

# Slovakia's stagnation in catching up with more developed economies: macroeconomic and regional dimensions

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**ABSTRACT:** In the aftermath of the global financial crisis in 2009, a number of Central and Eastern European economies, including the Visegrad four, experienced a phase of slowing real convergence. Their ability to catch up with the performance of more advanced European economies has declined to varying degrees and for varying lengths of time. The Slovak economy is a special case, which has been particularly hard hit by the problem of slowing real convergence. This paper shows the specific features of the Slovak case in both the macroeconomic and regional dimensions. It also explains the range of causes of this phenomenon. These are primarily related to the underdevelopment of new drivers of productivity: the parameters of capital accumulation have deteriorated, investment in intellectual property assets, the parameters of hi-tech activities and research and development have lagged far behind. In the regional perspective, the slowdown at macro-level convergence has mainly been reflected in the deterioration of the position of the strongest regions, and thus the performance of Slovakia's regions has paradoxically moved closer together. The analysis is in the nature of an explanatory case study that explains the peculiar trajectory of Slovakia and the deterioration of its position in the V4 group. In doing so, it analyses primarily data from national accounts and regional accounts.

**KEYWORDS:** real convergence, Slovak economy, V4 countries, regional development

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## Introduction

The aim of this study is to present the processes taking place in the Slovak real economy. In Slovakia's case, the process of catching up with the most developed economies has been slowing down significantly for more than a decade, and has even stagnated. This phenomenon has also been observed in other Central and Eastern European (CEE) economies for some time following the global recession of 2009. There are signs that this problem is more pronounced in Slovakia.

Three decades after the change of regime, two decades after joining the European Union, and in the case of Slovakia, a decade and a half after joining the eurozone, it is worth examining the extent to which the country has managed to catch up with the other member states of the Union and comparing the convergence process with that of neighbouring countries. The convergence of the Slovak economy is a topic that is also constantly examined in Hungary, usually within the framework of the V4 countries (Oblath, 2013, Kotosz – Lengyel 2018, Zöldréti 2019, Kollárik 2020, Zapresko-Farkas, 2024). Slovakia is often the subject of analysis for a number of reasons – proximity, similar economic and social structure, shared history (Hegedús et al., 2018; Bod – Pocsik 2020; Dániel et al., 2021).

In our paper, we compare the problem of Slovakia's slowing real convergence with the processes taking place within the V4 group, and we attempt to contribute to the debate on the causes of the problem and to assess the prospects for convergence in Slovakia's counties and NUTS3 regions. The study works with two regional dimensions. The first is the transnational region consisting of the V4 countries. We compare the development of the Slovak economy with the indicators of the V4 group. The other regional dimension is the Slovak regions – higher administrative units, at the county level. This study presents the Slovak perspective.

## Literature review

Landesmann and Stehrer (2002) already pointed out significant differences in real convergence between Central and Eastern European (CEE) countries, regions and sectors in the earlier stages of transition. They confirmed that the initial advantage of convergence can be found in areas where there is a greater initial lag in productivity and product quality, which also represents an opportunity for those lagging behind, both from a sectoral and a regional perspective. However, the existence of such potential does not automatically mean that it will be exploited. After the global financial crisis, the picture became more complex. Alexe (2012) highlighted that the global financial crisis had a heterogeneous impact on the dynamics of real convergence in Central and Eastern European countries. During and immediately after the crisis, the differentiation of the convergence process became more pronounced, and patterns of progress also changed (Smirnykh – Wörgötter, 2021).

Given that the significant slowdown in convergence is a clearly visible phenomenon when observing the economic development of CEE countries, it is

not surprising that it is the primary focus of interest for international organisations assessing the facts and forecasting trends. The phenomenon has gradually become an increasingly frequently analysed topic in the literature. The IMF (2016) asked the question: „How can CEE countries return to the path of rapid convergence?” In answering this question, the report’s most important recommendation was to improve capital deepening and labour supply, and to improve the quality of institutions. The European Commission (2019) emphasised the need to restart real convergence in Slovakia, while critically pointing out that GDP per capita at purchasing power parity has stagnated at around 77% of the EU average since 2014, and gross national income per capita has also remained at around 76% of the EU average since 2013. In its regular review of the Slovak economy, the OECD (2022) expressed concern about the sustainability of labour productivity growth. In the past, especially before the 2009 crisis, productivity growth was based on integration into global value chains. The OECD analysis considers increasing productivity growth desirable for economic convergence and rising living standards in an ageing society. It also found that strong productivity growth in the corporate sector did not spill over to domestic small and medium-sized enterprises. This reflects the duality of the Slovak economy (Gavurova et al. 2020).

The slowdown in convergence has also drawn the attention of experts to the problem. The earlier phase of the slowdown in real convergence was addressed by Žuk et al. (2018), who analysed the reasons for the differing dynamics of real convergence and presented the changing role of growth factors in the development phases of CEE economies. They analysed the slowdown in the convergence process following the global financial crisis and examined the causes of this phenomenon in terms of specific production factors. Their study was based on growth theories in which economic performance depends on capital inputs, labour inputs and total factor productivity (TFP). Among other things, they showed that the slowdown in real convergence dynamics over the past decade was primarily driven by changes in total factor productivity. It is precisely the factors supporting further TFP growth that have been weak in the recent period.

However, there is no complete agreement in the literature on which factor – capital, labour or TFP – is responsible for the slowdown in convergence and to what extent. The results of analyses based on growth calculations vary depending on the observation period and the group of CEE countries included in the observation. The main reason for the rapid growth and significant real convergence observed between approximately 2000 and 2008 was considered to be the significant increase in TFP and capital inputs (Labaj, 2007; Pokrivčák–Záhorský, 2016; Žuk et al. 2018). The contribution of labour accumulation was estimated to be positive but insufficient. The findings of Pokrivčák and Záhorský (2016) attributed a greater role to capital, especially capital other than information and communication technology, than those mentioned above. In this analysis, TFP ranks second in Slovakia, but still contributes significantly to growth. The slowdown in growth and convergence after the global crisis can therefore be linked primarily to the decline in the role of TFP and, possibly, capital inputs. Kónya (2023) arrived at similar conclusions using a slightly different

methodological approach. Based on a sample of 11 CEE countries, it was shown that production factors play a decisive role in the convergence process of each country. It follows that economic policy should focus primarily on productivity growth factors and the development of a well-functioning capital market.

The question arises as to why TFP has lost its importance in promoting growth and convergence in these countries. Chiacchio et al. (2018) explained the decline in the role of TFP with the two-stage process of technology diffusion. In the first phase, companies operating in the host economy prosper as a result of their direct access to new technologies developed by their parent companies and their participation in global value chains (GVCs). In the second phase, the technologies should be transferred to other companies in the host economy through domestic production networks. This is clearly the weak point in the process. The authors have shown that, following the global crisis, the ability of CEE companies to absorb new knowledge has declined. This is linked to the low level of R&D activity in the post-crisis period.

According to the authors of the study, the stages of technology diffusion described above were linked to the weakening role of GVCs. CEE countries that were already significantly integrated into GVCs have been exposed to two unfavourable phenomena in relation to TFP over the past 15 years or so. The first was the slowdown in TFP growth of parent companies operating outside the CEE countries, and the second was the slowdown in the integration of CEE companies into GVCs. This has been observed since around 2011. The import of intermediate products through production chains is a channel through which technological diffusion in GVCs takes place. Čekmeová (2016) also points to the slowdown in TFP growth in most European economies in the second decade of the 21st century. In line with the above, this limits the transfer of TFP growth to CEE countries through GVCs.

Studies explaining the principle of „dependent growth” help to understand the slowdown in convergence. According to Myant (2018), the principle of dependent development and growth enabled more than two decades of rapid convergence and strong growth in the CEE (Myant used the V4 countries as a sample). Foreign investment in these economies came through multinational companies. These enabled the expansion of export-oriented production activities, which integrated the CEE countries into global markets. This phenomenon led to temporary rapid growth, but the gap with the more developed economies of Western Europe remained significant. After evaluating the strategies of multinational companies operating in the CEE and data on their product mix, it was argued that low labour costs were a good reason not to relocate their most advanced products and processes to the CEE (Tiutiunyk et al. 2022). The relocation of less technology-intensive activities helped multinational companies to keep labour costs lower than in Western Europe. It follows that these countries are unable to catch up with Western Europe without changing their growth model. Soreg (2018) argued similarly, saying that it is doubtful whether some CEE countries will be able to continue real convergence after external financing sources dried up following the global financial crisis. According to this author, the previous strong growth and convergence cannot be sustained without massive external financing. In contrast, Galgóczi and Drahekoupil (2018)

argued that the „old” growth model is not completely unviable. After several years of stalled convergence following the global financial crisis, external forces – foreign direct investment and EU funds – once again played a significant role in restarting growth and real convergence in the individual CEE economies in the period after 2015. According to the authors, there are no convincing signs that the region is ready for a fundamental qualitative change in its growth model. R&D activity is among the lowest in the EU, the propensity to innovate is low, and the high degree of internationalisation of production networks is not matched by the internationalisation of R&D and innovation. The most significant obstacle is the lack of innovation capacity. At the end of the period under review, a new obstacle to growth and convergence is emerging in the form of a shortage of suitable labour.

Some authors have responded to the unfavourable data on real convergence in Slovakia by pointing to the distorting effects of purchasing power parity (or purchasing power standard) data. Dujava and Žúdel (2023) quantified the impact of distortion factors on parity and considered the change in the application of imputed rents to be the most significant distortion factor. After adjusting the time series of GDP per capita calculated at purchasing power parity (by correcting for parity distortion factors), the trend became more favourable. The authors recommended using data expressed in euros until the inaccuracies in the parity calculation were corrected. However, even after correcting for the distortions identified by the authors, there is still a significant slowdown in real convergence, albeit to a lesser extent. Hlaváč (2023) also confirmed the quantification of imputed rents as the most important source of distortions. (Note: imputed rents represent a particularly large item in the structure of GDP in Slovakia, as home ownership is extremely widespread). Without going into detail, problems related to the estimation of imputed rents in particular lead to inaccuracies in parity and thus to an underestimation of GDP per capita measured in parity terms. This caused the reversal of the real convergence process after 2015. However, it is important to note that catching up with the level of more developed economies slowed significantly even after the distortions were corrected, and the stalling of the convergence process remains a problem.

## Macroeconomic overview – the case of Slovakia’s halt in real convergence

Slovakia is one of the more unusual countries in the European Union. Academic works generally refer to it as a member of the Visegrad Group, but in the three and a half decades since it became an independent country, it has taken a number of measures that have attracted attention.

In 2004, Slovakia introduced a flat tax, known locally as the single tax. The essence of this was that a 19% tax rate was introduced, which applied to all legal and natural persons, and this was also the VAT rate. As part of the tax reform, the dividend tax and the so-called triple tax, i.e. the gift, inheritance and real estate transfer taxes, were abolished, and several exemptions were eliminated. This step

did not fundamentally reduce the tax burden; the main goal was simplification and transparency. The principle of fiscal neutrality prevailed, and the reform itself did not affect the state of public finances (Mikloš 2005).

The next important reform was implemented by Slovakia in 2005, when it introduced the second, or capital-funded, pillar. Half of pension savings were directed to state pension funds and half to private pension funds. The third event that sets Slovakia apart from its neighbours was the introduction of the euro in 2009.

The Slovak economy achieved significant success after these reforms. The most important changes took place in the growth dynamics of the economy and in tax revenues. GDP rose from 4.2% in 2003 to 10.4% in 2007. The unemployment rate fell from 18.2% to 11.1% during the same period. Tax revenues increased in the first four years of the new system. In 2007, tax revenues increased by 44.8% at current prices and 28% in real terms compared to 2003. The most dynamic growth was seen in revenue from profit tax, particularly tax paid by legal entities, which rose by 70.9% at current prices and 54.1% in real terms. Revenue from this tax was higher in the first year of the reform than in the last year before the reform. Significant results were also achieved in the area of public finances, with public debt falling below 40% and inflation slightly exceeding 10% in the first year of the reforms.

As a result of the reforms described above, Slovakia has become one of the favourite destinations for foreign investors. The most important investors in the country have been car manufacturers. Volkswagen settled here in 1991, followed by Peugeot-Citroën in 2003, Kia in 2004 and Jaguar Land Rover in 2015. The success of the economy's driving force was often highlighted, with Slovakia producing the most passenger cars per capita (Horbulák 2019). Machinery and transport equipment are Slovakia's most important export items, accounting for 61.5% of exports in 2024 ([www.statistics.sk](http://www.statistics.sk)).

We first compare the slowdown, then the halt and even the reversal of Slovakia's real convergence with the 27 member states of the European Union and the Visegrad Four. Slovakia was successful in the early stages of its real convergence between 2000 and 2008, with its relative economic level rising in comparison with both groups.

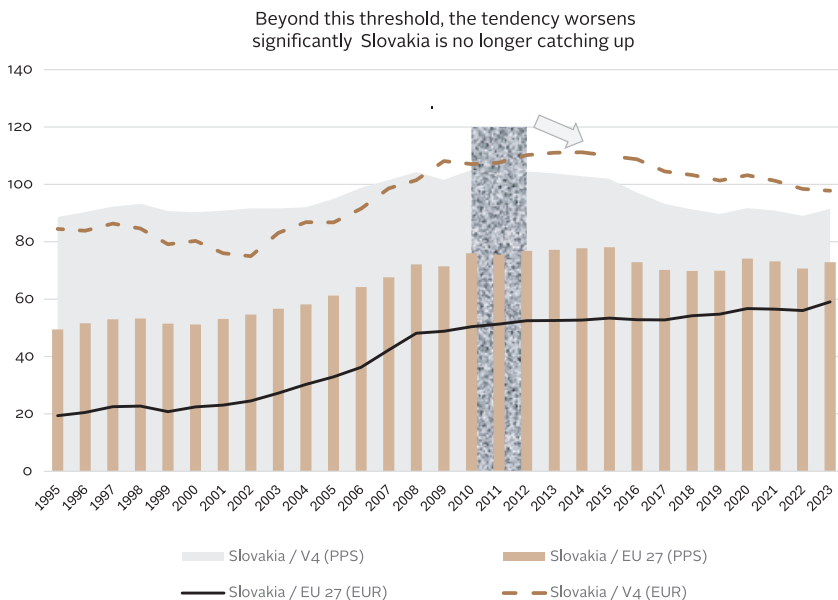
The country's profound economic efforts were crowned by its accession to the eurozone on 1 January 2009. The preparations took place with the consensus of the whole society, and the adoption of the single currency was supported by all relevant political forces. The transaction was facilitated by a smooth transition, which was completed in practically one week. In the following weeks, the rate of inflation did not increase, as the mortgage crisis spreading from the United States caused a recession, which helped to maintain price stability. According to analyses (Žúdel – Melioris, 2016), the introduction of the single currency in 2011 increased GDP by a further 10%.

The situation began to change significantly after 2012. Depending on the method of expression (euro or purchasing power standards, Figure 1), we can observe a slowdown in convergence and even divergence. The simultaneous use of both measures is justified by the referenced literature and the maintained parity. Both measures have their advantages and limitations, so it is advisable to examine them simultaneously.

Data expressed in euros may be influenced by movements in exchange rates and price levels, while parity data may be distorted by relative price levels, parity and purchasing power calculations. The problem of slowing convergence is present in both measures in the case of Slovakia, but their intensity differs.

**Figure 1: Relative level of Slovakia's economy compared to the EU and the V4 countries**

(GDP per capita relative to the EU and V4 average, in %)



Note: Data are expressed in current prices, in euros (EUR) and in purchasing power standards (PPS).

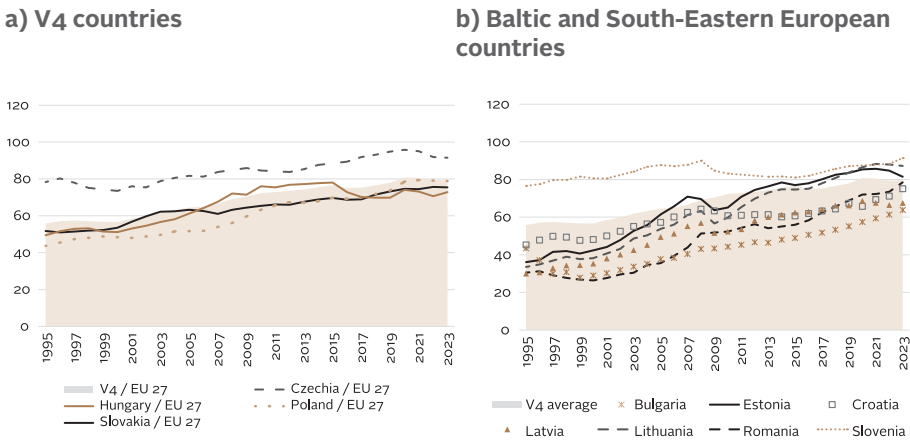
Source: own calculations based on Eurostat data

Although the slowdown in the catch-up process following the global crisis affected the entire CEE region, it had a greater impact on the Slovak economy. The relative level of the Slovak economy deteriorated significantly compared to the V4 average. At the same time, the relative position of the V4 group deteriorated compared to a number of previously less economically developed CEE countries (Figure 2). The Baltic economies in particular managed to catch up with the V4 average. The sequence of events can be summarised as follows: 1) the V4 countries are losing their relative position within the broader CEE group, and 2) Slovakia is losing its relative position within the V4 countries.

Looking at the development of Slovakia, the V4 countries and other countries in the CEE region, it can be observed that in several countries, the global crisis of 2009

and the subsequent recession interrupted the catching-up process for a shorter or longer period of time. However, after a short or medium-term slowdown or even interruption, the convergence process resumed in several economies. In Slovakia, however, the slowdown persisted and became a long-term problem, so it is no longer possible to speak of a short-term interruption of real convergence, as it has been present for more than a decade.

**Figure 2: Relative economic level of CEE countries**  
(GDP per capita at purchasing power parity, relative to the EU27 average, in %)



Source: own calculations based on Eurostat data

If the Slovak economy has problems maintaining or improving its relative position, this should be reflected not only in GDP per capita, but also in other indicators. To obtain a more vivid and less conventional picture, we present an alternative approach – we examine Slovakia’s position in the V4 group in terms of certain indicators. The indicators analysed include output, profit efficiency, employment and exports. Figure 3 compares three 10-year periods and different stages of development. In order to mitigate any fluctuations, we compare three-year averages of the data.

Between the first two measurements, which correspond to the first decade of the 21st century, the Slovak economy significantly strengthened its position within the V4 group. With the exception of employment, where there was no change, Slovakia’s share increased. However, a partial reversal can be observed in the following decade, with Slovakia’s position deteriorating in three indicators and remaining unchanged in three others. Slovakia’s share of value added, exports and the V4 group’s net

operating surplus (simplified as profit<sup>4</sup>) decreased. The fact that the share of intermediate products (inputs used in production) did not decrease, but the share of value added created did, indicates a lag in the development of technical efficiency, which refers to the ability of inputs to add value.

**Figure 3: Share of the Slovak economy within the V4 group, in %**



Notes: Data are expressed in euros at current prices (excluding employment). Employment is based on the number of employees, according to the methodology of national accounts (domestic concept).

Source: Own calculations based on Eurostat data.

The decline in the Slovak economy's share within the V4 complements and reinforces the picture of Slovakia's relative economic decline. In the next section, we examine Slovakia's relative position in terms of factors that should be drivers of productivity, growth and real convergence.

4 The macroeconomic categories do not include the amount of profit generated. However, the national accounting system recognises the category of 'net operating surplus', which is similar to profit. Therefore, with some simplification, we measure the volume of profit using this category.

## Weakening drivers of real convergence

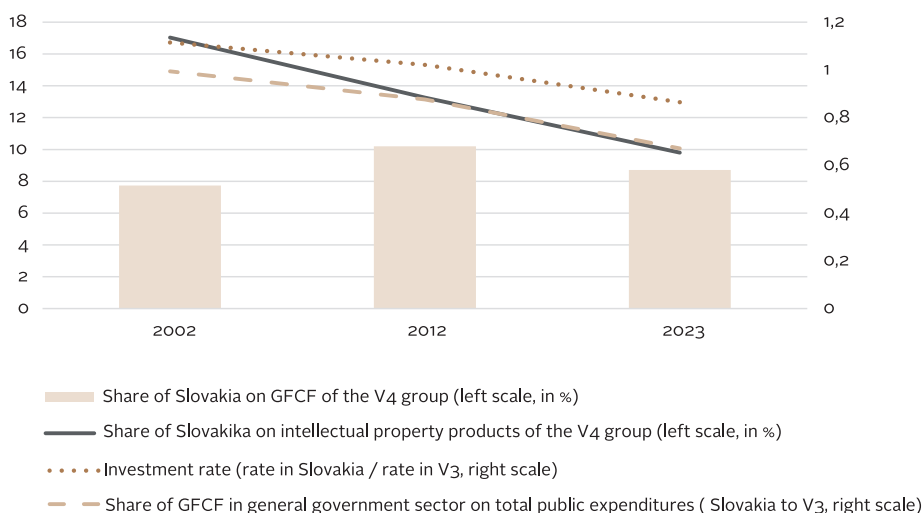
In the following, we examine the state of the factors that, according to the literature, have contributed most significantly to the slowdown in Slovakia's convergence: the factors supporting capital accumulation and aggregate productivity. As Slovakia's real convergence trend changed after 2012 compared to the EU and V4 averages, we will pay particular attention to this period.

In assessing capital inputs, we use criteria relating to total gross fixed assets, but also their composition, in particular the components marked as intellectual property. We assume that it is not only the total amount of capital that plays a role, but also its composition. The nature of the fixed asset components acquired provides the preconditions for the development of certain types of activities. The acquisition of intellectual property products, such as software, databases, research and development results, etc., is a prerequisite for the development of intellectually and technologically demanding, innovative activities. These are generally considered to be drivers of productivity and competitiveness and therefore receive special attention.

Observation of the basic parameters of fixed capital formation (Slovakia vs. V4 and V3) shows that

1. Slovakia's share of total gross fixed capital formation in the V4 region declined after 2012. A decade earlier (2002–2012), this share was still rising.
2. The finding described in point 1) corresponds to changes in investment rates. In the decade between 2002 and 2012, investment rates in Slovakia were above the average of the other three V4 countries (Figure 4). By 2023, the investment rate in Slovakia had fallen well below the V4 average.
3. Slovakia's relative position has deteriorated particularly in the area of capital formation in the form of intellectual property. These components of capital formation create the conditions for innovation, a knowledge-based economy and more intellectually demanding activities. It is precisely in these areas that the Slovak economy is performing poorly.
4. During the period under review, fixed capital formation indicators in the state-controlled sector and public administration deteriorated significantly, even by international standards. These components of capital create the conditions for both economic activity and the functioning of society.

**Figure 4: Changes in the growth dynamics of fixed capital formation in Slovakia**



**Notes:**

GFCF – Gross fixed capital formation

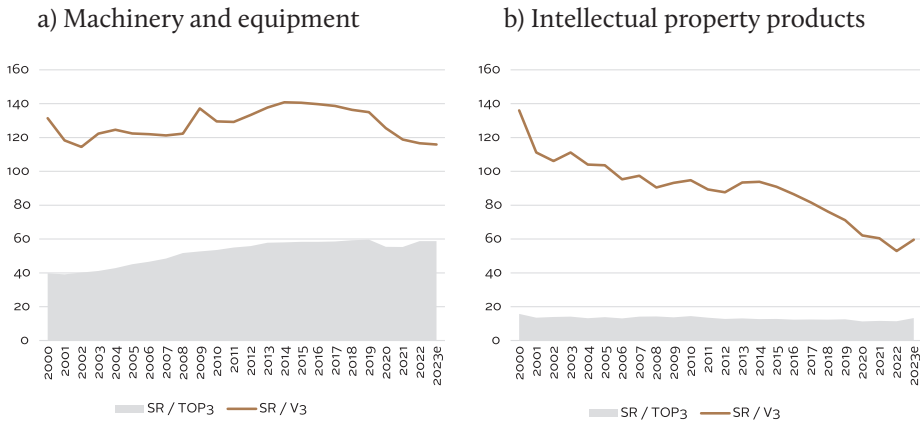
Investment rate – GFA/GDP

V3 – V4 group without Slovakia (for comparison purposes, Slovakia is excluded from the V4, as Slovakia would influence the V4 value)

Source: own calculations based on Eurostat data.

The problem of capital supply can also be analysed from the perspective of capital stock per employee. In this case, we are talking about a **stock variable**, i.e. the accumulated value of a given category of fixed assets per employee. It is generally accepted that higher capital stock leads to higher productivity. Figure 5 shows the relative level of endowment of two selected types of fixed assets in Slovakia – machinery and equipment, which are traditional factors of productivity, and intellectual property, which is a new, forward-looking factor of productivity and represents the knowledge-based economy. Slovakia's relative position compared to the V3 countries is favourable in terms of machinery and equipment, but very unfavourable in terms of intellectual property products. This means that the restructuring of capital assets towards intellectual and innovative activities is still not visible.

**Figure 5: Selected fixed assets per employee (capital endowment)**



Source: Own calculations based on Eurostat data

Notes: Calculated from data on the stock of fixed assets invested (in gross value), at replacement (reproduction) prices.

Intellectual property products – research and development results, software, databases and similar items.

Number of employees according to national accounting methodology (domestic concept).

TOP3 – Average value of the three EU countries with the highest capital endowment (Denmark, Austria, Finland).

V3 – Average of the V4 countries excluding Slovakia.

2023 estimate.

The above statement on the structural problem of fixed capital formation can be supported by other findings:

1. The dynamics of individual components of fixed assets in Slovakia differed significantly from the trends in the other V4 countries. Expressed in constant prices, the dynamics in Slovakia were higher for residential buildings than in other countries, and lower for machinery and equipment (Figure 6). The dynamics lag significantly behind in the case of other non-residential real estate and intellectual property.
2. The results of comparing so-called investment rates vary significantly depending on which component of fixed capital investment is taken into account. The investment rate should be calculated as the ratio of fixed capital accumulation to GDP. One generally accepted basis for real convergence is that investment rates in catching-up economies must be higher in the long term than in the economies they are catching up with. However, this is no longer the case for Slovakia (Figure 7a). To analyse this condition, we included the three most capital-intensive developed European economies (Denmark, Finland and Austria, collectively referred to as TOP3) in the comparison. Slovakia has gradually lost

its favourable position in terms of the ratio of total fixed capital formation (Figure 7a). The ratio of investment in machinery and equipment is relatively favourable (Figure 7b), but the ratio of investment in intellectual property products is very unfavourable (Figure 7c). Overall, there is considerable volatility in fixed capital formation in Slovakia. This can be seen in Figures 7a) to 7c), but it can also be observed in Figure 7d), which shows fluctuations and outliers. In the Slovak economy, the largest differences over the longer term were the most pronounced fluctuations in investment dynamics.

**Figure 6: Change in fixed assets between 2011 and 2023, in %**



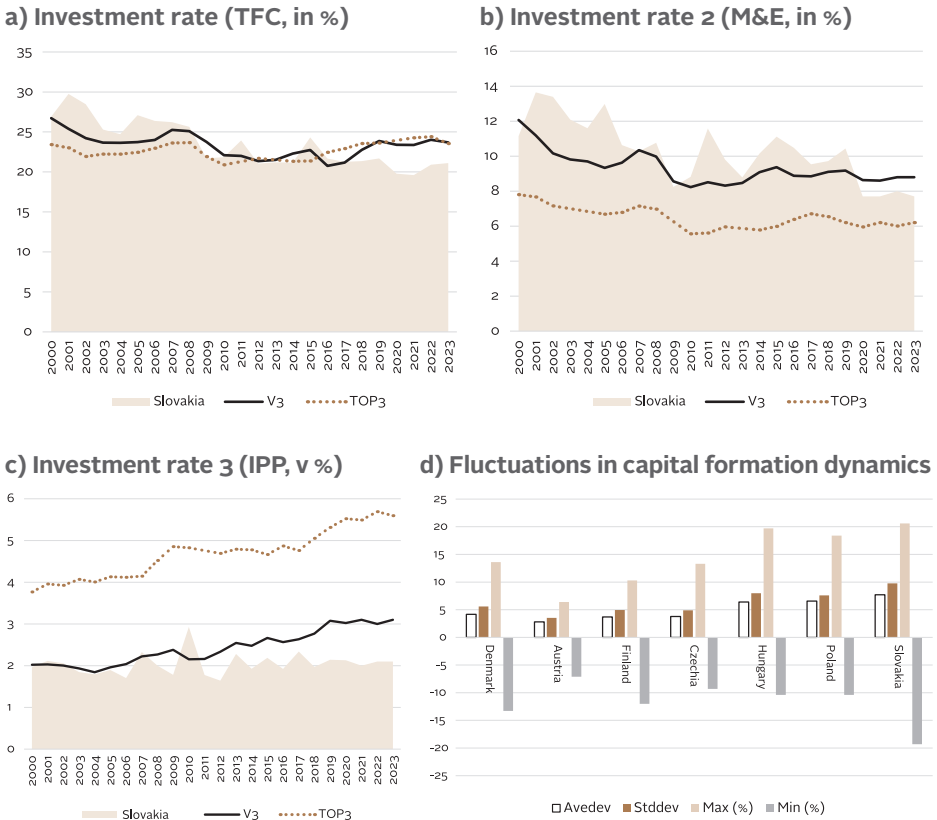
Source: Own calculations based on Eurostat data.

Notes: Calculated as the average annual change in fixed assets between 2011 and 2023.

Calculated from data obtained by chaining volumes.

V3: group of V4 countries excluding Slovakia

**Figure 7: Parameters of fixed capital formation**



Source: Own calculations based on Eurostat data

**Notes:**

Investment rate = gross fixed capital formation/GDP. Calculated at current prices, in euros. The results are expressed as percentages:

Investment rate 1 is calculated from total fixed capital formation (TFC).

The second investment rate is calculated in terms of capital in the form of machinery and equipment (M&E).

The third investment rate is calculated as capital in the form of intellectual property products (IPP).

Figure d) shows the dynamics of changes in gross fixed capital formation at constant prices, showing the differences over the long period from 2001 to 2023. Avedev is the average difference, Stddev is the standard deviation, and Max and Min are the outliers in the time series.

V3 – Average of V4 countries excluding Slovakia.

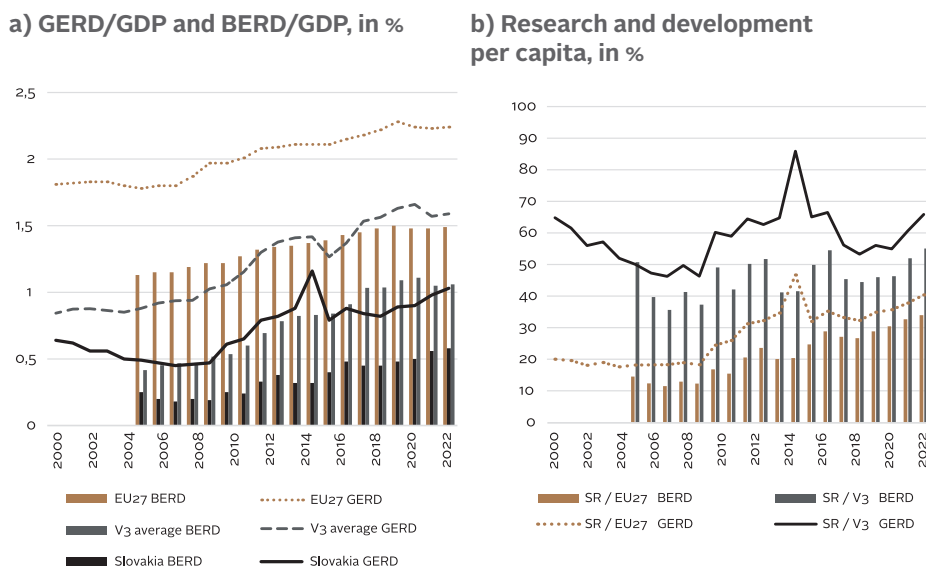
TOP3 – Average of the three countries with the highest capital endowment per employee in the EU (Denmark, Austria, Finland).

Similarly to the deterioration in Slovakia's relative level of fixed capital formation, the country's position in research and development and trade in technological and intellectual goods also deteriorated. Both research and development (measured by the GERD and BERD parameters in Figure 8 and by the number of people employed in research and development in Figure 9a) and participation in foreign trade in high-tech goods are channels for promoting innovation, productivity and real convergence. In all these areas, Slovakia's role among the V4 countries appears to be weakening.

A noteworthy phenomenon characteristic of Slovakia is the significant short-term improvement in research and development and investment values at the end of the EU fund budget cycle (see the fluctuation in 2015, Figures 7a) or 8)). This is a manifestation of the very uneven absorption of EU funds, which contributes to their sub-optimal, last-minute, pressure-driven use.

Slovakia's deterioration in relative position in terms of fixed capital formation, research and development, and trade in high-tech goods points to unfavourable trends in factors that could be drivers of productivity and real convergence. These findings are consistent with the deterioration of Slovakia's relative position and the slower growth of its economic output.

**Figure 8: Expenditure on science and research (GERD and BERD)**



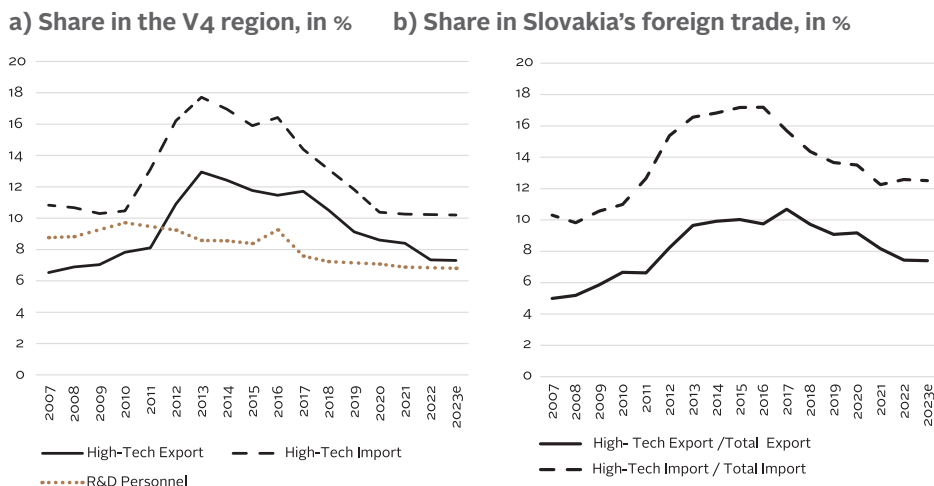
Source: Own calculations based on Eurostat data

Notes:

GERD – gross domestic expenditure on research and development

BERD – Business expenditure on research and development

**Figure 9: Indicator for selected technology- and knowledge-intensive activities**



Source: own calculation based on Eurostat

The main reasons for the weakening of the drivers of growth and convergence are the decline in the investment rate, the deterioration in the dynamics and structure of capital accumulation, the unfavourable development of capital assets and weak R&D activity. However, this list is not exhaustive. It could be supplemented by the disappearance of „dependent growth” effects, the depletion of adequate labour resources (ageing population, brain drain) or the weakening of technological diffusion through GVCs.

In the following, we examine the regional forecast for the slowdown in the convergence process.

## The regional dimension of the slowdown in convergence

The slowdown in real convergence at the macro level was unevenly distributed across regional indicators. Slovakia's economic development has been accompanied by long-term regional disparities, which are particularly pronounced between the capital and the peripheral regions along the border. In the following, we examine how the relative position of NUTS3 regions has changed as a result of the slowdown in real economic convergence. We also analyse the shift in the level of Slovak regions compared to the regions of the V4 countries.

Regional disparities are one of the biggest problems facing the Slovak economy in the long term. Although Slovakia is one of the smaller countries, there are significant differences in its labour market.

Not only the economic level of Slovak regions, but also their convergence paths are highly differentiated. Szakálné and Lengyel (2021) showed that up to 40% of the

population of the V4 countries live in non-converging regions and identified five convergence clubs that converge within countries but diverge from other clubs.

Below, we examine the level of development of the regions in terms of GDP per capita at purchasing power parity. In Slovakia, eight counties, i.e. NUTS3 regions, have been established according to the current administrative division. We compare the data with the average for EU countries and V4 countries (Neubauerová et al. 2003).

We would like to remind you that there was a period in the past when the Slovak economy rapidly caught up with the level of developed economies. This was approximately during the first decade of the 21st century. The pace of convergence has been slowing down steadily since around 2012. During the period of rapid real convergence of the economy as a whole, between 2001 and 2011, when the Slovak economy grew from 53% to 76% of the EU average, the relative position of all regions changed for the better. The most significant improvement took place in the capital region, followed by the well-known picture that emerged over time: a region with excellent indicators – Bratislava County – and the other seven counties lagging significantly behind.

It is possible that the statistics exaggerate the regional differences in GDP per capita, overestimating the performance of the capital region and underestimating the situation in the other regions. We acknowledge that the actual differences may be somewhat smaller than the regional GDP per capita data suggest. However, this does not fundamentally change the essence of the problem.

Figure 10 shows the shift in the relative positions of the regions, i.e. their position in relation to each other, from two perspectives. One compares the position of the region within the Slovak economy with that of the most developed region, while the other compares the position of the regions with the average for the V4 countries.

Figure 10a shows how the position of Slovak regions relative to the average of the V4 regions improved between 2000 and 2010, in other words, how the differences within the economy changed. Compared to the capital, the lag of all seven regions became more pronounced, and the differences within the seven regions also increased.

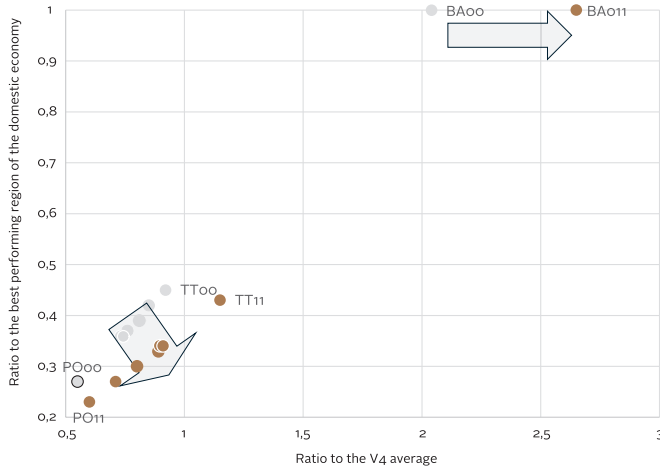
It may therefore seem paradoxical that while convergence across the economy as a whole slowed, regional disparities narrowed (see Figure 10b and the extent of the disparities in Table 1). At first glance, this appears to be one of the few positive developments in economic progress. The advantage of the Bratislava region has decreased, and the gap between the weaker performing regions, such as Prešov, Košice and Banská Bystrica, and the strongest regions – Bratislava, Trnava and Žilina – has narrowed for the first time in Slovakia's history, see Table 2 and Figure 10b).

However, this change is not a desirable form of convergence between regions. The less developed regions did not catch up with the stronger ones by improving their position. The differences decreased because the situation of the better performers deteriorated and those at the top fell back. The situation is illustrated by the following figures: In 2011, Prešovský kraj (PO) achieved 44% of the EU average in terms of GDP per capita (Table 2). Based on the latest data for 2023, it stands at 46% of the EU average. Meanwhile, however, the relative position of the Bratislava region has fallen from an impressive 193% of the EU average to 148%. The levels of the weak and strong regions

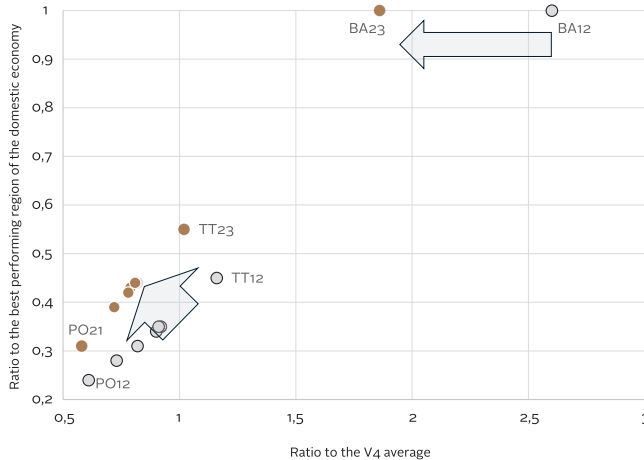
have thus converged. The preferred model, on the other hand, is for them to converge in a different way: for the relative position of the weaker regions to improve.

**Figure 10: Change in Slovakia's relative position**

**a) 2000–2010: period of successful convergence**



**b) 2011–2023: period of slowing convergence**



Source: own calculations based on Eurostat data

Notes: The best performing region was the capital region (Bratislava County, BA). The vertical scale shows the ratio of the levels of the other regions to the level of the best performing region. The units of measurement are regional GDP per capita calculated at purchasing power parity.

Other regions are marked as follows: TT – Trnava region (second best performing region), PO – Prešov region (worst performing region).

**Table 1: Differentiation of regional levels**

Average GDP per capita and variations expressed in purchasing power parity

		2000	2010	2011	2023
		Period of significant macro-level real convergence		Period of weakening macroeconomic convergence	
All V4 countries	Average deviation	0.296	0.293	0.289	0.262
	Standard deviation	0.419	0.465	0.456	0.418
Regions of Slovakia	Average deviation	0.303	0.375	0.383	0.3279
	Standard deviation	0.471	0.567	0.570	0.403

Source: own calculations based on Eurostat data

**Table 2: Relative level of development of Slovak regions**

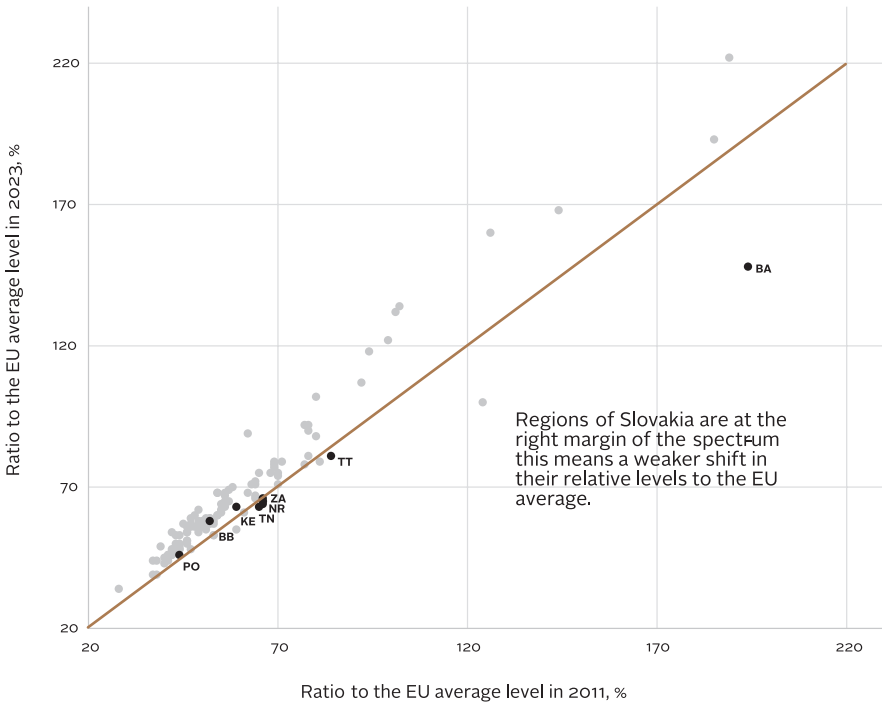
GDP per capita in purchasing power parity, as a percentage of the EU average

	2001	2011	2023
Slovakia	53	75	73
Bratislava Region (BA)	122	194	148
Trnava Region (TT)	53	84	81
Trenčiansky Region (TN)	51	65	63
Nitra Region (NR)	44	66	66
Žilina Region (ZA)	44	66	65
Banská Bystrica Region (BB)	44	52	57
Prešov Region (PO)	32	44	46
Košice Region (KE)	49	59	63

Source: own calculations based on Eurostat data

When comparing the relative development of all regions (NUTS<sub>3</sub>) in the V4 countries, the unfavourable situation of Slovak regions is clearly visible: Between 2011 and 2023, which is considered a „problematic” period in terms of the real convergence of Slovak regions, Slovak regions did not move in the desired direction, in line with the movement of most V4 regions (Figure 2). The situation in the Bratislava region has changed particularly unfavourably. (For a quicker overview of Figure 2: Positions above the diagonal indicate an improvement in the region’s position compared to the EU average. Positions below the diagonal indicate a deterioration).

**Figure 11: Combinations of the relative positions of the V4 regions**



Source: own calculations based on Eurostat data

Notes: Level of development measured in terms of regional GDP per capita in purchasing power standards.

The labels of the regions are described in Table 2.

## Reasons for the slowdown in convergence

It is a fact that the convergence process of the V4 countries is not continuous anywhere, with slowdowns or even setbacks observed everywhere. It can also be said that all experts consider the processes taking place in their own countries to be unique, of course. „Hungary’s convergence – both for the period as a whole and for individual sub-periods – differs in several respects from that of the other three countries.” (Oblath 2013, 934). It is also true that the Hungarian literature on the subject points to Slovakia’s below-average, deteriorating overall performance and that the Czech Republic is in the best position (Zöldréti 2019, 70).

As far as regional differences are concerned, the situation is very similar. In the case of the Czech Republic, Hungary and Slovakia, it can be seen that the regional GDP dispersion not only did not decrease, but even increased slightly by 2017.

„However, this increase was greatest in Slovakia (Kollárik 2020, 106).” The capital-province divide is evident practically everywhere. In Slovakia’s case, this is further exacerbated by the geographical location of the capital region. Kollárik believes that catching up will take the longest in Slovakia.

As our study shows, there are several reasons for the slowdown in real convergence in Slovakia, which can be clearly illustrated using growth accounting. The method works with three categories of drivers of growth and convergence: capital accumulation, labour accumulation and factor productivity. In Slovakia, there are significant lags in all three categories. The role of local governments in development should also be highlighted (Lentner et al. 2018).

Capital accumulation has been weakened by declining investment following the global financial crisis, low savings rates and declining capital inflows. The relatively low investment activity of the public sector, which is fundamentally dependent on the absorption of EU funds, also plays a role. Fixed capital formation has lagged behind economic growth and, in particular, final consumption growth. Capital accumulation has weakened over the past decade, especially compared to the period before 2009.

Labour accumulation has only reached its limits in recent years. This is due to demographic factors: since 2017 in particular, the number of people of working age has been declining steadily at a rate of around 1% per year. The labour supply is shrinking, which was unimaginable in the first two decades of Slovakia’s existence.

Productivity gains have been hampered by long-term neglect of innovation, including a deterioration in the quality of the regulatory framework, a weakening of reform policies and a decline in the efficiency of government institutions. Slovakia is significantly underperforming in terms of exploiting new drivers of competitiveness, such as digitalisation, R&D and the promotion of intellectual activities.

The causes of the slowdown described above are intertwined and complement each other. There is no single, clearly identifiable cause for Slovakia’s economic slowdown, but rather a series of mutually reinforcing factors, which is why improvement can only be achieved through comprehensive political and economic measures.

## Summary

The V4 countries are a group of countries with similar characteristics. They are undergoing almost identical internal processes and their starting positions were also the same. If we compare Slovakia’s development path with that of the other three Visegrad countries, the differences in their development are clearly visible, and the significant lack of real convergence is even more pronounced than when compared to the EU average, which is a more heterogeneous group. It is not surprising that Slovakia’s relative loss of position in terms of economic output compared to the V4 countries is reflected in its growth, the relative deterioration of its productivity drivers and its loss of position. If Slovakia’s position deteriorates in terms of

certain productivity factors, then the deterioration in its economic performance is understandable. It should not be overlooked that the V4 countries are not a homogeneous group, with significant differences between the Czech Republic and Poland, for example. Slovakia's deteriorating position among the V4 countries is a warning sign. All this means that the problem for Slovakia is not only a significant slowdown in catching up with the EU average, but also a loss of position within the V4 group. What is more, the V4 as a whole is also losing its relative position compared to other Central and Eastern European countries, especially the Baltic states.

It is also not surprising that the macro-level slowdown in real convergence has spread unevenly to the regional level. The levelling out of regional differences shown above is merely a manifestation of the fact that former growth centres are slowing down more than others. Greater cohesion at the expense of a slowdown in the leading regions is not the right scenario.

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