms to innovate more and thus can accelerate the adoption of labour-saving technologies. According to the findings of Acemoglu and Restrepo (2017, 2022), [31, 32] there is no negative association between ageing and growth either among or outside OECD countries, which they link to the upward impact of increased automation and robotisation on productivity. Another positive impact may come through aggregate savings and deepening of the capital stock. The recently retired tend to have more savings than younger working people or very old people (at least in advanced Western countries). Therefore, an increasing proportion of people in the early years of retirement can lead to higher aggregate savings and higher productivity if these savings are invested in productive capital.

In sum, empirical estimates of the overall consequences of ageing are mixed. Using variation in the predetermined component of population ageing across US states, Maestas, Mullen and Powell (2023)[33] estimated the impact of population ageing on growth in GDP per capita in the United States for 1980–2020 and found that each 10% increase in the share of the over-60 population decreased per capita GDP by 5.5%, with two-thirds of

[29] Hopenhayn, H., Neira, J. and Singhania, R., "From Population Growth to Firm Demographics: Implications for Concentration, Entrepreneurship and the Labor Share", *Econometrica,* Vol. 90, No 4, pp. 1879-1914.

[30] Bornstein, G., "Entry and Profits in an Aging Economy: The Role of Consumer Inertia", *2019 Meeting Papers,* No 309, Society for Economic Dynamics, 2019.

[31] Acemoglu, D. and Restrepo, P., "Secular Stagnation? The Effect of Aging on Economic Growth in the Age of Automation", *American Economic Review,* Vol. 107, No 5, May 2017, pp. 174-179.

[32] Acemoglu, D. and Restrepo, P., "Demographics and Automation", *The Review of Economic Studies,* Vol. 89, No 1, January 2022, pp. 1-44.

[33] Maestas, N., Mullen, K.J. and Powell, D. "The Effect of Population Aging on Economic Growth, the Labor Force, and Productivity", *American Economic Journal: Macroeconomics,* Vol. 15, No 2, April 2023, pp.306-332.

the decline due to slower labour productivity growth and one-third due to slower employment growth. Similarly, Aiyar, Ebeke and Shao (2016)[34] estimated that, in Europe, workforce ageing could reduce total factor productivity (TFP) growth by an average of 0.2 percentage points every year over the two decades from 2014 to 2035. However, the findings of Acemoglu and Restrepo (2017, 2022) lead to the opposite conclusion. Despite the literature's mixed conclusions on the overall impact of population ageing on productivity, it is clear that maintaining living standard growth will necessitate promoting productivity growth to offset the direct and indirect effects of population ageing.

Increasing labour productivity to compensate for the negative effects of population ageing is a particular challenge given long-term trend of slowing labour productivity growth both worldwide and in Slovakia. Novák and Vaňko (2024)[35] point out that the slowdown in productivity growth in Slovakia after the global financial crisis (GFC) was more pronounced than would be expected from a slowdown in productivity growth in the most productive countries, as well as from a slowdown in intra-EU convergence towards the most productive countries. Charts 38 and 39 show initial productivity levels and subsequent average real productivity growth for EU countries for the pre- and post-GFC periods, respectively. The red lines, representing average growth at the productivity frontier (defined as the three most productive countries at the beginning of each period, excluding Ireland and Luxembourg), indicate that after the GFC, labour productivity growth halved in the most productive EU countries. Moreover, the slope of the regression line became flatter, suggesting a slowdown in convergence. Slovakia's performance, which before the GFC was well above expectations based on its initial productivity level, subsequently converged towards expected values. Although Slovakia continued to outperform expectations on the basis of its initial productivity level in the aftermath of the financial crisis, it is important to note that productivity growth deteriorated further over this period (see Section 2.1).

---

[34] Aiyar, S., Ebeke, C. and Shao X., "The Impact of Workforce Aging on European Productivity", *IMF Working Paper,* No 16/238, International Monetary Fund, December 2016.

[35] Novák, V. and Vaňko, M., "Stylised facts of Slovak productivity and business demography", forthcoming.

Chart 38

Initial productivity level and average annual labour productivity growth (1995–2008)

y = -0.16x + 5.63

Average annual growth in hourly productivity (1995–2008)

Productivity per hour worked at PPP (1995)

Source: Novák and Vaňko (2024).

Chart 39

Initial productivity level and average annual labour productivity growth (2010–2019)

y = -0.05x + 2.95

Average annual growth in hourly productivity (2010–2019)

Productivity per hour worked at PPP (2010)

Source: Novák and Vaňko (2024).

Notes: The red line represents average annual growth in real labour productivity per hour at the productivity frontier across EU countries. This frontier is defined as the three most productive economies at the beginning of each period, with Ireland and Luxembourg omitted due to the structure of their economies. These countries are Germany, the Netherlands and Belgium before the global financial crisis and the Netherlands, Denmark and Belgium after the crisis. Central and eastern European countries, excluding Slovakia, are highlighted in yellow.

3.4 Fiscal implications

Population ageing is one of the most serious factors causing poor long-term sustainability of public finances in Slovakia. The S2 indicator, a measure of the fiscal effort need to stabilise public debt over the long term, is for Slovakia primarily composed of two factors: a currently high fiscal deficit and high expected costs related to population ageing.[36] According to the European Commission's 2024 Ageing Report,[37] age-related expenditure in Slovakia will be 6.1 percentage points of GDP higher in 2070 than today,[38] which represents the third highest increase among EU countries. Around half of

---

[36] However, additional fiscal efforts will also be required for higher defence expenditure and climate change–related expenditure. For more information, see European Central Bank, Economic Bulletin, Issue 4, 2024, Article 2: Longer-term challenges for fiscal policy in the euro area.

[37] European Commission, 2024 Ageing Report: Economic & Budgetary Projections for the EU Member States (2022-2070).

[38] The quantification is based on the demographic projections and other assumptions of the European Commission's 2024 Ageing Report, which enables consistent comparison of EU countries. When applying other assumptions, the quantification may be different, as, for example, in the Report on the Long-term Sustainability of Public Finances for 2023, published by Slovakia's Council for Budget Responsibility (CBR).

this increase will be due to spending on pensions (mainly old-age and disability pensions), while the other half will be accounted for by spending on healthcare and long-term care.

Change in ageing-sensitive costs between 2022 and 2070 (percentages of GDP)
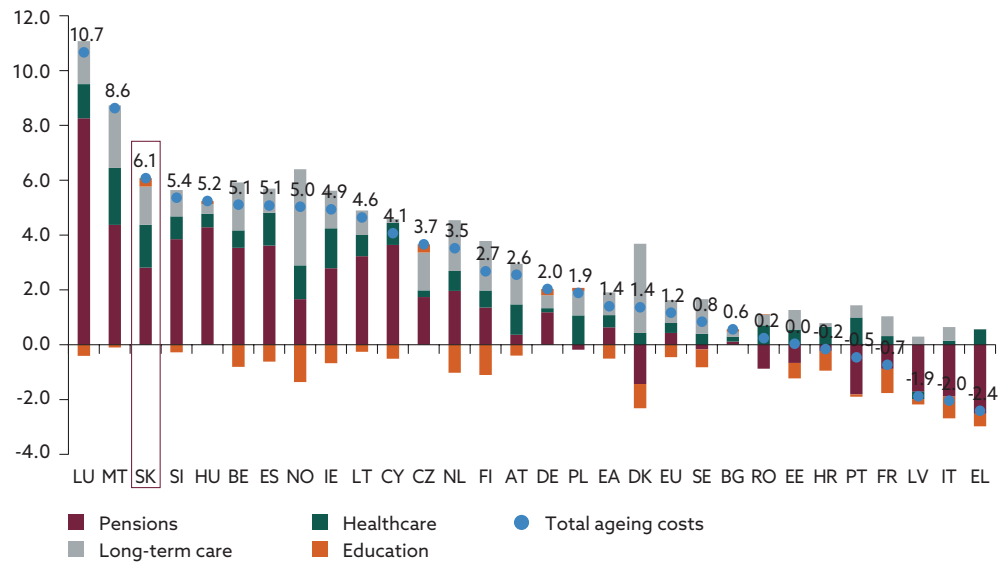
Source: The European Commission's 2024 Ageing Report.

The funding of the Slovak pension system is already a problem. Public finance sustainability is not a distant issue that will only become apparent in the future; the first signs can already be seen in the current deficit structure. The first pillar of the Slovak pension system – the public pension scheme run by the Social Insurance Agency (SIA) – has been persistently in deficit, requiring funding from the state budget. In the pre-pandemic years from 2015 to 2019, this deficit averaged less than €300 million per year, while during the pandemic, it surged to nearly €800 million per year. However, the currently approved budget envisages deficits of more than twice that level in the coming years.

The deficit in the first pillar pension scheme will thus account for more than 20% of the total general government deficit in the years ahead. Moreover, from 2024, part of the funding that was supposed to be allocated to savers in the second pillar of the pension system will be diverted to the SIA in order to cover its pension scheme deficit. This allocation will amount to €2 billion in 2024. However, reducing contributions to the second pillar scheme will ease pressure on the SIA only in the short term. In the long term, liabilities will accumulate for higher future pension benefits

The SIA's current funding needs, together with additional costs caused by population ageing, will amount to more than 7% of GDP. The SIA's budget

deficit is estimated by NBS to be around 1.5% of GDP (Chart 41) in the near term, and when increased by additional costs resulting from population ageing, it could climb to 7.5% absent an increase in insurance revenues. This implies significant cutbacks in the funding of other government priorities if the deficit is to be kept in line with common fiscal rules. Hence, there will be less fiscal space for other spending – for example on productive investments.

Chart 41
Coverage of the SIA's budget deficit (EUR millions; percentages of GDP)
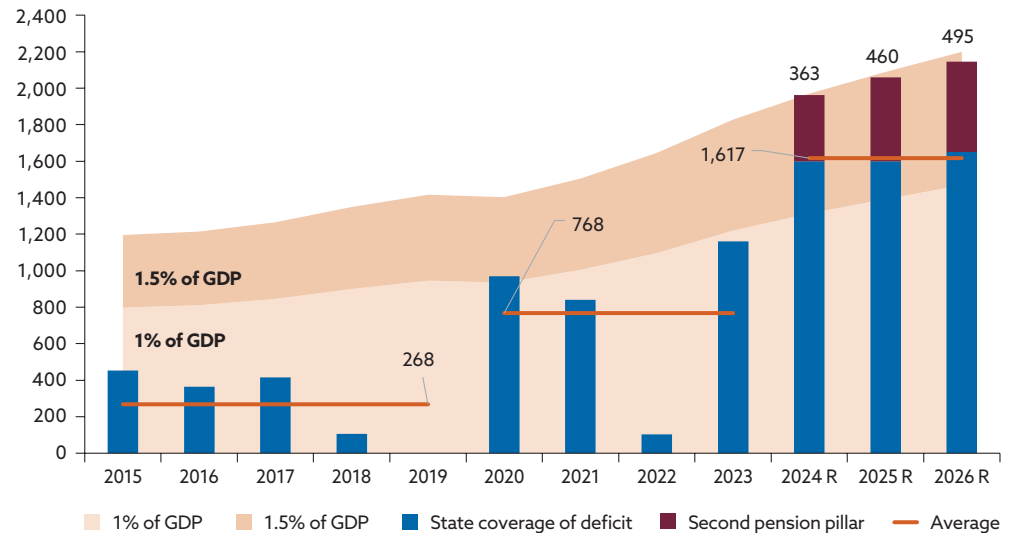
Sources: General Government Budget for 2024-2026, Social Insurance Agency, and own calculations.

In terms of age-related expenditure with no change in policy, the long-term projections for EU countries show Slovakia with the highest debt level. In addition to ageing costs, another key factor is the underlying fiscal balance. In The European Commission's Spring 2024 European Economic Forecast,[39] Slovakia is projected to have one of the highest deficits in 2025 (Figure 42). The structural primary balance (SPB), assuming unchanged policies, i.e. no additional consolidation measures, remains unchanged over time. Thus, in the long-term projection, the running of budget deficits has a persistent upward impact on public debt.

---

[39] European Commission, European Economic Forecast, Spring 2024.

Chart 42

Structural primary balance in 2025 (percentages of GDP)
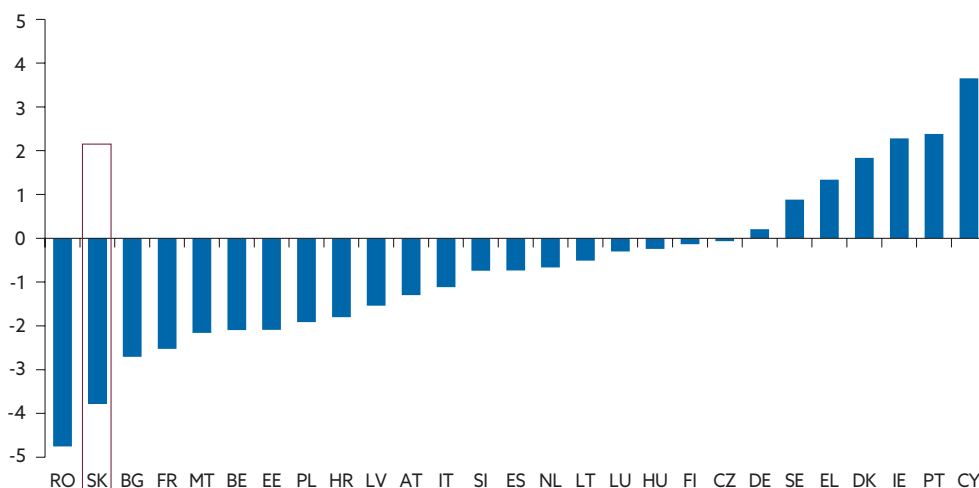
Source: EC (European Economic Forecast, Spring 2024).

Most Member States will face rising public debt due to population ageing[40] and will therefore find it challenging to keep public finances on a sustainable course. There are, however, countries where prudent fiscal management means the budgetary position is able to cope with the expected increase in ageing costs without requiring additional fiscal consolidation[41] (Chart 43). In this scenario, Slovakia's fiscal position is not favourable, and its public debt would exceed 400% of GDP by 2070,[42] ranking it among the most indebted countries. It should be stressed, however, that this projection is to be seen as indicative. Debt management problems would occur much sooner. The rapid debt growth would be reflected in risk premia on government debt, up to the point where the government would no longer have access to new market funding.

---

[40] European Commission, 2024 Ageing Report.

[41] The mechanical calculation is based on the assumption of no change in the initial SPB (i.e. the government does not pursue additional consolidation measures), on a long-term projection of macroeconomic variables (economic growth, inflation, interest rate) and on the costs of population ageing (EC 2024 Ageing Report). The calculation does not take into account the risk premium that markets would demand because of high indebtedness. The premium represents an additional downside risk to the debt growth projection.

[42] Similar developments are highlighted by Slovakia's Council for Budget Responsibility in its Report on the Long-term Sustainability of Public Finances for 2023 (April 2024), on page 39 (Table 6). Assuming unchanged policies, the debt is similarly projected to exceed the 400% threshold over the 50-year horizon, despite different underlying assumptions. This scenario is based on the CBR's own model on long-term projections, implicitly considers a slightly more favourable initial position (SPB) and, unlike the EC projection for ageing costs, takes into account the partial diversion of second pillar contributions to the pay-as-you-go first pillar, a measure adopted in 2023.

Chart 43

Projection of public debt up to 2070 under the baseline scenario[1] for ageing costs and the EC's medium-term macroeconomic and fiscal forecast (Spring 2024) (percentages of GDP)
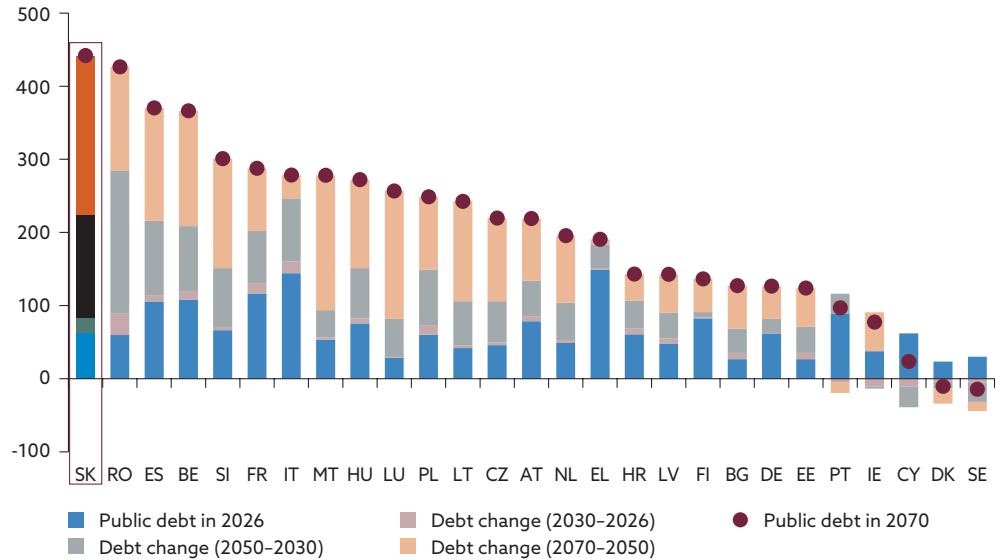
Source: European Commission, and NBS calculations.
1) Referred to as the 'AWG reference scenario' in previous EC Ageing Reports.

Expenditure on pensions in particular is expected to accelerate the increase in public debt over the next ten years. Together with other ageing costs, this expenditure is projected to peak in the 2050s and then stabilise. The debt-to-GDP ratio's acceleration will also increasingly reflect the snowball effect (Chart 44) of the difference between the projected future path of the interest rate on government borrowing and the economy's nominal growth – the so-called interest-growth (i-g) differential.[43] This factor is projected to account for more than one-fifth of the debt increase by the end of the horizon.

---

43 The i-g differential expresses the relationship by $r=(1+i)/(1+g)-1$, where i is the nominal interest rate and g is nominal GDP growth. Without the effect of the SPB, debt evolves over time according to $D(t)=D(t-1)*(1+r)$. If $r>0$, the debt increases, meaning that the interest costs are so large that the debt increases even with a zero deficit.

Chart 44

Decomposition of year-on-year change in Slovakia's public debt up to 2070
(Percentage points of GDP)
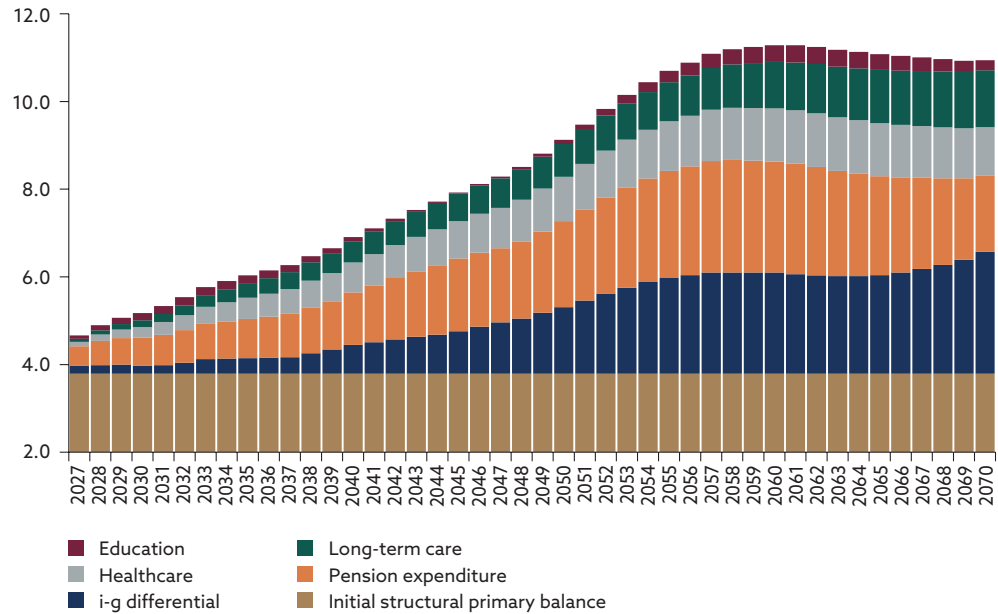
Source: NBS, and European Commission.

The no-consolidation scenario can be seen as the upper boundary if the government does not take any consolidation measures and does not improve the initial budget balance. Three additional scenarios consider different consolidation efforts. The first scenario (SC1) assumes a faster annual rate of improvement in the initial SPB, so that public debt at the end of the horizon is equal to 60% of GDP. This scenario assumes a consolidation of 1 percentage point in the years from 2026 to 2033. This implies the structural primary balance improving significantly, before stabilising at a permanent surplus of more than 4 pp (excluding the impact of the change in ageing costs). The second scenario (SC2) assumes a slower consolidation effort to stabilise the SPB at zero. The annual change in the SPB over the period 2026–2033 is 0.5 pp. In this scenario, public debt does not stabilise and exceeds the 100% of GDP threshold in the early 2040s. In the third scenario (SC3), public debt is assumed to reach 60% of GDP with the pace of consolidation different from that in SC1. In the initial phase, the pace is slower, identical to SC2. Assuming no new consolidation measures, the debt continues to rise without any prospect of stabilisation. In order to reverse the trend and reach the desired target, the government is assumed to accelerate consolidation from 2034, to 1 pp per year for five years. Hence, the public debt target in 2070 is achievable, but with a higher budget surplus compared with SC1 (i.e. an age-adjusted SPB of around 5 pp); however, the need for consolidation is 'backloaded', thus increasing the cost burden on future generations

Chart 45

Public debt in consolidation scenarios (Percentage of GDP)
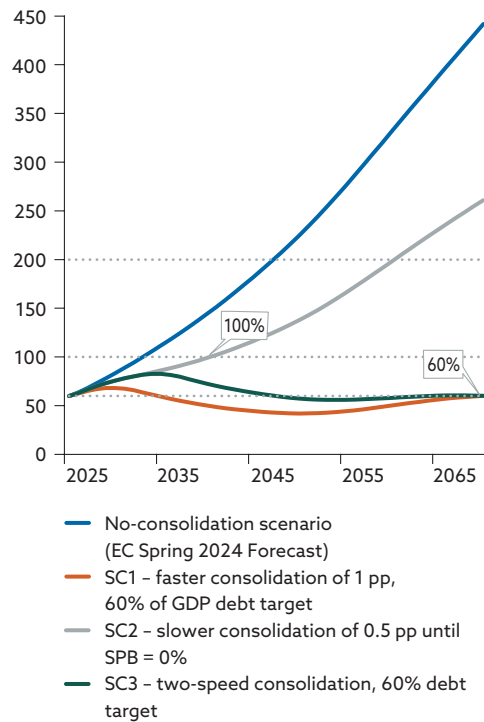
Source: NBS calculations.

Chart 46

Structural primary balance, including the impact of ageing costs (Percentage of GDP)

Legend (both charts):
- No-consolidation scenario (EC Spring 2024 Forecast)
- SC1 – faster consolidation of 1 pp, 60% of GDP debt target
- SC2 – slower consolidation of 0.5 pp until SPB = 0%
- SC3 – two-speed consolidation, 60% debt target
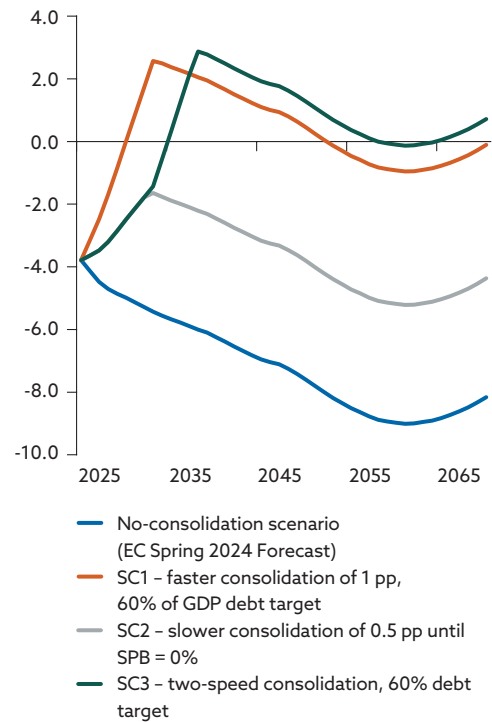
Source: NBS calculations.

Rising ageing costs in the EU is an irreversible trend that will require far-reaching measures to stabilise public finances. This is accompanied by significant uncertainty about, for example, the impact of new technologies, global developments and the EU's competitive position, and the impact of climate change on demographics and the economy.[44] Long-term projections for Slovakia indicate both significant risks from an increased impact of population ageing, and risks from the current budget deficit outlook. Public debt stabilisation will require urgent and massive efforts to improve the state of public finances. In both cases, the postponement of, or heel-dragging on, consolidation leads to a high risk of public finance unsustainability. Being less ambitious in budget reform today implies backloading the necessary adjustment measures. This burden is likely to affect

---

[44] According to an indicative estimate of fiscal costs published by the ECB, which, in addition to the impact of population ageing, also takes into account the impact of climate change (green transition costs and environmental damage) and compliance with the defence spending commitment (2% of GDP per year), Slovakia's initial position in terms of public finances is worse than any other euro area country. In order to stabilise its public debt by 2070, Slovakia would need to immediately adopt a greater volume of budget-improving measures than any other euro area country. Source: European Central Bank, Economic Bulletin, Issue 4, 2024, Article 2: Longer-term challenges for fiscal policy in the euro area.

the living standards of all generations, regardless of their economic activity, while the important question is how to distribute the burden fairly between generations.

3.5 How to ride the demographic wave

Sound public finances and a sufficient fiscal buffer are essential to riding the demographic wave. We know well in advance when large age cohorts will reach retirement age and how large the age cohorts entering the labour market will be. It is therefore important to prepare as early and responsibly as possible. Slovakia is still in a period when the largest population cohorts are at or just past their peak productivity. They are therefore still having a very positive impact on public finances by paying taxes and social contributions, while not yet receiving old-age pensions and requiring less healthcare expenditure than they will in old age. It is therefore essential to now prepare public finances for the consequences of an ageing population. Conversely, living beyond current means implies passing on an excessive cost burden to future generations, who will find it much harder to bear.

Policies to slow the decline in the working-age population have only a limited impact, but can ease the economic pressure of an ageing population.[45] Family policies, such as family allowances, maternity and parental leave, and investment in preschool education, have an impact on the birth rate but are insufficient to reverse ongoing trends Similarly, policies to promote the work–parenting balance can slow or reverse the trend of birth rate decline, but there is uncertainty about the extent of their impact. Reversing the downtrend in the working-age population would necessitate relatively large inflows of migrants. As the foreign labour force will also gradually age, maintaining the population age structure would require ongoing inflows of migrants in the context of an ageing global population. Migration can, however, alleviate labour shortages in the short to medium term At the same time, it is important to implement better integration policies, as migrants' skills often remain untapped.

All available labour market resources will need to be mobilised. This necessitates ensuring that people are healthy enough to work longer and that the pension system properly rewards later retirement. Policies should promote lifelong learning, flexible transitions between work and retirement, and good working conditions for older workers. It is also important to maintain the relationship between life expectancy and the retirement age.

---

[45] An analysis of the issues and a review of the literature can be found in André et al. (2024).

If labour market participation is to be increased, especially among women and older workers, it is necessary to improve the education system, provide affordable childcare, and increase labour market flexibility, including the availability of part-time work.

A prerequisite for prolonging working life is good health. Healthy ageing improves individual well-being, productivity and participation in social life. Poor health outcomes translate into lower productivity and additional costs for the treatment of neglected ailments. Policies promoting the integration of older people into the economy, healthy lifestyles, healthcare improvement, and the provision of long-term care are crucial for maintaining health and independence in old age The incidence of chronic diseases among older people is rising, but improved healthcare and new technologies can help address this problem. Therefore, in addition to preparing for a higher number of elderly patients, the health system should also be ensuring preventive care to help extend people's healthy life years.

Human labour will become scarcer and it is therefore essential to increase its productivity. The key to this is good quality education that equips the population not only with the skills needed in today's labour market, but also with the ability to respond to the significant structural changes in the domestic and global economy. The available workforce will need to be complemented as efficiently as possible with productive capital such as machinery, robots and software. This implies a good quality business environment and access to financing for stimulating business investment in automation. If Slovakia is to accelerate productivity growth, it must transition to an innovation-based economic model. In this context, the rapid advances in artificial intelligence represent a major challenge as well as an opportunity.

Adapting to an ageing population will require significant changes in different areas of social life and investment in infrastructure. Workplaces will need to operate more flexibly and adapt work organisation to older workers. Education systems need to promote lifelong learning and digital literacy to keep older people integrated and skilled. It will also be necessary to invest in public transport, housing and physical infrastructure in order to improve the mobility and social engagement of older people. Last but not least, the elderly care system needs to be improved. Given the growth of the post-working-age population, there must be investment in affordable institutional care. At the same time, only a small proportion of the elderly will require full-time care. It is therefore important to build up a network of community social workers to assist elderly people only with tasks they can no longer manage on their own. Such a model can serve a relatively large

number of elderly people, while also helping them to maintain their cognitive abilities and to feel independent and useful. Moreover, an affordable, good quality care system can help relieve the burden on family members of elderly people, freeing them up for more productive employment in the labour market.

4 Generational differences in education: Slovakia and the world[46]

Intergenerational mobility (IGM) is considered one of the key aspects of human progress.[47] Most parents around the world aspire for their children to have a better life and a higher standard of living than they themselves had. Similarly, most people hope to achieve a higher level of economic well-being during their lifetime than the one they were born into. The general public associates this phenomenon with the 'American Dream', i.e. the belief that anyone can achieve significant social advancement and wealth primarily through ability, education and hard work, regardless of the conditions in which they were born. Therefore, to ensure sustainable and inclusive growth, it is essential that public policy both supports such aspirations and enables their realisation.

The importance of IGM lies not only in its role for economic progress, but also in its importance for maintaining social cohesion and a sense of fairness.[48] In societies where there is little chance of improving upon the parental standard of living, there is a risk that different groups will compete for shares of a stagnating or shrinking economic pie. The fact that individuals' socio-economic position is largely determined by their own or their parents' socio-economic situation undermines the sense of fairness in society and limits economic growth. This is due to the inefficient allocation of resources and untapped human capital, i.e. a proportion of relatively talented people may not have access to good education and therefore do not fully realise their potential.[49]

For these reasons, this special section of the 2024 Structural Challenges report takes a closer look at IGM in Slovakia and compares it with other countries in Europe and around the world. IGM can be defined in several domains, such as income mobility, wealth mobility or educational mobility. For the purposes of this section, we will focus almost exclusively on ed-

---

[46] This section presents a small selection of the preliminary results from a forthcoming paper by Vladimír Novák, titled "The Slovak Illusion: Unravelling the Gap Between Believed and True Intergenerational Mobility".

[47] Samuel, L.R., *The American Dream: A Cultural History*, Syracuse University Press, 2012.

[48] See, for example, Narayan, A. et al., *Fair Progress? Economic Mobility across Generations around the World,* World Bank, Washington DC, 2018.

[49] For more references to the literature, see Section 4.2.

ucational mobility, drawing on the Global Database on Intergenerational Mobility (GDIM) compiled by the World Bank.[50]

In this chapter, for example, we will show that:
– Slovakia is one of the European countries where children are less likely to surpass the educational outcomes of their parents;
– the difference in average intergenerational educational mobility between the former Eastern bloc countries and western Europe was significant in the past and has continued to widen over time
– parents with lower-secondary education in Slovakia have a lower chance of their children surpassing their educational level. Conversely, for parents with higher-secondary education, this probability is higher;
– a notable difference between Western countries and the former Eastern bloc is the extent to which the educational attainment of daughters was dependent on the educational attainment of their parents;
– high productivity and private returns to investment in tertiary education are also maintained in younger, more educated cohorts in Slovakia.

4.1   Data and main indicators

The Global Database on Intergenerational Mobility (GDIM) contains estimates of intergenerational mobility (IGM) in education by 10-year cohorts, covering individuals born between 1950 and 1989, i.e. people currently aged between 35 and 75. We will refer to the generation born between 1980 and 1989 as the 1980s cohort, that born between 1970 and 1979 as the 1970s cohort, and so on. By parents, we mean the parents of the respective cohort.

The dataset also provides estimates by the type of parental educational attainment (mothers/fathers/average/max) and type of child's educational attainment (sons/daughters/all). This allows us, for instance, to explore the effects of gender, both of parents and children, on IGM, and not just father-son mobility, which has up to now been the usual focus of attention in the Slovak environment.[51] Unless otherwise specified, the presented results are for the maximum educational attainment of parents and for all children.

The dataset focuses on educational mobility for four main reasons:
i)   human capital, primarily acquired through education, is the key aspect of economic well-being;
ii) intergenerational data on education is more widely available than on income, hence almost all countries can be compared;

---

[50]   World Bank, Global Database on Intergenerational Mobility, 2023.
[51]   For example, in Rizman, T., "Jablko padá ďaleko od stromu" (The apple falls far from the tree), *Commentaries,* No 2018/9, Institute for Financial Policy at the Finance Ministry of the Slovak Republic, May 2018.

iii) the estimation of educational mobility involves fewer methodological challenges;

iv) individuals can report their parents' educational level with a high degree of precision, whereas the same is not true for income.

Important limitations of the data:

i) the data focus exclusively on educational attainment, not the quality of education, so they may significantly distort the extent to which IGM in education is linked to IGM in, for example, income;

ii) the data sources are surveys conducted in individual countries, not administrative data sources.

Box 2
Indicators of intergenerational mobility in education

In this section, we work with two main indicators of intergenerational mobility (IGM):

Absolute upward IGM measures the extent to which one generation's standard of living is higher than that of their parents. Specifically, it measures whether children attain a higher living standard (measured in this chapter by educational attainment) than their parents. It is important to note that this does not necessarily mean that children are better off relative to their peers than their parents were, especially in countries where living standards have risen for everyone.

This type of mobility reflects the universal human desire of parents for a better life for their children. Higher absolute upward mobility is closely linked to increases in shared prosperity, which is why we focus on it in this section. In general, however, IGM can be both upward and downward within the distribution, and this can be informative about the impact of uncertainty and other risks on intergenerational prosperity.

In the context of education, absolute upward IGM is defined as the proportion of children whose educational attainment is higher[52] than that of their parents, where the parents have not completed tertiary education.[53, 54] Hence, absolute mobility depends on the general level of education in a given country. The more developed a country is and the higher the general level of education, the harder it is to surpass the educational level of the previous generation.

---

[52] The level of education is categorised according to the International Standard Classification of Education (ISCED): less than primary (ISCED 0), primary (ISCED 1), lower secondary (ISCED 2), upper secondary or post-secondary/non-tertiary (ISCED 3–4) and tertiary (ISCED 5–8). The categories refer to the highest educational level completed by the respondent.

[53] To verify the robustness of the results, the GDIM also shows absolute mobility measured to include parents with tertiary education. The presented results differ only marginally when applying this alternative definition.

[54] The GDIM also includes indicators which do not require the parents not to have tertiary education. The results are, however, very similar and we therefore use an indicator providing conservative estimates of mobility.

Absolute mobility can therefore experience a purely mechanically decrease, because of progress in the general level of education.

Relative intergenerational mobility is the extent to which an individual's standard of living (in this chapter measured by education) is dependent on their parent's standard of living. Again, relative mobility defined in this way may not be indicative of individuals' position relative to their peers, but only of their position of relative to their parents. At the same time, even with improved living standards for all members of a new generation, relative mobility can vary for different groups of the population, thus helping to reveal the mobility/immobility of certain segments of society. Higher relative mobility – less dependence on parents' standard of living – across generations is associated with lower inequality of opportunity. This means that relative mobility reflects the extent to which people's life achievements are influenced by the circumstances into which they are born, such as parental education and income, race, gender and place of birth. Specifically, we measure relative IGM as 1 minus the correlation coefficient between the number of years spent in education between children and parents.

4.2   Why promote absolute and relative intergenerational mobility

Promoting absolute and relative IGM is crucial for ensuring economic growth and social cohesion.[55] Absolute mobility ensures rising living standards,[56] while relative mobility reduces inequality and enables the effective use of human potential for economic growth.[57] Without effective absolute mobility, social cohesion could be undermined,[58] and without relative mobility, inequality would persist across generations,[59] leading to inefficient allocation of resources and hindering economic progress.[60]

---

[55] Chetty, R., Friedman, J.N., Hendren, N., Jones, M.R. and Porter, S.R., "The Opportunity Atlas: Mapping the Childhood Roots of Social Mobility"*, NBER Working Paper,* No 25147, National Bureau of Economic Research, October 2018.

[56] Samuel, L.R., *The American Dream: A Cultural History,* Syracuse University Press, 2012.

[57] Bell, A., Chetty, R., Jaravel, X., Petkova, N. and Van Reenen, J., "Who Becomes an Inventor in America? The Importance of Exposure to Innovation"*, The Quarterly Journal of Economics,* Vol. 134, No 2, May 2019, pp. 647-713.

[58] Chetty, R., Grusky, D., Hell, M., Hendren, N., Manduca, R. and Narang, J., "The fading American dream: Trends in absolute income mobility since 1940"*, Science,* Vol. 356, No 6336, pp. 398-406.

[59] This relationship is captured by what has been called 'The Great Gatsby Curve', as examined, for example, in Corak, M., "Income Inequality, Equality of Opportunity, and Intergenerational Mobility"*, Journal of Economic Perspectives,* Vol. 27, No 3, 2013, pp. 79-102, and popularised in a 2012 speech given by Alan B. Krueger at the White House, titled "The Rise and Consequences of Inequality in the United States".

[60] See, for example: Narayan, A. et al., *Fair Progress? Economic Mobility across Generations around the World,* World Bank, Washington DC, 2018; Cholli, N.A. and Durlauf, S.N., "Inter-

Increased intergenerational mobility contributes significantly to economic growth and poverty reduction. Research confirms that higher mobility, especially in education, leads to more robust economic growth and poverty reduction. Countries with higher mobility perform better in terms of GDP per capita, suggesting that efficient use of resources promotes overall economic productivity and prosperity.[61]

Promoting intergenerational mobility is critical for long-term economic success and social progress.[62] Policies aimed at increasing relative mobility improve the allocation of human and financial resources, thereby reducing economic inefficiencies.[63] These policies should focus on providing equal opportunities in access to education and employment, thereby promoting sustainable growth and improving social well-being.[64]

4.3 Comparison of intergenerational mobility in education in Slovakia and Europe

Absolute IGM in Slovakia for the 1980s cohort is among the lowest in Europe, with only around one-third of children born between 1980 and 1989 attaining a higher level of education than their parents. Slovakia, along with Czechia, Hungary and Bulgaria, is among the countries with the lowest levels of mobility. The countries with the highest absolute mobility in this cohort are Portugal, Spain, Cyprus and the Netherlands.[65]

Countries of the former Eastern bloc have lower absolute mobility than do western European countries, with the exception of Austria and Switzerland. This phenomenon is surprising, as economically advanced countries tend to have a higher number of highly educated inhabitants, making it more difficult for children to surpass parental educational attainment.

---

generational Mobility", *NBER Working paper,* No 29760, National Bureau of Economic Research, February 2022.

[61] Owen, A.L. and Weil, D.N., "Intergenerational earnings mobility, inequality and growth"*, Journal of Monetary Economics,* Vol. 41, No 1, February 1998, pp. 71-104.

[62] Banerjee, A.V. and Newman, A.F., "Occupational Choice and the Process of Development"*, The Journal of Political Economy,* Vol. 101, No 2, April 1993, pp. 274-298.

[63] Hassler, J. and Mora, J.V.R., "Intelligence, Social Mobility, and Growth"*, The American Economic Review,* Vol. 90, No 4, September 2000, pp. 888-908.

[64] *Poverty and Shared Prosperity 2016: Taking on Inequality,* World Bank, Washington DC, 2016.

[65] The absolute mobility rate is affected by the initial distribution of education levels in the country. The education level distributions for Slovakia are shown in Charts 47 and 48. A country with a higher general level of education will find it more challenging to achieve high absolute mobility. In Slovakia, the proportion of the population with at least upper-secondary education has consistently been higher than the EU average, but the proportion with tertiary education is lower. It is therefore important in the future to more closely examine mobility for different educational distribution groups.

Chart 47

Chart 47
Absolute mobility in Europe: 1980s cohort (percentages)
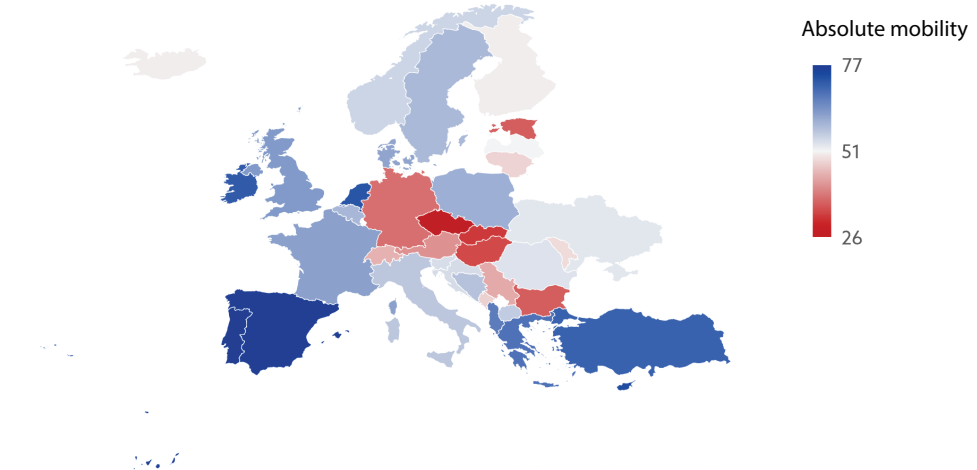
Source: GDIM 2023 (World Bank).

Slovakia's middle position in the European ranking for relative mobility indicates that individuals in the country's 1980s cohort have a medium level of dependence on the educational level of their parents.

For most countries, the data show that the educational attainment of individuals in the 1980s cohort is highly dependent on that of their parents. The countries where the educational attainment of the 1980s cohort is least dependent on their parent's educational attainment are Denmark, the United Kingdom, Iceland and Finland. The level of dependence is highest in Hungary, Romania and Bulgaria. At the same time, many of the countries with low relative mobility have higher absolute mobility, which raises questions about the relationship between absolute and relative mobility.

Chart 48
Relative mobility in Europe: 1980s cohort
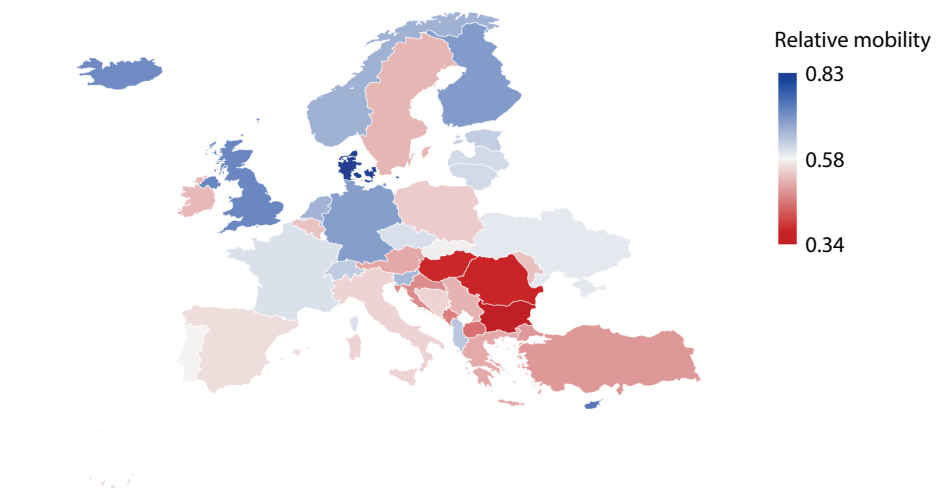
Source: GDIM 2023 (World Bank).
Notes: We measure relative IGM as 1 minus the correlation coefficient between the number of years spent in education by children and their parents. A lower value indicates greater persistence in education between children and their parents.

Absolute and relative mobility in the education of the 1980s cohort are correlated to some extent. Economies with a higher proportion of adults who have attained a higher educational level than their parents show less dependence of individuals' educational level on that of their parents. This suggests that absolute and relative mobility are mutually supportive and reinforcing. Insufficient relative mobility leads to lower and less inclusive growth, subsequently limiting absolute mobility in the long run.[66] However, this relationship is not unconditional and there are important exceptions. These differences show that although absolute and relative mobility are linked and interact, their relationship is complex and dependent on the specific historical, social and economic conditions of individual countries.

Chart 49
Correlation of relative and absolute mobility
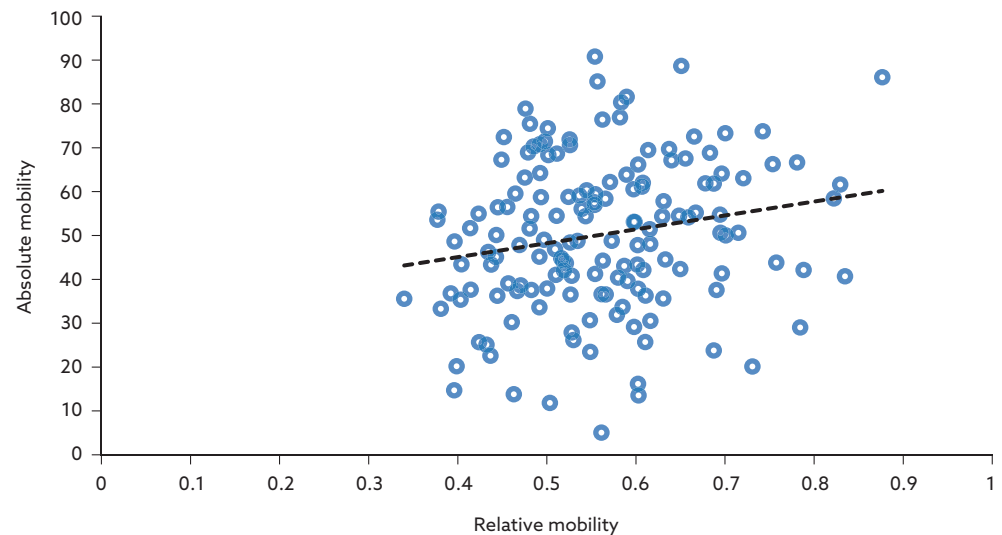
Source: GDIM 2023 (World Bank).

4.4 Mobility trends for individual cohorts

The above results indicate the difference between former Eastern bloc countries and western European countries in terms of the mobility situation of the 1980s cohort. In this part, we focus on the evolution of mobility for the four available cohorts – from the 1950s cohort to the 1980s cohort – to understand whether this observation holds only for the 1980s cohort. Charts 50 and 51 show the unweighted average absolute and relative mobility for the former Eastern bloc countries and western European coun-

---

[66] Narayan, A. et al., *Fair Progress? Economic Mobility across Generations around the World,* World Bank, Washington DC, 2018.

tries. Charts 52 and 53 focus in on the Visegrad Four countries, Finland and France

The difference in average absolute and relative mobility between the former Eastern bloc countries and western Europe was significant in the past and has widened further over time. Only for the 1950s cohort was absolute mobility higher in the former Eastern bloc. Relative mobility has been consistently higher in western European countries. What is remarkable, however, is the significant widening of the previously stagnant relative mobility gap for the 1980s cohort.

Despite their increasing wealth, western European countries have managed to increase their relative mobility while experiencing only a slight decline in absolute mobility. In the former Eastern bloc, the factors contributing to falling absolute and relative mobility include not only the education system and the economic transformation process, but also social norms and persistent aspirations.

Chart 50
Absolute mobility for cohorts from the 1950s to the 1980s (percentages)

— Former Eastern bloc countries
— Western European countries
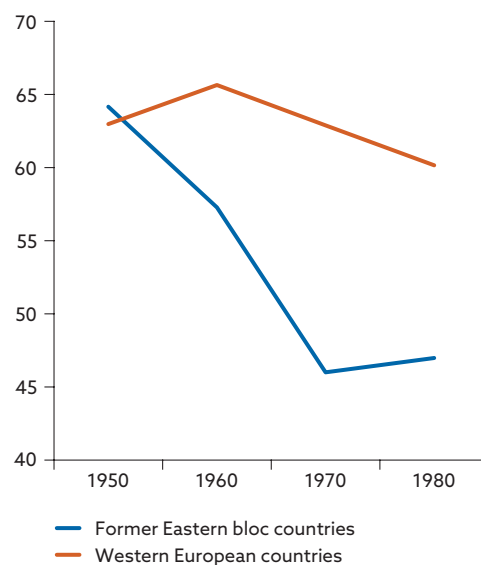
Source: GDIM 2023 (World Bank).

Chart 51
Relative mobility for cohorts from the 1950s to the 1980s

— Former Eastern bloc countries
— Western European countries
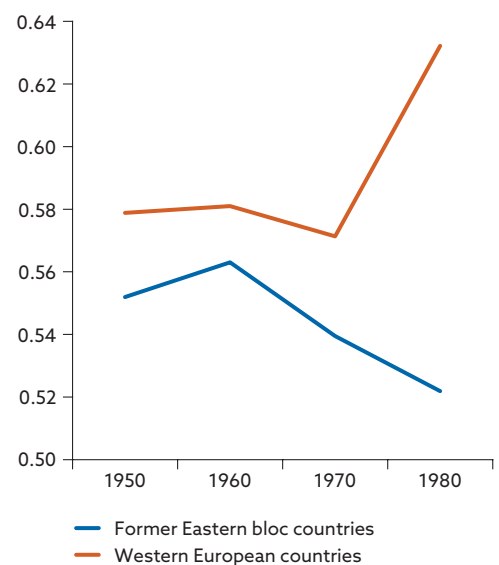
Source: GDIM 2023 (World Bank).

A similar situation is observed when focusing on the V4 countries (all of them post-communist countries) and two of the western European democracies – Finland and France. Both Finland and France rank among the countries with the highest absolute and relative mobility.

Chart 52

Absolute mobility for cohorts from the 1950s to the 1980s (percentages)
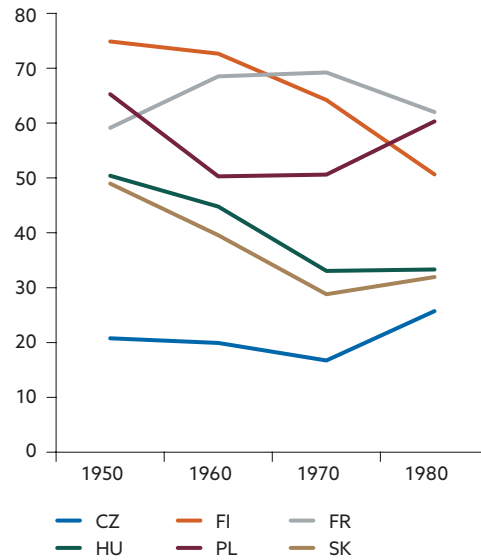
Source: GDIM 2023 (World Bank).

Chart 53

Relative mobility for cohorts from the 1950s to the 1980s
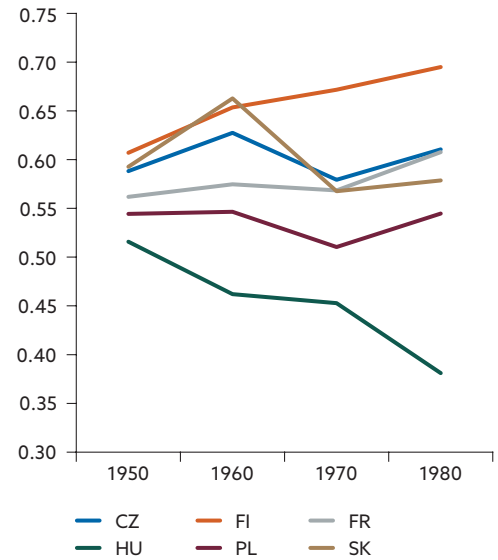
Source: GDIM 2023 (World Bank).

In Slovakia, the highest absolute mobility was recorded for the 1950s cohort, and the highest relative mobility for the 1960s cohort. The fall of communism and subsequent transformation led to a slight improvement in both types of mobility for the 1980s cohort vis-à-vis the 1970s cohort. Finland and France, with their wealth increasing, show a slight decline in the likelihood of children surpassing their parents' educational attainment. This is to be expected, as it becomes increasingly difficult to surpass educational levels in a highly educated society. At the same time, they reduce the persistence in education between parents and children.

In Slovakia, it has become less likely over the years that children of parents with lower-secondary education will surpass their parents' educational attainment, whereas for children of parents with higher-secondary education, the likelihood has increased. This contrast indicates mainly that parents with lower-secondary education lack the economic resources to support their children's educational attainment. **Data for Slovakia also indicate that a poverty trap may be emerging for parents with lower-secondary education.**

Chart 54
Absolute mobility by ISCED level of parental education in Slovakia (percentages)

Legend: 1950, 1960, 1970, 1980

Source: GDIM 2023 (World Bank).

Chart 55
Absolute mobility by ISCED level of parental education in France (%)

Legend: 1950, 1960, 1970, 1980

Source: GDIM 2023 (World Bank).

Notes: The ISCED classification of educational attainment is as follows: ISCED 0 – less than primary; ISCED 1 – primary; ISCED 2 – lower secondary; ISCED 3–4 – upper secondary or post-secondary/non-tertiary; ISCED 5-8 – tertiary.

The probability of children of tertiary-educated parents surpassing their parents' educational attainment is automatically 0, by definition of absolute mobility.

In France, by comparison, the likelihood of children surpassing their parents' educational level increased for successive cohorts across all parental educational levels. This is consistent with the previous observation for France that absolute mobility has declined slightly while relatively mobility has increased.

In Slovakia, the mobility of children from the lower half of the education distribution remained largely unchanged between 1950 and 1980 (edging up from 35% to 37%). Specifically, across the cohorts from the 1950s to the 1980s, the probability of a child from the lower half of the education distribution moving up to the top quartile hardly changed at all (rising from 14% to 16%). The likelihood of moving into the third quartile increased in the 1960s, but it is almost identical for the 1950s and 1980s cohorts

Chart 56

Probability in Slovakia that a child from the lower half of the education distribution will end up in a given quartile by birth cohort (percentages)
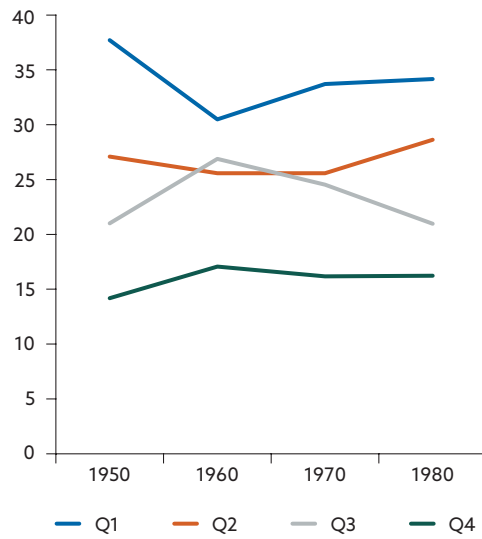
Source: GDIM 2023 (World Bank).

Chart 57

Probability that a child from the lower half of the distribution in the 1980s cohort will end up in a given quartile (percentages)
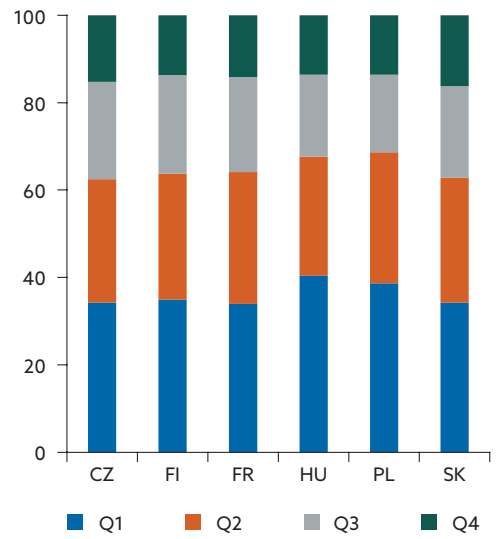
Source: GDIM 2023 (World Bank).

In an international comparison of children from the 1980s cohort in the V4 countries and France (Chart 57), we see very similar probability for the movement of children out of the lower half of the distribution. The probability falls almost linearly between quartiles. The probability of remaining in the lower half of the distribution ranges between 63% and 69%, while the probability of ending up in the lowest quartile ranges between 34% and 40%.

However, children in the 1980s cohort who were born into a family in the highest quartile have an almost a 50% probability of staying there. The countries with the highest persistence rates in the highest quartile are France and Hungary. In Finland, on the other hand, in the 1980s cohort, there is the highest probability of someone from the highest quartile moving into the lower half.

Chart 58

The probabilities of children from the highest education quartile (Q4) in the 1980s cohort in Slovakia remaining in that quartile and falling into the lower half of the distribution (Q1+Q2) (percentages)
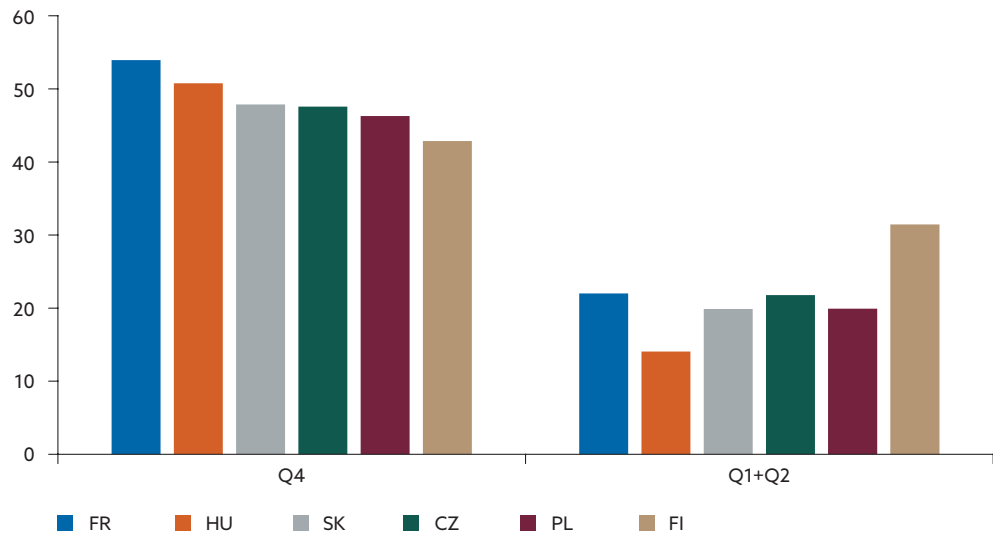
Source: GDIM 2023 (World Bank).

4.5 The role of gender in intergenerational mobility

For children born in the 1980s, both genders had almost identical probabilities of surpassing either their father's or mother's educational level. In the 1950s cohort, by contrast, it was primarily sons that surpassed their parents' educational level, largely because of the familial social norms of the time, which for women prioritised homemaking and raising children over the pursuit of education. In the subsequent 1960s and 1970s cohorts, the opposite was true, in that daughters were more likely than sons to surpass their parents' educational level. This may largely be because of societal changes in the post-war decades. Whereas in the first post-war decade, it was primarily sons who pursued education to provide for their families, often requiring only secondary, or even primary, education to surpass their parents' educational level, in the 1960s and 1970s, under the communist regime, there was greater support for worker occupations requiring less advanced education; at the same time, daughters were moving into jobs requiring tertiary education, such as teaching or medicine.

For all available cohorts, it appears that mothers had lower education than fathers, hence children had a greater probability of surpassing their mother's educational level than their father's. In other words, although daughters in the 1960s and 1970s cohorts predominated over sons in terms of surpassing their parents' educational level, this temporary effect did not close the educational gap that existed in society until then. This en-

trenched inequality may, among other things, negatively affect the expectations formed by generations of young women and hence their lifelong investments in education.[67]

Chart 59
Absolute IGM in Slovakia by gender combination of parent-child pairs (percentages)
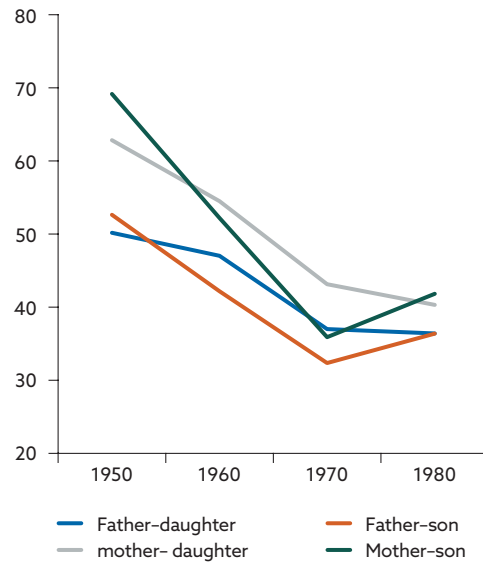
Source: GDIM 2023 (World Bank).

Chart 60
Relative IGM in Slovakia by gender combination of parent-child pairs
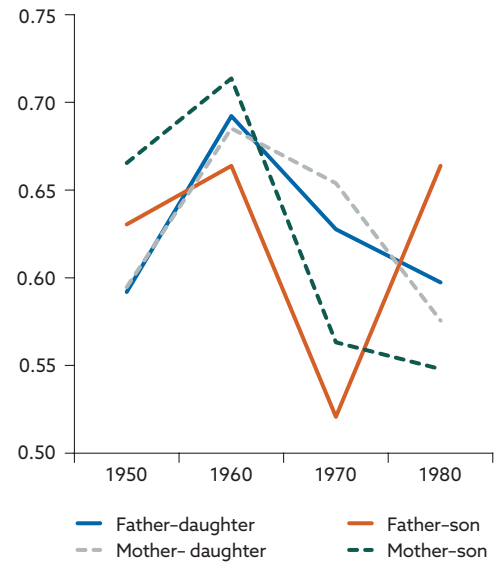
Source: GDIM 2023 (World Bank).

In Slovakia, educational persistence by parent-child gender combinations has changed over the years. In the 1950s cohort, the strongest correlation between the educational attainment of parents and children was between parents and daughters, while in the 1960s and 1970s cohorts it was between fathers and sons. The implications of this trend are seen in the 1980s cohort, whose educational attainment was determined less by that of their fathers and more by that of their mothers.

---

[67] This effect has been examined by, for example, Claudia Goldin, winner of the 2023 Nobel Prize in Economics; for further reading, see the blog post by Brian Fabo and Vladimír Novak, "O platovej nerovnosti medzi ženami a mužmi" (On the gender pay gap), published on the website of Národná banka Slovenska on 8 November 2023 (in Slovak only).

Chart 61
Absolute IGM in western European countries and former Eastern bloc countries by gender of child (percentages)

- Daughter (Eastern bloc)
- Daughter (western Europe)
- Son (Eastern bloc)
- Son (western Europe)
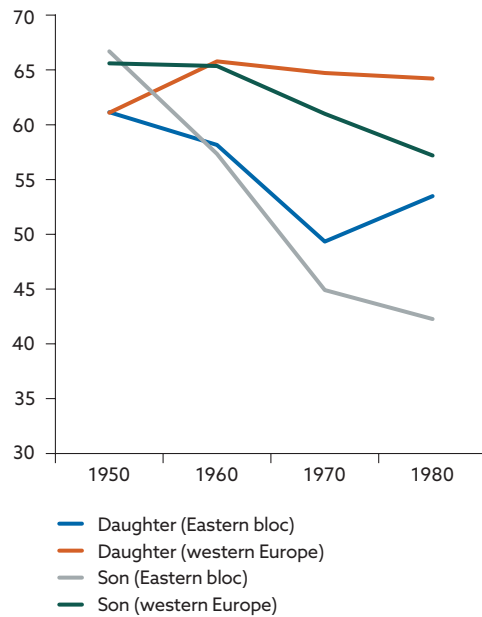
Source: GDIM 2023 (World Bank).

Chart 62
Relative IGM in western European countries and former Eastern bloc countries by gender of child

- Daughter (Eastern bloc)
- Daughter (western Europe)
- Son (Eastern bloc)
- Son (western Europe)
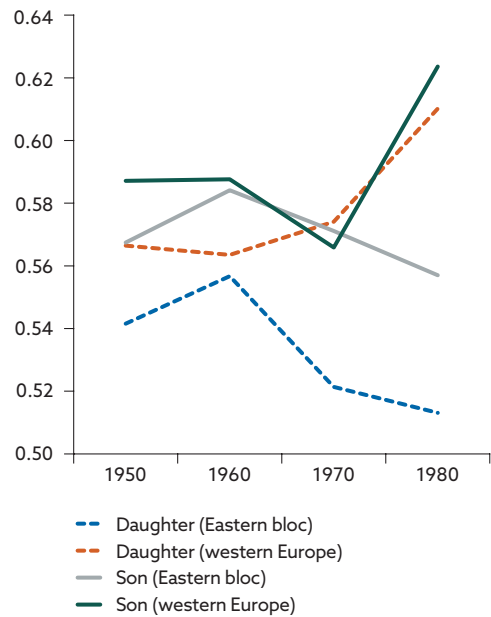
Source: GDIM 2023 (World Bank).

The gap in absolute IGM between western European democracies and the former Eastern bloc countries is almost identical for both genders. Children from western Europe were around 15% more likely than their Eastern bloc counterparts to surpass their parents' educational attainment.

A major difference between western European democracies and the former Eastern bloc can be observed in the degree of dependence of daughters' educational level on their parents' educational level. The difference in the relative mobility of daughters between western European and former Eastern bloc countries persists for all age cohorts, and even the trend in relative mobility between the two is reversed. As for sons, the West–East gap did not open until the 1980s.

The long-term persistence of opposite trends in relative mobility between western European democracies and the former Eastern bloc may lead – for both genders – to a growing sense of unfairness, rising discontent and declining social cohesion.

4.6   Linking education and income

As explained in the introduction to this section, our focus on intergenerational mobility in education was based on the fact that education is the

key element of human progress and thus a strong predictor of lifetime earnings. However, the relationship between educational attainment and income mobility is complex and may depend on other factors such as the remuneration of skills in the labour market and the impact of parental contacts on economic opportunities. Economic theories predict a positive correlation between IGM in education and income, which is supported by empirical data from countries where data on both types of mobility are available.[68]

Furthermore, in the previous part we looked at how parents' (increasing) education level over the years affected their children's education attainment. As regards parents, what has been most notable over the years is the increase in those with ISCED 3–8 and the decrease in those with lower educational attainment (Chart 63). Among children, we have seen mainly an increase in tertiary education (ISCED 5-8) and a decrease in upper-secondary education (ISCED 3-4) (Chart 64) This naturally leads us to the question: does the increasing number of tertiary-educated people affect their income profiles?

Chart 63

Parents' educational attainment by birth cohort of their children (ISCED classification; percentages)

Chart 64

Children's educational attainment by birth cohort (ISCED classification; percentages)

Source: GDIM 2023 (World Bank).
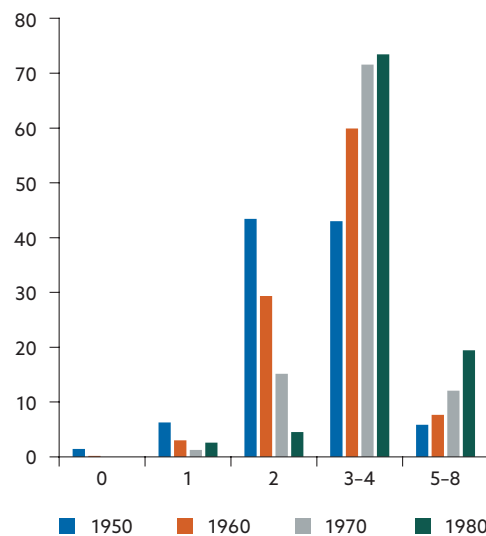
Source: GDIM 2023 (World Bank).
Notes: Educational attainment is categorised according to the ISCED classification: ISCED 0 – less than primary; ISCED 1 – primary; ISCED 2 – lower secondary; upper secondary or post-secondary/non-tertiary; ISCED 3–4 – upper secondary or post-secondary/non-tertiary; ISCED 5-8 – tertiary.

---
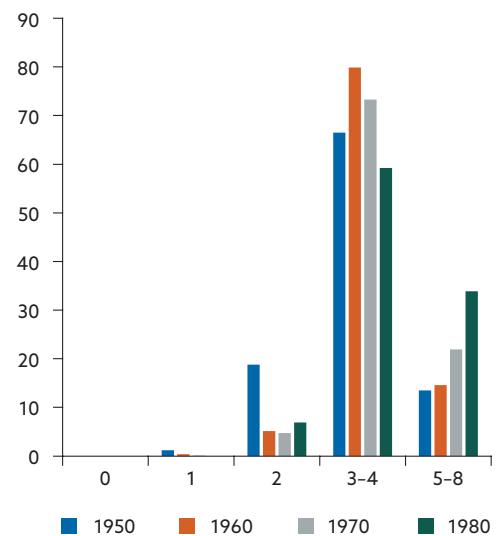
[68] Narayan, A. et al., *Fair Progress? Economic Mobility across Generations around the World*, World Bank, Washington DC, 2018.

To answer this question, we can use the results of a Czech study[69] that examined whether Czechia has too many graduates; it was conducted by the Institute for Democracy and Economic Analysis (IDEA), a Czech think-tank that is a project of the National Economic Institute of the Czech Academy of Sciences. The authors track, among other things, the wage evolution of university graduates in selected EU countries born in 1960, 1970, 1980 and 1990, i.e. in cohorts that differ significantly in terms of the share of tertiary-educated people. Importantly, they compare the wage ratio between the tertiary-educated and secondary-educated (TE/SE), i.e. the percentage difference in average and median wages, and they are also able to track the income trajectory for the different cohorts.

Chart 65

Cohort profiles of median real wages of the tertiary-educated
(men; corporate and non-business sector; EU SILC data)

Slovakia (euro per month)

Hungary (euro per month)

Year of birth: 1960 1970 1980 1990
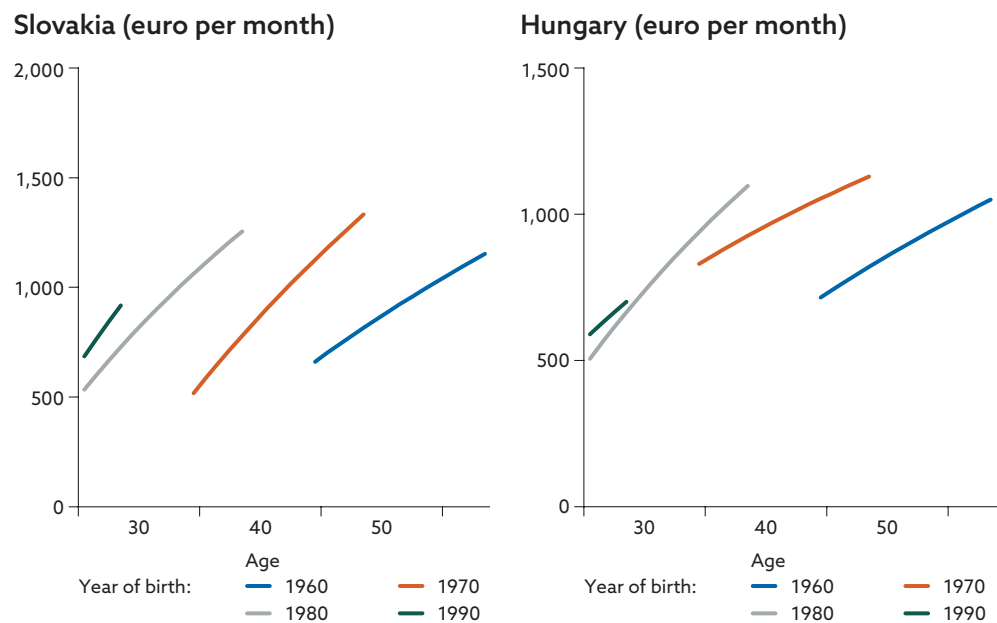
[69] Hrendash, T., Jurajda, Š., Münich, D., Doleželová, P. and Mrázek, P., "Máme příliš mnoho vysokoškoláku? Co lze vyčíst z celoživotních mzdových profilu" (Do we have too many university graduates? Insights from lifetime earnings profiles), *IDEA working paper*, No 13/2023, Institute for Democracy and Economic Analysis, November 2023, available online at https://idea.cerge-ei.cz/files/IDEA_Studie_13_2023_Vysokoskolaci_1031B.pdf
We thank the Institute for Democracy and Economic Analysis (IDEA), Daniel Münich, and the authors of the study for the opportunity to share and reproduce their results.

Poland (euro per month)

Year of birth:
— 1960 — 1970
— 1980 — 1990
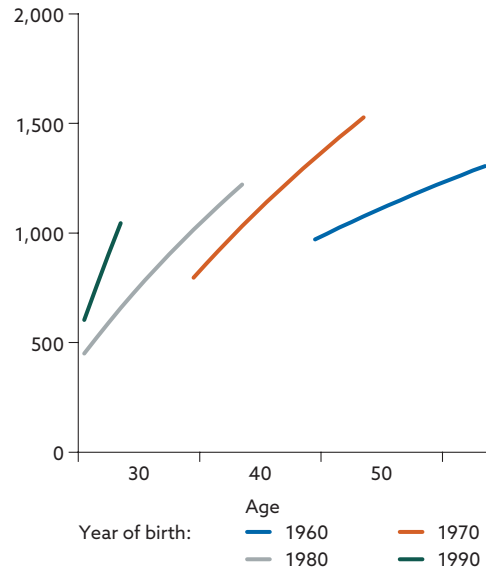
Lithuania (euro per month)

Year of birth:
— 1960 — 1970
— 1980 — 1990

Austria (euro per month)

Year of birth:
— 1960 — 1970
— 1980 — 1990

Finland (euro per month)

Year of birth:
— 1960 — 1970
— 1980 — 1990
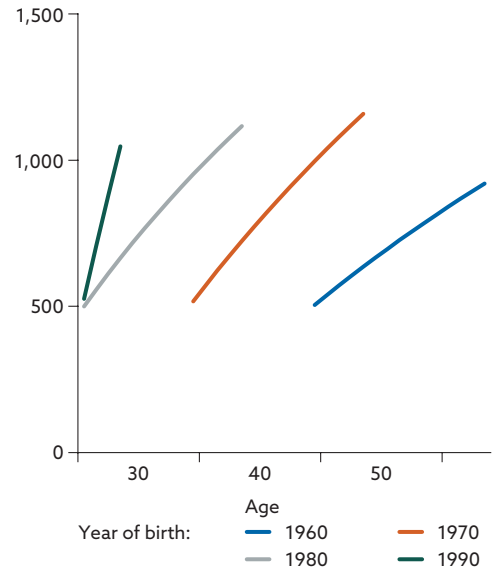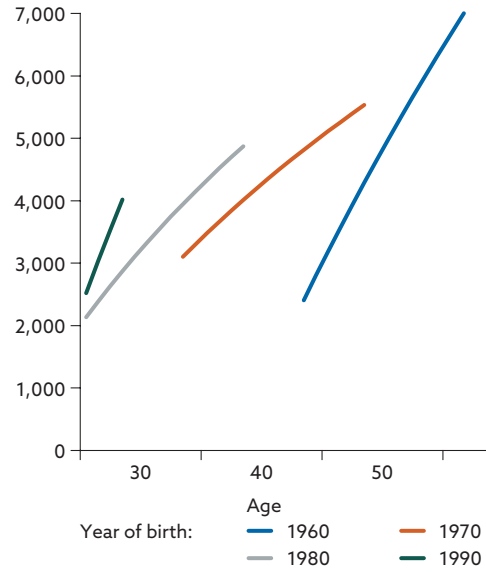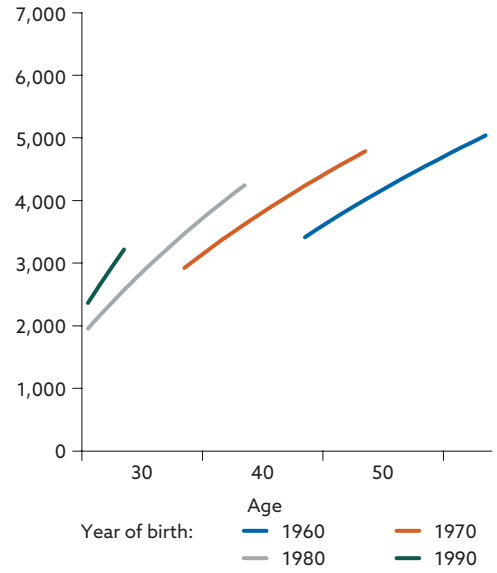
Spain (euro per month)
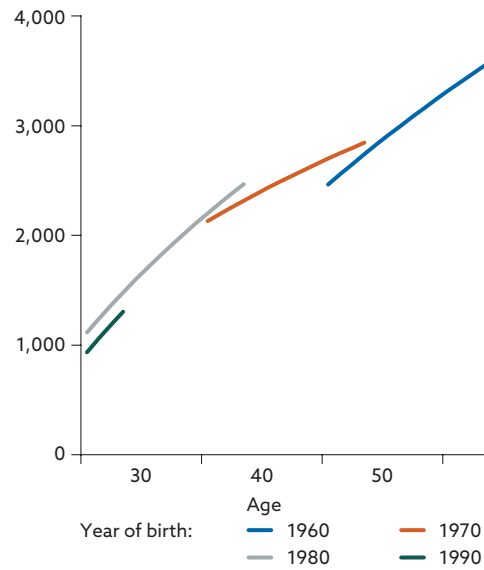
Italy (euro per month)
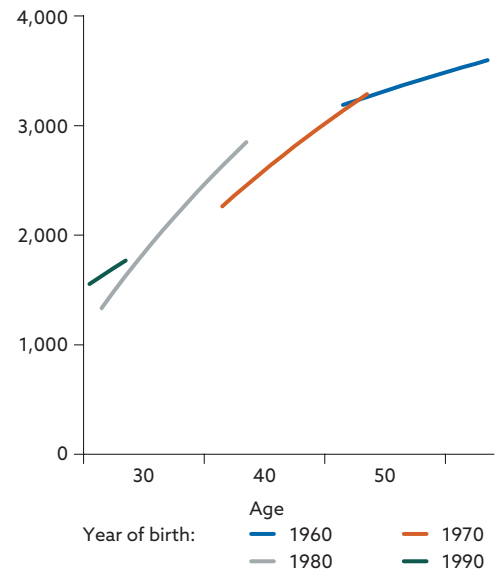
Source: Hrendash, Jurajda, Münich, Doleželová and Mrázek (2023).

In Slovakia, the wage profiles of the tertiary-educated are higher for younger cohorts than they were for older cohorts when they were younger.[70] It is a similar situation in other post-communist countries in Europe, such as Hungary, Poland and Lithuania, and to a lesser extent in democracies that have undergone rapid growth, such as Austria and Finland. In democracies with slower growth, such as Spain and Italy, we see very similar wage trajectories for different cohorts.

In Slovakia, high productivity and private returns to investment in tertiary education are also maintained in younger, more educated cohorts. The increasing supply of tertiary-educated labour may push down the TE/SE ratio if demand does not grow faster than supply; nevertheless, observations from wage profiles suggest that rapid growth in the supply of tertiary-educated labour leads to commensurate growth in the demand for tertiary-educated labour.

4.7 How to promote intergenerational mobility

The key to supporting intergenerational mobility in the future is to focus on mitigating and compensating for initial disparities at birth and to promote equal opportunities regardless of place and social conditions

---

[70] This refers to a higher level for a certain age. For example, 29-year-olds in the 1980s cohort earned €728, while 29-year-olds in the 1990 cohort were already earning €918. For non-overlapping ages, i.e. where data for the same age are not available, we can infer trends from the steepness of the curves since wages rise over a lifetime. In other words, we can extrapolate the cohort wage curves even for ages that we do not have data for and infer from this how wages have evolved between cohorts.

of birth. We know, of course, from research and international comparisons that effective policies to promote intergenerational mobility need to reflect the national specificities and the preferences of the given society. Further measures should ensure the following:

- **reduction of educational inequalities:** investment in public education to improve access and quality, especially in less developed areas;
- **promotion of a functional labour market:** active labour market policies aimed at supporting young people entering the market and at reducing discrimination;
- **equality in the regional distribution of opportunities:** reduction of economic segregation and promotion of local investment in education and infrastructure;
- **redistributive fiscal policy:** more progressive taxation and targeted social transfers to promote equality of opportunity.

Improvement in local knowledge about the evolution and determinants of intergenerational mobility is, however, a prerequisite for the success and effectiveness of the aforementioned measures, for evaluating their impacts in other domains, and for formulating previously unconsidered measures. It is especially important to more closely examine the following:

- intergenerational mobility in other domains, such as income and wealth, how they interact, their main determinants, and what is the most appropriate methodology for measuring them over time in Slovakia;
- the regional distribution of intergenerational mobility and the impact of internal and external migration;
- the impact and interaction of intergenerational mobility and inequalities, and their impact on economic growth;
- perceptions of intergenerational mobility in Slovakia, how they affect people's and firms' preferences, aspirations, information intake, acceptance of inequalities and thus their key economic decisions;
- the interaction of intergenerational mobility with people's time preferences and with the risk preferences of different population groups, and how these interactions affect people's key long-term decisions (e.g. saving for retirement).

We intend to analyse these and many other aspects in the coming period.

5 Annex of tables

5.1 Economic performance

Table 4 Factors of economic growth										
Indicator		**2010**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
GDP per hour worked *(PPP units)*	SK	26.5	27.8	27.7	28.1	29.1	32.4	34.4	35.4	38.4
Sources: Eurostat, NBS calculations	EU average	31.5	35.8	36.9	37.8	38.7	40.3	42.4	44.8	46.5
Total factor productivity *(annual percentage change)*	SK	6.0	0.0	1.5	2.0	1.1	2.2	4.1	-1.5	-0.4
Source: Ameco	EU average	2.0	0.6	2.3	1.4	1.0	-1.0	3.4	0.9	-0.9
Capital stock per employee *(annual percentage change)*	SK	3.6	0.4	0.6	0.9	2.4	3.3	2.1	0.0	4.0
Sources: DG ECFIN, Ameco	EU average	3.3	-0.1	-0.2	0.0	1.2	3.9	0.0	-0.7	0.7
Fixed capital formation *(annual percentage change)*	SK	8.6	-9.2	2.9	2.8	6.7	-10.9	3.5	5.7	10.6
Source: Eurostat	EU average	-3.3	3.8	6.2	4.3	8.8	-3.2	4.8	3.8	2.4
Export performance *(percentage of GDP)*	SK		94	95	96	92	85	92	99	91
Source: Eurostat	EU average		68	70	71	71	68	73	79	74
Foreign direct investment inflow *(percentage of GDP)*	SK	1.9	0.9	4.2	1.5	2.4	-2.2	1.5	2.5	
Source: OECD	OECD average	4.1	6.2	3.7	3.0	6.9	1.3	2.6	-11.1	
Foreign value added embodied in domestic exports *(percentage of exports)*	SK	45	48	49	48					
Source: OECD	OECD average	27	27	28	28					
Domestic value added embodied in foreign exports *(percentage of exports)*	SK	18	19	19	19					
Source: OECD	OECD average	19	20	20	20					
Re-exported intermediate imports *(percentage)*	SK	67	74	75	74					
Source: OECD	OECD average	45	47	48	48					
Score		**2010**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
GDP per hour worked		-0.41	-0.57	-0.65	-0.67	-0.68	-0.50	-0.47	-0.53	-0.48
Total factor productivity		1.94	-0.34	-0.44	0.36	0.05	0.96	0.25	-1.01	0.25
Capital stock per employee		0.16	0.26	0.50	0.45	0.41	-0.19	0.65	0.35	1.28
Fixed capital formation		1.23	-0.91	-0.59	-0.25	-0.11	-1.37	-0.12	0.29	1.10
Export performance			0.66	0.66	0.65	0.52	0.41	0.46	0.51	0.42
Foreign direct investment inflow		-0.20	-0.26	0.10	-0.19	-0.20	-0.69	-0.23	0.16	
Foreign value added embodied in domestic exports		-1.59	-1.82	-1.83	-1.75					
Domestic valued added embodied in foreign exports		-0.26	-0.19	-0.23	-0.24					
Re-exported intermediate imports		-1.46	-1.65	-1.69	-1.61					

Table 5 Institutional quality, innovation capacity, and technology

Indicator		2015	2016	2017	2018	2019	2020	2021	2022	2023
Voice and accountability	SK	0.97	0.96	0.91	0.85	0.86	0.88	0.90	0.89	
(score: from -2.5 to +2.5) *Source: World Bank*	EU average	1.10	1.08	1.07	1.06	1.04	1.06	1.07	1.08	
Political stability	SK	0.87	0.71	0.90	0.74	0.67	0.63	0.62	0.44	
(score: from -2.5 to +2.5) *Source: World Bank*	EU average	0.68	0.66	0.69	0.68	0.70	0.69	0.71	0.62	
Government effectiveness	SK	0.74	0.79	0.67	0.58	0.55	0.50	0.49	0.38	
(score: from -2.5 to +2.5) *Source: World Bank*	EU average	1.07	1.05	1.03	1.03	1.02	0.98	0.99	0.98	
Rule of law	SK	0.47	0.60	0.51	0.47	0.50	0.65	0.68	0.62	
(score: from -2.5 to +2.5) *Source: World Bank*	EU average	1.09	1.06	1.05	1.03	1.05	1.03	1.04	1.03	
Control of corruption	SK	0.11	0.15	0.10	0.23	0.19	0.42	0.21	0.21	
(score: from -2.5 to +2.5) *Source: World Bank*	EU average	0.94	0.94	0.91	0.92	0.92	0.96	0.95	0.95	
Regulatory quality	SK	0.77	0.88	0.81	0.80	1.00	0.77	0.87	0.85	
(score: from -2.5 to +2.5) *Source: World Bank*	EU average	1.14	1.13	1.13	1.14	1.18	1.11	1.11	1.07	
R&D expenditure – business sector	SK		21	21	27	33	31	31	34	36
(standardised index: EU 2016 = 100) *Source: EIS*	EU average		71	71	71	73	75	77	81	81
R&D expenditure – public sector	SK		69	115	44	45	42	40	48	47
(standardised index: EU 2016 = 100) *Source: EIS*	EU average		80	82	71	72	75	77	82	80
Innovators	SK		44	44	44	39	39	45	45	59
(standardised index: EU 2016 = 100) *Source: EIS*	EU average		98	98	98	110	110	138	138	141
Attractive research systems	SK		38	42	43	42	48	50	54	57
(standardised index: EU 2016 = 100) *Source: EIS*	EU average		96	98	102	106	107	114	120	123
Knowledge-intensive services exports	SK		39	38	38	45	46	45	59	59
(standardised index: EU 2016 = 100) *Source: EIS*	EU average		72	73	73	74	75	76	89	89
High-tech product exports	SK		111	114	112	113	116	120	113	119
(standardised index: EU 2016 = 100) *Source: EIS*	EU average		75	77	75	75	77	80	76	77
Intellectual assets	SK		38	41	42	46	44	43	47	45
(standardised index: EU 2016 = 100) *Source: EIS*	EU average		84	85	86	84	82	82	83	81
Linkages	SK		56	58	66	66	71	78	70	66
(standardised index: EU 2016 = 100) *Source: EIS*	EU average		125	128	133	144	150	168	176	170
Scientific publications among the top 10% most cited publications worldwide	SK		26	29	28	25	31	30	34	38
(standardised index: EU 2016 = 100) *Source: EIS*	EU average		82	81	82	82	80	81	82	84

Table 5 Institutional quality, innovation capacity, and technology (continued)

Indicator		2015	2016	2017	2018	2019	2020	2021	2022	2023
Broadband connectivity of at least 100 Mbps	SK				10	13	15	25	26	33
(percentage of households) Source: European Commission	EU average				18	23	29	34	40	54
Broadband connectivity of at least Gbps	SK						0.0	0.4	1.0	0.9
(percentage of households) Source: European Commission	EU average						0.7	1.5	2.9	6.2
5G coverage	SK							0	14	55
(percentage of households) Source: European Commission	EU average							13	46	74

Score	2015	2016	2017	2018	2019	2020	2021	2022	2023
Voice and accountability	-0.39	-0.33	-0.46	-0.56	-0.50	-0.51	-0.45	-0.54	
Political stability	0.48	0.13	0.58	0.17	-0.12	-0.20	-0.39	-0.73	
Government effectiveness	-0.61	-0.47	-0.68	-0.80	-0.84	-0.81	-0.85	-1.06	
Rule of law	-0.95	-0.77	-0.90	-0.93	-0.93	-0.64	-0.62	-0.71	
Control of corruption	-1.05	-1.00	-1.07	-0.87	-0.94	-0.70	-0.95	-0.95	
Regulatory quality	-0.75	-0.49	-0.63	-0.71	-0.42	-0.69	-0.47	-0.44	
R&D expenditure – business sector		-0.95	-0.95	-0.86	-0.79	-0.86	-0.90	-0.93	-0.88
R&D expenditure – public sector		-0.28	0.85	-0.69	-0.67	-0.82	-0.93	-0.83	-0.81
Innovators		-1.00	-1.00	-1.00	-1.23	-1.23	-1.43	-1.43	-1.37
Attractive research systems		-0.95	-0.94	-0.98	-1.05	-1.01	-1.07	-1.09	-1.14
Knowledge-intensive services exports		-0.87	-0.94	-0.95	-0.80	-0.79	-0.87	-0.91	-0.89
High-tech product exports		1.37	1.42	1.50	1.54	1.59	1.65	1.54	1.61
Intellectual assets		-1.30	-1.28	-1.26	-1.13	-1.14	-1.21	-1.16	-1.27
Linkages		-0.99	-0.98	-0.98	-1.10	-1.12	-1.19	-1.33	-1.37
Scientific publications among the top 10% most cited publications worldwide		-1.26	-1.22	-1.30	-1.34	-1.23	-1.37	-1.27	-1.40
Broadband connectivity of at least 100 Mbps				-0.64	-0.69	-0.81	-0.49	-0.78	-1.08
Broadband connectivity of at least Gbps						-0.36	-0.39	-0.40	-0.66
5G coverage							-0.56	-1.00	-0.77

Table 6 Labour market characteristics

Indicator		2010	2016	2017	2018	2019	2020	2021	2022	2023
Employment rate	SK	60.4	66.7	68.1	69.5	70.4	69.5	69.4	71.3	72.0
(percentage) Source: Eurostat	EU average	62.7	66.0	67.5	68.8	69.7	68.7	69.8	71.5	71.9
Participation rate	SK	70.5	73.9	74.1	74.4	74.7	74.5	74.6	76.1	76.5
(percentage) Source: Eurostat	EU average	70.1	72.6	73.3	73.9	74.3	73.9	74.8	75.9	76.3
Hours worked per employee	SK	1,805	1,740	1,714	1,704	1,692	1,572	1,583	1,622	
(hours per year) Source: OECD	OECD average	1,744	1,723	1,713	1,707	1,697	1,611	1,669	1,660	
Employment rate of age group 15–74	SK	53.8	58.2	59.2	60.1	60.6	59.5	60.8	62.2	62.6
(percentage) Source: Eurostat	EU average	56.7	58.7	59.9	60.9	61.6	60.7	61.3	62.7	63.1

Table 6 Labour market characteristics (continued)

Indicator		2010	2016	2017	2018	2019	2020	2021	2022	2023
Employment rate of older workers, age group 55–64	SK	41.5	50.5	54.6	55.9	58.8	60.2	60.6	64.1	66.6
(percentage) *Source: Eurostat*	EU average	44.5	52.4	54.6	56.9	58.4	58.9	60.6	62.6	64.2
Employment rate of women, age group 15–39	SK	46.8	50.6	51.5	51.5	51.2	49.7	56.7	57.7	57.7
(percentage) *Source: Eurostat*	EU average	56.1	57.7	59.0	59.7	60.2	58.4	59.9	61.9	62.1
Part-time employment rate	SK	2.6	4.1	4.1	3.4	3.2	3.2	3.1	3.1	3.3
(percentages) *Source: Eurostat*	EU average	13.4	14.2	14.0	13.6	13.5	13.1	13.1	13.0	13.0
Youth employment rate, age group 15– 24	SK	20.8	25.3	27.0	27.6	25.0	22.8	20.8	21.3	21.7
(percentage) *Source: Eurostat*	EU average	31.3	32.0	33.2	34.0	34.2	31.5	32.6	34.5	34.8
Young people aged 15–24 not in employment, education or training	SK	14.1	12.3	12.1	10.2	10.3	10.7	11.0	9.6	8.9
(percentage) *Source: Eurostat*	EU average	12.2	11.1	10.4	9.6	9.4	10.2	9.9	9.1	8.9
Employment rate of persons with less than upper-secondary education	SK	28.6	35.9	37.3	36.4	36.1	34.0	26.9	31.3	33.5
(percentage) *Source: Eurostat*	EU average	50.3	51.2	52.6	53.9	54.7	53.8	54.0	55.6	56.7
Long-term unemployment rate	SK	10.6	6.8	5.8	4.6	3.8	3.7	3.9	4.0	3.8
(percentage) *Source: Eurostat*	EU average	4.4	4.2	3.5	2.8	2.4	2.3	2.5	2.2	2.0
Participation rate of persons aged over 65	SK	1.6	2.7	3.6	4.0	4.6	4.5	4.4	4.9	5.4
(percentage) *Source: Eurostat*	EU average	5.6	5.8	6.2	6.5	6.8	6.8	7.2	7.7	8.1
Firms offering ICT courses to employees	SK				16.8	17.5	18.1	16.2	16.2	15.4
(percentage of firms) *Source: European Commission*	EU average				21.1	21.4	22.8	21.1	21.1	22.5
Adult participation in learning	SK	3.1	2.9	3.4	4.0	3.6	2.8	4.8	12.8	10.5
(percentage) *Source: Eurostat*	EU average	9.4	10.7	11.2	11.4	11.7	10.0	12.6	13.7	14.5

Score	2010	2016	2017	2018	2019	2020	2021	2022	2023
Employment rate	-0.38	0.11	0.10	0.12	0.13	0.14	-0.07	-0.04	0.02
Participation rate	0.07	0.26	0.16	0.11	0.08	0.12	-0.04	0.04	0.03
Hours worked per employee	0.25	0.07	0.00	-0.01	-0.02	-0.20	-0.37	-0.18	
Employment rate of age group 15–74	-0.56	-0.09	-0.13	-0.15	-0.19	-0.24	-0.09	-0.10	-0.10
Employment rate of older workers, age group 55–64	-0.32	-0.18	0.00	-0.09	0.04	0.13	0.01	0.16	0.27
Employment rate of women, age group 15–39	-1.26	-0.93	-0.98	-1.03	-1.14	-1.06	-0.37	-0.48	-0.49
Part-time employment rate	-1.22	-1.08	-1.06	-1.10	-1.10	-1.10	-1.09	-1.07	-1.03
Youth employment rate, age group 15– 24	-0.82	-0.52	-0.48	-0.50	-0.71	-0.67	-0.88	-0.94	-0.93
Young people aged 15–24 not in employment, education or training	-0.43	-0.29	-0.43	-0.16	-0.27	-0.15	-0.30	-0.15	0.01
Employment rate of persons with less than upper-secondary education	-2.12	-1.93	-1.91	-2.16	-2.40	-2.51	-2.99	-2.68	-2.53
Long-term unemployment rate	-2.34	-0.83	-0.83	-0.73	-0.65	-0.71	-0.76	-1.15	-1.39
Participation rate of persons aged over 65	-1.10	-0.99	-0.83	-0.77	-0.67	-0.70	-0.77	-0.73	-0.65
Firms offering ICT courses to employees				-0.51	-0.47	-0.57	-0.64	-0.64	-0.90
Adult participation in learning	-0.83	-0.99	-0.99	-0.95	-0.96	-1.00	-0.94	-0.11	-0.47

Table 7 Quality of human capital

Indicator		2010	2016	2017	2018	2019	2020	2021	2022	2023
Mean years of schooling	SK	12.3	12.7	12.8	12.9	12.9	13.0	13.0	13.0	
(years) *Source: UNDP*	EU average	11.6	12.0	12.1	12.2	12.2	12.3	12.3	12.3	
Early leavers from education and training	SK	4.7	7.4	9.3	8.6	8.3	7.6	7.8	7.4	6.4
(percentage) *Source: Eurostat*	EU average	12.0	9.3	9.3	9.0	8.9	8.7	8.3	8.1	8.2
Early childhood education and care	SK		73.4	74.9	77.6	77.8	78.1	77.4	78.6	
(percentage) *Source: Eurostat*	EU average		88.2	89.2	89.0	90.0	91.0	90.0	90.8	
Population aged 25–64 with at least upper secondary educational attainment	SK	91.0	91.9	91.4	91.7	91.4	92.7	93.3	93.7	93.8
Population aged over 25 with tertiary educational attainment	SK	17.3	22.0	23.1	24.6	25.8	26.8	27.9	29.2	28.8
(percentage) *Source: Eurostat*	EU average	26.2	31.7	32.5	33.5	34.5	35.5	36.6	37.3	37.6
Qualification mismatch rate	SK	10.0	21.2	22.2	23.7	22.6	22.5	22.9	23.4	22.9
(percentage) *Source: Eurostat*	EU average	17.1	20.0	20.2	20.5	20.5	19.9	20.1	20.4	20.1
Employment rate of recent graduates	SK		79.6	81.5	83.4	83.9	82.8	79.5	83.9	84.5
(percentage) *Source: Eurostat*	EU average		78.2	79.7	81.8	82.1	79.5	80.0	82.7	83.8
Public expenditure on early childhood education and care	SK	106	161	179	193	216				
(USD at constant prices; per capita at PPP) *Source: OECD*	EU average	252	299	309	318	329	246.6	202.9		
Connection to the internet – all types of households	SK	67.5	80.5	81.3	80.8	82.2	85.8	90.0	90.7	90.6
(percentage) *Source: Eurostat*	EU average	66.2	82.1	84.2	86.0	87.9	89.6	91.8	92.2	93.0
Connection to the internet – households with children	SK	85.8	95.8	97.0	94.6	96.3	91.5	97.2	99.0	98.4
(percentage) *Source: Eurostat*	EU average	84.4	95.8	96.5	97.0	97.7	98.0	98.8	98.9	99.1
Use of internet	SK					79.4	78.5	82.0	88.2	87.2	87.7
(percentage of individuals aged 16–74) *Source: European Commission*	EU average					79.7	81.3	83.9	86.0	88.0	89.1

Score	2010	2016	2017	2018	2019	2020	2021	2022	2023
Mean years of schooling	0.56	0.61	0.62	0.64	0.62	0.65	0.65	0.65	
Early leavers from education and training	1.15	0.45	-0.01	0.11	0.15	0.32	0.14	0.22	0.54
Early childhood education and care		-1.71	-1.80	-1.15	-1.64	-2.05	-1.93	-1.93	
Population aged 25–64 with at least upper secondary educational attainment	1.02	1.00	0.94	0.95	0.90	0.97	1.02	1.05	1.10
Population aged over 25 with tertiary educational attainment	-1.09	-1.19	-1.15	-1.07	-1.02	-1.00	-0.97	-0.87	-0.96
Qualification mismatch rate	1.00	-0.16	-0.28	-0.46	-0.29	-0.38	-0.42	-0.46	-0.43
Employment rate of recent graduates		0.13	0.18	0.18	0.21	0.39	-0.06	0.16	0.11
Public expenditure on early childhood education and care	-0.76	-0.61	-0.56	-0.53	-0.47				
Connection to the internet – all types of households	0.09	-0.18	-0.35	-0.85	-0.98	-0.79	-0.46	-0.44	-0.82
Connection to the internet – households with children	0.12	0.01	0.14	-1.04	-0.72	-3.56	-1.67	0.06	-1.12
Use of internet					-0.03	-0.34	-0.25	0.29	-0.14	-0.30

Table 8 Programme for International Student Assessment (PISA)

Indicator		2006	2009	2012	2015	2018	2022
Reading	SK	466	477	463	453	458	447
(score)	OECD average	485	490	492	489	485	476
Science	SK	488	490	471	461	464	462
(score)	OECD average	495	498	496	489	487	485
Mathematics	SK	492	497	482	475	486	464
(score)	OECD average	490	492	488	485	487	472
Score		2006	2009	2012	2015	2018	2018
Reading		-0.56	-0.5	-1.01	-1.29	-1.01	-1.04
Science		-0.18	-0.24	-0.75	-0.88	-0.79	-0.72
Mathematics		0.04	0.15	-0.18	-0.28	-0.02	-0.25

Source: OECD.

5.2 Economic vulnerabilities

Table 9 Internal equilibrium

Category	Indicator		2010	2016	2017	2018	2019	2020	2021	2022	2023
Outcome indicators	Output gap	SK	0.2	-0.6	0.3	1.9	2.0	-2.7	0.4	0.6	-0.6
	(percentage of potential GDP) Source: AMECO	EU average	-2.9	-1.1	0.4	1.1	1.4	-5.1	-0.4	1.2	-0.4
	Private sector debt	SK	65	88	90	91	92	95	93	94	86
	(percentage of GDP) Source: Eurostat	EU average	153	145	139	135	133	139	134	125	110
	Non-performing loans	SK	10.4	4.6	3.7	3.2	2.9	2.5	2.0	1.7	
	(percentage) Source: Eurostat	EU average	15.4	9.1	7.5	5.9	4.9	4.1	2.7	2.2	
Additional indicators	Private sector credit flow	SK	23.5	19.2	19.2	20.4	15.7	13.3	11.6	15.5	15.2
	(percentage of GDP over three years) Source: Eurostat	EU average	18.1	7.3	9.2	10.6	10.3	11.8	16.2	17.2	11.9
	Real house prices (three-year percentage change)	SK	-6.5	14.6	17.9	17.3	16.4	19.6	17.4	12.0	-5.2
	Source: Eurostat	EU average	-11.3	9.7	12.0	13.0	12.8	13.7	16.1	12.0	2.3
	Banking leverage	SK	10.4	9.2	9.3	9.5	9.6	9.7	10.4	10.7	
	(assets-to-equity multiple) Source: Eurostat	EU average	15.4	12.2	11.6	11.7	11.9	12.5	13.0	13.2	
	Banks' exposures to domestic sovereign debt	SK	18.6	12.7	10.1	9.5	8.9	10.2	10.5	10.3	9.8
	(percentage of GDP) Sources: ECB, NBS calculations	EU average	15.6	14.7	13.3	13.0	12.1	14.4	13.0	11.5	10.8
	Banking sector profitability (ROE)	SK	8.6	3.7	5.9	6.4	5.0	4.3	5.8	7.0	9.4
	(percentage) Source: ECB	EU average	-2.4	6.3	6.6	8.1	7.3	3.3	6.9	9.5	13.1

Table 9 Internal equilibrium (continued)

Category	Score	2010	2016	2017	2018	2019	2020	2021	2022	2023
Outcome indicators	Output gap	0.93	0.40	0.48	0.06	0.24	0.81	0.79	0.49	0.71
	Private sector debt	1.35	0.75	0.69	0.66	0.61	0.64	0.60	0.49	0.50
	Non-performing loans	0.97	0.43	0.40	0.34	0.29	0.33	0.39	0.41	
Additional indicators	Private sector credit flow	-0.31	-0.79	-0.81	-0.83	-0.54	-0.11	0.21	0.10	-0.43
	Real house prices	-0.32	-0.42	-0.60	-0.49	-0.41	-0.73	-0.14	0.00	0.87
	Banking leverage	0.97	0.84	0.68	0.67	0.73	0.91	0.87	0.89	
	Banks' exposures to domestic sovereign debt	-0.37	0.25	0.42	0.43	0.44	0.49	0.32	0.17	0.15
	Banking sector profitability (ROE)	0.32	-0.38	-0.13	-0.38	-0.57	0.20	-0.18	-0.54	-0.90

Notes: The output gap score was calculated from the gap's absolute value. Banking sector indicators include data for foreign bank branches.

Table 10 External equilibrium

Category	Indicator		2010	2016	2017	2018	2019	2020	2021	2022	2023
Outcome indicators	Real effective exchange rate (PPI-deflated)	SK	2.7	-5.2	-5.2	-0.9	-0.3	1.0	-2.1	-1.4	-0.8
	(three-year percentage change) *Source: ECB*	EU average	-1.2	-2.7	-2.4	2.4	0.8	0.8	0.1	2.2	3.4
	Nominal unit labour costs	SK	8.0	4.0	7.8	11.3	14.2	15.4	12.6	12.7	16.5
	(three-year percentage change) *Source: Eurostat*	EU average	9.4	2.6	4.1	7.5	8.5	12.0	8.7	11.4	15.1
Additional indicators	Export market shares	SK	3.8	7.0	4.8	1.9	1.0	7.1	-2.2	-7.1	-1.9
	(five-year percentage change) *Source: Eurostat*	EU average	0.3	5.1	11.9	10.1	9.9	12.2	7.1	4.0	7.2
	Terms of trade	SK	-6.0	-2.3	-1.6	-1.7	-2.0	-2.1	-2.6	-5.9	-5.1
	(five-year percentage change) *Source: Eurostat*	EU average	1.4	3.3	3.6	2.6	2.3	2.0	-0.1	-2.3	0.2
	Current account balance	SK	-4.8	-1.2	-2.2	-2.3	-2.5	-1.7	-2.2	-3.6	-4.3
	(three-year average, percentage of GDP) *Source: Eurostat*	EU average	-2.4	1.7	1.7	1.7	1.6	1.3	1.2	0.4	0.4
	Net investment position	SK	-11	-15	-15	-17	-14	-15	-14	-18.2	-14.7
	(percentage of GDP) *Source: Eurostat*	EU average	-90	-151	-155	-145	-162	-163	-174	-137.9	-148.4
	Net external debt	SK	20	29	32	34	32	31	31	32.4	33.8
	(percentage of GDP) *Source: Eurostat*	EU average	-95	-38	-45	-50	-104	-112	-132	-111.6	-131.1
Category	**Score**		**2010**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
Outcome indicators	Real effective exchange rate (PPI-deflated)		-1.30	0.48	0.84	1.17	0.32	-0.08	0.71	0.60	0.72
	Nominal unit labour costs		0.20	-0.20	-0.51	-0.52	-0.84	-0.55	-0.68	-0.17	-0.13
Additional indicators	Export market shares		0.20	0.13	-0.45	-0.51	-0.57	-0.34	-0.68	-0.93	-0.89
	Terms of trade		-1.19	-2.16	-2.08	-1.91	-1.77	-1.25	-0.85	-0.80	-1.71
	Current account balance		-0.43	-0.99	-1.31	-1.20	-1.08	-0.74	-0.80	-0.84	-0.87
	Net investment position		0.23	0.20	0.19	0.19	0.19	0.19	0.18	0.16	0.18
	Net external debt		-0.21	-0.19	-0.21	-0.22	-0.27	-0.27	-0.29	-0.32	-0.32

Note: A positive value for the real effective exchange rate denotes exchange rate appreciation.

Table 11 Fiscal sustainability

Category	Indicator		2010	2016	2017	2018	2019	2020	2021	2022	2023
Outcome indicator	Sustainability of public finances (S2 indicator)	SK	10.4	2.4	2.4	2.5	3.8	7.7	10.6	11.3	9.9
	(percentage of GDP) Source: European Commission	EU average	6.8	2.1	1.9	2.3	2.4	2.4	3.8	3.3	3.3
Additional indicators	Gross public debt	SK	40.6	52.3	51.5	49.4	48.0	58.8	61.1	57.7	56.0
	(percentage of GDP) Source: Eurostat	EU average	60.7	70.3	67.5	65.6	63.4	75.4	72.2	67.6	65.6
	Gross public debt with a residual maturity of less than one year	SK	4.7	4.4	2.1	3.4	3.8	3.6	3.8	4.8	4.3
	(percentage of GDP) Source: ECB	EU average	11.5	11.2	10.0	10.3	9.5	11.6	10.5	10.1	9.7
	Gross public debt with a residual maturity of one to five years	SK	17.2	12.5	9.8	12.2	11.8	17.3	19.1	18.0	15.7
	(percentage of GDP) Source: ECB	EU average	23.0	23.5	22.4	21.3	20.9	24.4	23.1	21.9	21.9
	Ten-year government bond yields	SK	3.9	0.5	0.9	0.9	0.3	0.0	-0.1	2.1	3.7
	(percentage) Source: Eurostat	EU average	4.8	1.6	1.6	1.5	0.8	0.4	0.5	2.6	3.7

Category	Score	2010	2016	2017	2018	2019	2020	2021	2022	2023
Outcome indicator	Sustainability of public finances (S2 indicator)	-0.87	-0.15	-0.26	-0.07	-0.55	-1.83	-1.88	-2.19	-2.06
Additional indicators	Gross public debt	0.61	0.46	0.42	0.41	0.40	0.38	0.27	0.26	0.27
	Gross public debt with a residual maturity of less than one year	0.78	0.80	0.97	0.85	0.77	0.88	0.84	0.70	0.76
	Gross public debt with a residual maturity of one to five years	0.47	1.07	1.24	0.87	0.85	0.61	0.36	0.38	0.61
	Ten-year government bond yields	0.47	0.58	0.48	0.52	0.52	0.51	0.59	0.32	0.07

5.3 Social inclusion

Table 12 Risk of poverty or social exclusion by economic activity; risk of material deprivation

Indicator		2016	2017	2018	2019	2020	2021	2022	2023
Risk of poverty – population	SK	17.1	15.8	15.2	14.8	13.8	15.6	16.5	17.6
(percentage)	EU average	23.4	22.6	21.5	20.9	20.6	20.7	20.7	20.6
Risk of poverty – employed	SK	8.9	8.1	7.5	5.7	6.3	8.5	9.0	10.9
(percentage)	EU average	12.0	11.5	10.5	10.2	10.1	10.0	10.1	10.5
Risk of poverty – not employed	SK	24.2	23.1	21.5	24.0	22.2	22.5	22.8	23.1
(percentage)	EU average	34.7	34.2	33.8	33.3	33.2	32.9	33.6	33.0
Risk of poverty – retired	SK	11.8	12.4	10.5	12.2	12.3	13.4	13.1	14.2
(percentage)	EU average	21.1	21.6	22.3	22.4	22.6	22.3	23.7	22.9
Material deprivation	SK	15.5	13.5	12.3	11.4	9.7	9.2	10.5	14.0
(percentage)	EU average	17.2	15.8	14.2	12.8	12.4	11.2	11.7	12.0

Table 12 Risk of poverty or social exclusion by economic activity; risk of material deprivation (continued)

Score	2016	2017	2018	2019	2020	2021	2022	2023
Risk of poverty – population	0.82	0.96	1.02	1.06	1.20	0.92	0.78	0.64
Risk of poverty – employed	0.45	0.55	0.61	0.96	0.87	0.32	0.26	-0.10
Risk of poverty – not employed	1.18	1.23	1.33	1.08	1.31	1.28	1.21	1.30
Risk of poverty – retired	0.75	0.72	0.88	0.77	0.83	0.73	0.84	0.77
Material deprivation	0.14	0.20	0.19	0.16	0.30	0.25	0.15	-0.27

Sources: Eurostat, and NBS calculations.

Table 13 Risk of poverty by type of household

Indicator		2016	2017	2018	2019	2020	2021	2022	2023
Risk of poverty – one adult aged under 65	SK	27.2	29.8	26.5	28.6	23.4	27.2	27.7	27.0
(percentage)	EU average	37.0	37.0	35.1	34.0	33.0	33.2	32.3	31.9
Risk of poverty – one adult aged over 65	SK	14.6	15.9	15.8	24.2	31.3	32.5	30.0	36.8
(percentage)	EU average	32.9	34.1	35.9	36.6	37.7	36.8	38.1	38.3
Risk of poverty – one adult with one dependent child	SK	40.1	46.3	42.3	38.0	37.4	35.2	46.5	46.4
(percentage)	EU average	46.9	45.4	44.2	41.9	40.7	42.4	41.1	40.8
Risk of poverty – two adults with one dependent child	SK	12.4	11.3	13.7	12.0	12.3	14.0	18.4	15.2
(percentage)	EU average	17.2	16.6	15.2	14.7	13.8	13.6	14.4	14.2
Risk of poverty – two adults with two dependent children	SK	17.1	15.5	16.2	11.3	11.3	11.5	11.6	17.2
(percentage)	EU average	17.8	16.6	15.1	14.3	14.5	14.2	14.2	14.4
Risk of poverty – two adults with three or more dependent children	SK	37.7	37.1	36.9	38.0	38.0	37.8	43.8	37.1
(percentage)	EU average	34.2	32.1	29.3	29.0	29.8	29.5	27.9	29.7
Score		**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
Risk of poverty – one adult aged under 65		1.51	1.16	1.32	0.95	1.67	0.96	0.77	0.81
Risk of poverty – one adult aged over 65		0.96	0.95	1.04	0.64	0.35	0.25	0.46	0.06
Risk of poverty – one adult with one dependent child		0.66	-0.12	0.30	0.56	0.46	0.86	-0.63	-0.75
Risk of poverty – two adults with one dependent child		0.71	0.90	0.30	0.58	0.37	-0.08	-0.86	-0.22
Risk of poverty – two adults with two dependent children		0.08	0.14	-0.15	0.46	0.50	0.44	0.35	-0.43
Risk of poverty – two adults with three or more dependent children		-0.20	-0.31	-0.60	-0.66	-0.59	-0.65	-1.17	-0.54

Sources: Eurostat, and NBS calculations.

Table 14 Expenditure on social inclusion

Indicator		2010	2016	2017	2018	2019	2020	2021
Social protection expenditure	SK	17.9	18.3	18.2	17.9	17.8	19.6	19.4
(percentage of GDP)	EU average	24.0	23.1	22.6	22.5	22.6	25.8	24.5
Old-age expenditure	SK	6.5	7.2	7.2	7.1	7.1	7.8	7.7
(percentage of GDP)	EU average	9.2	9.5	9.3	9.3	9.3	10.2	9.7
Disability expenditure	SK	1.5	1.6	1.6	1.5	1.5	1.6	1.4
(percentage of GDP)	EU average	2.0	1.8	1.7	1.7	1.7	1.8	1.7
Family policy expenditure	SK	1.7	1.6	1.6	1.5	1.6	1.9	1.9
(percentage of GDP)	EU average	2.1	1.9	1.9	2.0	2.0	2.2	2.0
Unemployment expenditure	SK	1.0	0.5	0.5	0.5	0.5	0.8	0.8
(percentage of GDP)	EU average	1.4	1.0	0.9	0.9	0.8	1.8	1.4
Score		**2010**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Social protection expenditure		-1.13	-0.77	-0.71	-0.74	-0.78	-0.95	-0.84
Old-age expenditure		-1.28	-0.85	-0.79	-0.81	-0.81	-0.80	-0.72
Disability expenditure		-0.51	-0.21	-0.16	-0.24	-0.24	-0.23	-0.37
Family policy expenditure		-0.51	-0.43	-0.45	-0.61	-0.46	-0.32	-0.18
Unemployment expenditure		-0.42	-0.77	-0.73	-0.68	-0.62	-0.95	-0.76

Sources: Eurostat, and NBS calculations.

Table 15 Income inequality

Indicator		2010	2016	2017	2018	2019	2020	2021	2022	2023
Gini coefficient	SK	25.9	24.3	23.2	20.9	22.8	20.9	21.8	21.2	21.6
	EU average	29.6	30.1	29.9	29.7	29.7	29.4	29.4	29.2	29.5
Income quintile share ratio (S80/S20)	SK	3.8	3.6	3.5	3.0	3.3	3.0	3.2	3.1	3.6
(ratio)	EU average	4.8	5.0	4.9	4.9	4.8	4.7	4.8	4.7	4.7
Income quintile share ratio (S80/S50)	SK	2.0	1.8	1.7	1.6	1.7	1.6	1.6	1.6	1.6
(ratio)	EU average	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1
Income quintile share ratio (S50/S20)	SK	2.0	2.0	2.0	1.9	2.0	1.9	2.0	1.9	2.1
(ratio)	EU average	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Score		**2010**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
Gini coefficient		1.00	1.52	1.65	2.07	1.69	2.13	1.79	2.07	2.13
Income quintile share ratio (S80/S20)		0.91	1.08	1.14	1.46	1.22	1.48	1.29	1.47	1.17
Income quintile share ratio (S80/S50)		0.91	1.66	1.74	2.00	1.71	2.09	1.79	2.04	2.36
Income quintile share ratio (S50/S20)		0.79	0.62	0.59	1.04	0.75	0.94	0.71	0.87	0.15

Sources: Eurostat, and NBS calculations.
Note: The table shows difference in equivalent household income, which, unlike net disposable income, takes into account the size and composition of households.

Table 16 Gender pay gap

Indicator		2010	2016	2017	2018	2019	2020	2021	2022
Gender pay gap – population	SK	19.6	19.0	19.9	19.7	18.1	15.5	16.4	17.4
(percentage)	EU average	14.6	14.4	13.7	12.5	12.4	11.5	11.2	11.9
Gender pay gap – 25–34 age group	SK	16.2	13.4	15.7	15.9	14.1	11.5	12.6	14.1
(percentage)	EU average	7.2	8.5	8.9	8.9	9.3	8.6	8.6	8.8
Gender pay gap – 35–44 age group	SK	27.5	24.2	24.4	24.0	22.3	20.1	19.8	20.7
(percentage)	EU average	15.5	14.5	14.3	13.9	13.5	12.7	12.7	13.0
Gender pay gap – 45–54 age group	SK	21.5	22.0	22.5	22.1	20.6	17.7	20.0	20.3
(percentage)	EU average	16.6	15.8	15.7	15.1	14.1	13.3	13.1	14.0
Gender pay gap – 55–64 age group	SK	13.5	16.8	17.1	17.3	16.3	13.1	12.9	15.0
(percentage)	EU average	15.4	13.5	13.4	13.8	11.8	10.7	10.3	11.5
Gender pay gap – over 65 age group	SK	6.7	20.6	24.4	14.9	11.7	12.7	14.2	13.7
(percentage)	EU average	18.5	17.8	16.4	16.2	13.4	12.7	11.9	11.3
Gender pay gap – under 25 age group	SK	7.3	11.1	12.8	12.3	10.4	6.9	6.7	8.0
(percentage)	EU average	2.7	6.2	6.6	5.7	5.8	5.6	5.2	6.0
Score			2016	2017	2018	2019	2020	2021	2022
Gender pay gap – population			-0.84	-0.97	-1.12	-1.38	-1.05	-0.72	-1.06	-1.11
Gender pay gap – 25–34 age group			-1.57	-1.01	-1.40	-1.16	-1.00	-0.59	-0.92	-1.12
Gender pay gap – 35–44 age group			-1.76	-1.60	-1.65	-1.44	-1.46	-1.24	-1.27	-1.30
Gender pay gap – 45–54 age group			-0.69	-1.03	-1.14	-1.06	-1.09	-0.73	-1.20	-1.07
Gender pay gap – 55–64 age group			0.19	-0.45	-0.54	-0.47	-0.65	-0.32	-0.36	-0.48
Gender pay gap – over 65 age group			0.83	-0.19	-0.49	0.10	0.14	0.00	-0.19	-0.22
Gender pay gap – under 25 age group			-0.88	-1.08	-1.43	-1.30	-1.00	-0.28	-0.29	-0.40

Sources: Eurostat, and NBS calculations.

Table 17 Blinder-Oaxaca decomposition of the hourly gender pay gap in Slovakia

	(1)	(2)	(3)	(4)	(5)
Survey year:	2002	2006	2010	2014	2018
Logarithmic gap between women's and men's wages	-0.315***	-0.292***	-0.211***	-0.215***	-0.222***
Explained gap	-0.074***	-0.041***	0.003***	-0.007***	-0.023***
Unexplained gap	-0.241***	-0.251***	-0.214***	-0.208***	-0.199***
Decomposition of unexplained gap:					
Employer characteristics:					
Firm size: >49, <250 employees	-0.003**	-0.003***	-0.010***	-0.012***	-0.011***
Firm size: >249 employees	-0.089***	-0.036***	-0.057***	-0.046***	-0.037***
Firm in private ownership	0.038***	-0.009***	-0.032***	-0.047***	-0.040***
Industrial sectors	-0.043***	-0.018***	-0.003***	0.005***	-0.004***
Labour-intensive services	-0.002***	-0.012***	0.004***	0.009***	0.004***
Professional services	0.009***	-0.014***	0.008***	0.007***	0.004***
Public administration	0.001***	0.004***	-0.026***	-0.044***	-0.017***
Collective agreement at industry level	0.024***	0.011***	0.010***	0.022***	-0.003***
Collective agreement at firm level	0.067***	-0.011***	0.004***	-0.017***	-0.023***

	(1)	(2)	(3)	(4)	(5)
Survey year:	**2002**	**2006**	**2010**	**2014**	**2018**
Type of occupation:					
High-skilled occupations	0.021***	0.001	0.012***	0.010***	0.001
Medium-skilled blue-collar occupations	0.004***	0.014***	0.007***	0.011***	0.009***
Medium-skilled white-collar occupations	-0.024***	-0.021***	-0.014***	-0.008***	-0.005***
Low-skilled occupations	0.003***	0.002***	0.001***	-0.001***	-0.000*
Job characteristics:					
Number of years employed at firm	-0.018***	-0.030***	-0.035***	-0.044***	-0.035***
Part-time employment	0.006***	0.006***	0.005***	0.005***	0.004***
Fixed-term contract	-0.002***	0.003***	-0.002***	-0.004***	-0.001***
Individuals' characteristics:					
Respondent's age: 20–29 years	-0.017***	-0.011***	-0.012***	-0.013***	-0.007***
Respondent's age: 30–39 years	-0.039***	-0.042***	-0.042***	-0.037***	-0.022***
Respondent's age: 40–49 years	-0.036***	-0.037***	-0.039***	-0.041***	-0.028***
Respondent's age: 50–59 years	-0.011***	-0.011***	-0.017***	-0.019***	-0.008***
Respondent's age: >59 years	-0.000**	-0.000	0.001***	0.001	0.003***
Primary education	-0.001	0.001***	0.004***	0.005***	0.005***
Secondary vocational education	-0.004**	0.002	-0.012***	-0.023***	-0.025***
Tertiary education – first stage	0.003***	-0.001***	-0.000*	-0.002***	-0.000***
Tertiary education – second and third stages	-0.007***	0.006***	-0.005***	-0.002***	-0.003***
Intercept	-0.119***	-0.044***	0.036***	0.075***	0.041***
Number of observations	419,715	674,408	773,860	887,052	964,342

Sources: Structure of Earnings Survey, Eurostat, and own processing.

Notes: Estimates were made using the Blinder-Oaxaca decomposition. *, **, and *** denote statistical significance at the level of 10%, 5%, and 1% respectively, based on robust standard errors. Industrial sectors – codes B–F according to the NACE Rev. 2 classification; labour-intensive services – codes G–I and S (NACE Rev. 2); professional services – codes J–N (NACE Rev. 2); public administration – code O (NACE Rev. 2). High-skilled occupations – groups 1, 2 and 3 according to the ISCO classification; medium-skilled white-collar occupations – groups 4 and 5 (ISCO); medium-skilled blue-collar occupations – groups 6, 7 and 8 (ISCO); low-skilled occupations – groups 9 and 10 (ISCO).

5.4 Health

Table 18 Health outcome indicators

Indicator		2010	2016	2017	2018	2019	2020	2021	2022
Life expectancy at birth	SK	75.6	77.3	77.3	77.4	77.8	77.0	74.6	77.0
(years) *Source: Eurostat*	EU average	78.7	80.0	80.0	80.2	80.5	79.7	79.2	79.9
Preventable mortality	SK		244	239	241	231.2	262.4	379.3	
(deaths per 100,000 inhabitants) *Source: Eurostat*	EU average		188	184	182	175.6	201.4	237.2	
Treatable mortality	SK		168	174	165	163.6	168.8	206.0	
(deaths per 100,000 inhabitants) *Source: Eurostat*	EU average		111	109	108	104.4	107.1	110.7	
Infant mortality	SK	5.7	5.4	4.5	5.0	5.1	5.1	4.9	5.4
(deaths per 1,000 live births) *Source: Eurostat*	EU average	4.2	3.7	3.5	3.4	3.5	3.2	3.1	3.3
Newborns with low birth weight	SK	9.0	7.5	7.5	7.3	7.5	7.3	7.2	
(percentage) *Source: OECD*	OECD average	6.5	6.6	6.6	6.5	6.6	6.3	6.5	7.4
Score		**2010**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**
Life expectancy at birth		-1.02	-0.95	-0.98	-0.99	-0.97	-0.93	-1.22	-1.00
Preventable mortality			-0.77	-0.78	-0.84	-0.82	-0.76	-1.18	
Treatable mortality			-1.14	-1.32	-1.18	-1.21	-1.12	-1.55	
Infant mortality		-0.81	-1.21	-0.76	-1.34	-1.33	-1.82	-1.80	-2.05
Newborns with low birth weight		-1.52	-0.60	-0.59	-0.48	-0.62	-0.68	-0.44	

Note: The sources also include NBS calculations.

Table 19 Health system resources

Indicator		2010	2015	2016	2017	2018	2019	2020	2021	2022
Healthcare expenditure	SK		6.8	7.0	6.8	6.7	6.9	7.1	7.8	
(percentage of GDP) *Source: Eurostat*	EU average	9.1	8.2	8.3	8.2	8.2	8.3	9.1	9.3	8.7
Healthcare expenditure per capita	SK		1,508	1,444	1,390	1,401	1,519	1,514	1,742	
(EUR at PPP) *Source: Eurostat*	EU average	2,326	2,273	2,322	2,390	2,481	2,593	2,731	3,028	3,444
Inhabitants per hospital bed	SK	155	174	173	172	176	174			
Source: Eurostat	EU average	207	221	224	228	230	233			
Inhabitants per doctor	SK	298	290	288	292	284	280	273		
Source: Eurostat	EU average	302	279	274	270	255	249	250	205	
Inhabitants per nurse	SK	165	176	174	177	175	174	173		
Source: Eurostat	EU average	130	130	128	126	123	127	133	68	
CT examinations	SK	90	156	162	154	155	160	144	167	
(number per 1,000 inhabitants) *Source: OECD*	OECD average	110	130	135	140	147	153	143	164	109
MRI examinations	SK	34	57	61	63	70	74	68	76	
(number per 1,000 inhabitants) *Source: OECD*	OECD average	46	66	69	72	76	81	74	85	36

Table 19 Health system resources (continued)

Indicator		2010	2015	2016	2017	2018	2019	2020	2021	2022
Number of examinations per CT scanner	SK	6,371	8,734	9,375	8,905	8,451	9,005	7,542	8,426	
Source: OECD	OECD average	6,115	6,111	6,114	6,223	6,783	7,107	6,263	7,208	
Number of examinations per MRI scanner	SK	4,875	6,415	6,808	6,585	7,282	7,728	6,917	7,023	
Source: OECD	OECD average	4,384	4,501	5,303	5,176	5,395	5,374	4,791	5,619	9,963

Score	2010	2015	2016	2017	2018	2019	2020	2021	2022
Healthcare expenditure		-0.76	-0.70	-0.75	-0.82	-0.75	-1.02	-0.79	
Healthcare expenditure per capita		-0.75	-0.88	-0.98	-1.04	-1.04	-1.15	-1.16	
Inhabitants per hospital bed	0.72	0.57	0.60	0.64	0.61	0.65			
Inhabitants per doctor	0.08	-0.20	-0.29	-0.46	-0.75	-0.80	-0.54		
Inhabitants per nurse	-0.71	-0.95	-0.98	-1.07	-1.10	-1.04	-0.84		
CT examinations	-0.35	0.48	0.48	0.25	0.13	0.11	0.02	0.05	
MRI examinations	-0.44	-0.29	-0.24	-0.28	-0.21	-0.23	-0.19	-0.24	
Number of examinations per CT scanner	0.07	0.87	1.06	0.88	0.44	0.47	0.33	0.29	
Number of examinations per MRI scanner	0.24	0.99	0.33	0.37	0.71	1.03	0.96	0.57	

Note: The sources also include NBS calculations.

Table 20 Selected healthcare quality indicators

Indicator		2010	2015	2016	2017	2018	2019	2020	2021	2022
Self-reported unmet need for medical care	SK	1.7	2.1	2.3	2.4	2.6	2.7	3.2	2.9	2.8
(percentage of population aged over 16) Source: Eurostat	EU average	3.6	3.5	3.2	2.5	2.7	2.5	2.3	2.2	2.6
AMI 30-day mortality	SK	8.0	6.3	5.8	5.9	6.3	6.3	6.5	7.4	
(deaths per 100 admissions) Source: OECD	OECD average	7.8	7.2	7.2	7.1	6.6	6.6	6.8	7.2	7.2
Ischaemic stroke 30-day mortality	SK	11.5	9.4	8.8	9.0	8.9	8.6	9.0	9.9	
(deaths per 100 admissions) Source: OECD	OECD average	9.2	8.8	8.4	8.2	8.1	7.9	8.1	8.3	9.2
Haemorrhagic 30-day mortality	SK	30.8	28.8	25.5	26.9	25.4	24.0	27.9	27.2	
(deaths per 100 admissions) Source: OECD	OECD average	25.0	23.3	24.3	23.1	23.6	23.1	23.5	23.7	24.5
Breast cancer five-year net survival [1]	SK	76.6	75.5							
(percentage) Source: OECD	OECD average	83.3	84.3							
Lung cancer five-year net survival [1]	SK	10.5	11.2							
(percentage) Source: OECD	OECD average	15.3	17.1							
Immunisation of children against measles	SK	98.5	95.2	95.2	95.8	96.1	96.2	96.0	95.4	94.7
(percentage) Source: OECD	OECD average	93.6	94.8	94.5	94.5	94.8	94.3	94.2	93.6	92.1
Immunisation of children against diphtheria, tetanus and pertussis	SK	99.1	96.0	96.4	96.4	96.5	96.7	97.0	97.0	96.5
(percentage) Source: OECD	OECD average	95.2	95.1	95.0	95.0	94.8	95.1	94.5	93.5	93.1

Table 20 Selected healthcare quality indicators (continued)

Indicator		2010	2015	2016	2017	2018	2019	2020	2021	2022
Immunisation of children against hepatitis B	SK	99.1	96.0	96.4	96.4	96.5	96.7	97.0	97.0	96.5
(percentage) *Source: OECD*	OECD average	88.7	91.5	92.4	90.5	91.1	92.1	92.9	91.6	92.3
Immunisation of people aged over 65 against influenza	SK	23.8	13.8	13.3	13.0	12.5	11.5	12.8	12.9	
(percentage) *Source: OECD*	OECD average	46.2	43.9	44.6	46.0	47.4	45.8	53.5	54.3	59.3
Breast cancer screening rate	SK	32.7	30.4	30.8	30.7	30.4	31.0	27.2	25.5	
(percentage of women aged 50–69) *Source: OECD*	OECD average	57.4	55.5	56.8	57.1	57.9	57.0	53.0	54.1	50.5
Cervical cancer screening rate	SK	48.5	48.3	46.0	46.2	45.6	46.1	40.1	44.4	
(percentage of women aged 20–69) *Source: OECD*	OECD average	56.9	57.6	57.2	57.4	57.6	55.4	51.1	52.8	41.6

Score	2010	2015	2016	2017	2018	2019	2020	2021	2022
Self-reported unmet need for medical care	0.50	0.37	0.23	0.03	0.03	-0.07	-0.31	-0.33	-0.10
AMI 30-day mortality	-0.04	0.20	0.28	0.26	0.08	0.06	0.08	-0.05	
Ischaemic stroke 30-day mortality	-0.67	-0.17	-0.09	-0.19	-0.21	-0.21	-0.22	-0.37	
Haemorrhagic 30-day mortality	-0.78	-0.75	-0.17	-0.59	-0.25	-0.14	-0.59	-0.46	
Breast cancer five-year net survival [1]	-1.33	-1.73							
Lung cancer five-year net survival [1]	-1.05	-1.12							
Immunisation of children against measles	1.16	0.12	0.25	0.32	0.44	0.41	0.48	0.36	0.53
Immunisation of children against diphtheria, tetanus and pertussis	1.05	0.32	0.42	0.42	0.51	0.41	0.66	0.75	0.83
Immunisation of children against hepatitis B	0.63	0.49	0.56	0.61	0.58	0.52	0.77	0.94	1.05
Immunisation of people aged over 65 against influenza	-0.96	-1.40	-1.34	-1.51	-1.68	-1.60	-1.95	-1.89	
Breast cancer screening rate	-1.27	-1.48	-1.53	-1.72	-1.69	-1.68	-1.38	-1.62	
Cervical cancer screening rate	-0.49	-0.51	-0.64	-0.68	-0.71	-0.50	-0.56	-0.42	

Note: The sources also include NBS calculations.
1) The figure for 2015 represents the period 2010–2014, while the figure for 2010 represents the period 2005–2009.

Table 21 Indicators of lifestyle and other factors

Indicator		2010	2015	2016	2017	2018	2019	2020	2021	2022
Premature deaths due to ambient air pollution	SK	751	646	613	614	622	636			
(deaths per million inhabitants) *Source: OECD*	OECD average	350	298	284	278	282	287			
Share of out-of-pocket payments	SK		18.4	18.2	18.7	18.9	19.2	18.8	19.4	
(percentage) *Source: Eurostat*	EU average	20.6	22.3	22.3	22.2	21.7	21.0	19.0	18.6	17.0
Smoking prevalence [1]	SK	26.0			26.0			25.0		
(percentage) *Source: Eurostat*	EU average	29.6			26.0			24.6		
Obesity rate by body mass index (BMI) [2]	SK	15.1			14.4		19.7			17.1
(percentage) *Source: Eurostat*	EU average	15.8			16.5		18.1			17.1
Alcohol consumption	SK	10.1	10.2	9.9	9.7	10.1	10.3	10.2	9.6	
(litres per inhabitant aged over 15) *Source: OECD*	OECD average	9.0	8.7	8.7	8.6	8.6	8.6	8.7	8.9	7.4

Table 21 Indicators of lifestyle and other factors (continued)

Score	2010	2015	2016	2017	2018	2019	2020	2021	2022
Premature deaths due to ambient air pollution	-1.70	-1.72	-1.71	-1.77	-1.76	-1.80			
Share of out-of-pocket payments		0.37	0.38	0.33	0.28	0.20	0.03	-0.10	
Smoking prevalence [1]	0.62			0.01			-0.05		
Obesity rate by body mass index [2]	0.19				0.52		-0.39		0.01
Alcohol consumption	-0.40	-0.52	-0.45	-0.42	-0.58	-0.64	-0.60	-0.26	

Note: The sources also include NBS calculations.
1) The figure under 2010 is for 2009.
2) The figure under 2010 is for 2008.

5.5 Environment

Table 22 Climate neutrality indicators

Categorya	Indicator		2010	2015	2016	2017	2018	2019	2020	2021	2022
Outcome indicators	Change in greenhouse gas emissions	SK	63.9	55.3	55.9	57.8	59.1	54.3	46.5	52.7	46.4
	(index: 1990 = 100)	EU average	86.1	79.3	80.3	84.6	85.4	80.9	70.9	74.9	75.4
	Greenhouse gas emissions per inhabitant	SK	7.7	6.6	6.7	6.9	7.0	6.4	5.5	6.3	5.5
	(tonnes per inhabitant)	EU average	9.3	8.5	8.6	8.8	8.9	8.3	7.3	7.7	7.6
Additional indicators	Energy productivity	SK	5.6	7.0	6.6	6.3	6.6	7.1	7.4	7.3	8.3
	(PPP per kilogram of oil equivalent)	EU average	6.5	8.1	8.1	8.3	8.7	9.1	9.6	10.1	11.4
	Final energy consumption	SK	111.7	97.2	100.8	107.3	105.8	101.8	94.5	105.7	98.3
	(index: 2000 = 100)	EU average	109.6	103.4	105.9	108.6	110.0	109.8	100.6	107.1	105.5
	Share of renewable energy in the energy mix	SK	9.1	12.9	12.0	11.5	11.9	16.9	17.3	17.4	17.5
	(percentage)	EU average	16.4	20.3	20.4	20.9	21.5	22.4	24.4	24.8	25.7
	Share of solid fossil fuels in final energy consumption	SK	6.4	4.6	3.8	3.9	4.1	4.2	3.7	3.8	3.1
	(percentage)	EU average	2.7	2.3	2.1	2.1	2.1	1.9	1.8	1.8	1.6
	Average CO2 emissions per km from new passenger cars	SK	149.0	127.6	124.8	152.8	154.7	158.0	144.6	138.0	136.8
	(grams of CO2 per kilometre)	EU average	144.1	120.9	118.7	144.4	145.9	147.8	134.2	121.8	115.6
	Material consumption efficiency	SK	1.4	1.7	1.7	1.6	1.6	1.8	1.8	1.9	
	(PPP per kilogram)	EU average	1.6	1.8	1.9	1.9	1.9	2.0	2.0	2.2	
	Share of buses and trains in total passenger transport	SK	22.2	24.2	25.2	25.6	26.1	26.2	19.1	16.3	
	(percentage)	EU average	18.2	18.1	18.2	18.0	17.9	18.1	13.2	13.3	
	Share of rail in total freight transport	SK	38.5	36.6	34.6	32.9	32.6	31.0	28.5	32.1	30.4
	(percentage)	EU average	25.9	24.5	23.6	23.8	24.1	23.3	22.0	21.7	20.6

Table 22 Climate neutrality indicators (continued)

Category	Score	2010	2015	2016	2017	2018	2019	2020	2021	2022
Outcome indicators	Change in greenhouse gas emissions	0.75	0.84	0.82	0.87	0.92	0.95	0.92	0.81	1.00
	Greenhouse gas emissions per inhabitant	0.33	0.47	0.45	0.48	0.45	0.51	0.57	0.43	0.70
Additional indicators	Energy productivity	-0.54	-0.49	-0.64	-0.76	-0.75	-0.72	-0.67	-0.76	-0.71
	Final energy consumption	-0.22	0.56	0.42	0.09	0.26	0.47	0.39	0.09	0.41
	Share of renewable energy in the energy mix	-0.67	-0.63	-0.71	-0.79	-0.83	-0.46	-0.61	-0.60	-0.65
	Share of solid fossil fuels in final energy consumption	-0.95	-0.69	-0.48	-0.54	-0.69	-0.92	-0.75	-0.81	-0.70
	Average CO2 emissions per km from new passenger cars	-0.47	-0.68	-0.75	-0.89	-0.88	-0.96	-0.84	-0.98	-1.05
	Material consumption efficiency	-0.21	-0.12	-0.26	-0.34	-0.42	-0.25	-0.23	-0.26	
	Share of buses and trains in total passenger transport	0.83	1.42	1.60	1.72	1.93	1.96	1.65	0.94	
	Share of rail in total freight transport	0.57	0.63	0.60	0.50	0.46	0.43	0.41	0.68	0.75

Source: Eurostat, and NBS calculations.

Table 23 Pollution indicators

Category	Indicator		2010	2015	2016	2017	2018	2019	2020	2021	2022
Outcome indicator	Mean population exposure to PM2.5	SK	21.3	19.0	17.7	18.0	18.5	15.7	15.3		
	(micrograms per cubic metre) Source: OECD	OECD average	15.0	13.5	12.7	12.8	12.9	11.9	11.6		
Additional indicators	Nitrate in groundwater	SK	24.0	19.5	16.5	16.2	18.3	16.2	18.6	17.9	
	(milligrams per litre) Source: Eurostat	EU average	24.4	25.4	26.4	23.5	23.6	22.6	20.7	20.2	
	Phosphates in rivers	SK	0.07	0.09	0.10	0.07	0.07	0.1	0.1	0.1	
	(milligrams per litre) Source: Eurostat	EU average	0.07	0.07	0.07	0.07	0.07	0.1	0.1	0.1	
	Share of industry in GDP	SK	22.6	23.5	22.4	21.4	22.1	23.6	22.5	22.6	19.7
	(percentage) Source: Eurostat	EU average	17.9	18.2	18.0	17.7	17.4	17.2	17.1	17.3	17.9
	Population connected to waste water treatment systems	SK			63.6	65.0	65.7	68.1	68.8	69.9	
	(percentage) Source: Eurostat	EU average	71.6	72.1	75.2	75.3	75.8	75.8	75.7	73.9	
Category	Score		2010	2015	2016	2017	2018	2019	2020	2021	2022
Outcome indicator	Mean population exposure to PM2.5		-1.10	-0.96	-0.89	-0.97	-1.04	-0.76	-0.74		
Additional indicators	Nitrate in groundwater		0.03	0.31	0.43	0.43	0.33	0.41	0.15	0.16	
	Phosphates in rivers		-0.02	-0.41	-0.54	-0.01	-0.01	0.04	0.35	0.37	
	Share of industry in GDP		-0.88	-0.82	-0.70	-0.60	-0.77	-1.09	-0.90	-0.86	-0.29
	Population connected to waste water treatment systems				-0.50	-0.47	-0.45	-0.34	-0.32	-0.17	

Note: The sources also include NBS calculations.

Table 24 Waste production indicators

Category	Indicator		2010	2015	2016	2017	2018	2019	2020	2021	2022
Outcome indicators	Generation of municipal waste per capita	SK	319	329	348	378	414	421	478	497	478
	(kilograms per inhabitant)	EU average	481	470	490	500	507	516	537	541	516
	Recycling rate of municipal waste	SK	9.1	14.9	23.0	29.8	36.3	38.5	45.3	48.9	49.5
	(percentage)	EU average	26.8	35.2	37.3	37.8	38.3	39.6	39.7	41.1	41.5
Additional indicators	Recycling rate of packaging waste	SK	45.7	64.3	65.8	65.7	66.6	67.5	70.8	73.9	
	(percentage)	EU average	59.9	63.5	65.0	64.4	64.1	63.4	63.7	63.8	
	Recovery rate of packaging waste	SK	47.5	66.7	69.5	68.6	69.1	69.7	74.1	79.7	
	(percentage)	EU average	70.8	74.7	76.3	75.9	75.5	75.9	77.1	77.7	
	Landfill rate of waste	SK	55.0		47.0		40.0		31.0		
	(percentage)	EU average	35.3		30.5		29.0		24.8		

Category	Score	2010	2015	2016	2017	2018	2019	2020	2021	2022
Outcome indicators	Generation of municipal waste per capita	1.33	1.11	1.02	0.95	0.72	0.73	0.42	0.32	0.28
	Recycling rate of municipal waste	-1.02	-1.34	-0.97	-0.55	-0.13	-0.08	0.38	0.49	0.48
Additional indicators	Recycling rate of packaging waste	-1.15	0.09	0.09	0.14	0.27	0.39	0.72	0.93	
	Recovery rate of packaging waste	-1.19	-0.48	-0.41	-0.44	-0.37	-0.32	-0.17	0.11	
	Landfill rate of waste	-0.85		-0.70		-0.48		-0.31		

Sources: Eurostat, and NBS calculations.

Table 25 Environmental policy indicators

Indicator		2010	2015	2016	2017	2018	2019	2020	2021	2022
Implicit tax rate on energy [1]	SK	144	180	175	173	178	189	194	180	204
(EUR per tonne of oil equivalent)	EU average	196	220	224	222	221	225	211	212	212
Environmental tax revenues [1]	SK	2.4	2.5	2.5	2.5	2.5	2.5	2.5	2.4	2.5
(percentage of GDP)	EU average	2.6	2.7	2.8	2.7	2.6	2.6	2.5	2.4	2.3
Share of environmental taxes in public revenues [1]	SK	8.4	7.7	7.6	7.5	7.3	7.3	7.1	6.7	7.1
(percentage)	EU average	7.7	7.7	7.8	7.5	7.3	7.3	6.8	6.6	6.4
Environmental protection investments	SK	0.4	0.8	0.4	0.4	0.4	0.3			
(percentage of GDP)	EU average	0.6	0.7	0.4	0.4	0.4	0.4	0.3		
National expenditure on environmental protection	SK	2.2	2.3	1.9	1.9	1.7	1.8			
(percentage of GDP)	EU average	1.8	2.0	1.8	1.8	1.9	1.9	1.7		

Score	2010	2015	2016	2017	2018	2019	2020	2021	2022
Implicit tax rate on energy	-0.68	-0.48	-0.59	-0.58	-0.52	-0.46	-0.24	-0.42	-0.08
Environmental tax revenues	-0.40	-0.33	-0.39	-0.22	-0.22	-0.17	-0.02	-0.03	0.16
Share of environmental taxes in public revenues	0.41	-0.01	-0.10	-0.02	0.00	0.01	0.14	0.08	0.24
Environmental protection investments	-0.54	0.30	0.19	0.36	-0.02	-0.66			
National expenditure on environmental protection	0.79	0.51	0.10	0.09	-0.23	-0.16			

Source: Eurostat, and NBS calculations.
1) The figure under 2010 is for 2011.