

Report on Productivity and Competitiveness

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Please note:

The material presents the opinions of the authors from the Institute for Economic Analysis (hereinafter, "IHA"), and need not reflect the official positions of the Ministry of Economy of the Slovak Republic (hereinafter, "ME SR"). The purpose of this publication is to animate and improve professional and public debate on topics of current economic significance. All opinions included herein should therefore be attributed to IHA and not ME SR.

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Introduction

"If Europe cannot become more productive, we will be forced to choose. We will not be able to become, at once, a leader in new technologies, a beacon of climate responsibility and an independent player on the world stage. We will not be able to finance our social model. (...) THIS IS AN EXISTENTIAL CHALLENGE. Europe's fundamental values are prosperity, equity, freedom, peace and democracy in a sustainable environment. The EU exists to ensure that Europeans can always benefit from these fundamental rights. If Europe can no longer provide them to its people – or has to trade off one against the other – it will have lost its reason for being."

The Future of European Competitiveness, 2024

The report on the future of European competitiveness prepared under the leadership of the former Presidents of the European Central Bank Mario Draghi emphasised Europe's need for radical change to compete on a constantly changing global playing field. The report links its call for a more productive Europe to support for fundamental European values. Raising productivity is the most important driver for growth and living standards. Seeking improvements in competitiveness should not be seen in the narrow sense of a zero-sum game focused on conquering global market share and raising trade surpluses. It should also avoid policies aimed at protecting "national champions", which can stifle competition and innovation, or suppressing wages as a means to lower relative costs. Competitiveness no longer depends so much on relative labour costs as on workers' knowledge and skills. Additionally, the report observes that it can be beneficial to pay specific attention to sectors and industries where (otherwise productive) enterprises are disadvantaged by asymmetric global conditions.

Support for competitiveness and mitigation of asymmetries are important on both the global and national levels. Reducing asymmetries can contribute to productivity growth. The aim of this second report on productivity and competitiveness prepared by the Institute of Economic Analysis in line with EU Council Recommendation of 20 September 2016 on the establishment of National Productivity Boards (2016/C 349/01) is to provide a clearer picture of these asymmetries in corporate productivity. Whereas the previous report sought to provide an overview of all the key aspects of productivity and competitiveness, the present report looks more closely at the vertical and horizontal gaps in productivity between businesses operating in Slovakia.

The first chapter summarises trends in productivity, focusing on its slight acceleration since 2019. It is based on macroeconomic data. The second chapter concerns the horizontal gaps in productivity between foreign firms and domestic ones. It is based on business data from linked databases (financial statements and labour records). The third chapter examines the vertical gaps in productivity between the least and most productive firms in Slovakia. It uses the CompNet database, a panel data set of corporate data of European non-financial corporations. While the vertical analysis covers enterprises with 20 or more employees, the horizontal analysis also includes smaller employers. Productivity is defined as the value added per unit of labour (each chapter includes a more specific definition).

Executive summary

Microdata indicate that foreign-owned firms in Slovakia are twice as productive as domestically owned firms, and their compensation per employee is 2.2 times higher. This dual economic structure is the result of Slovakia's integration into the world economy through global value chains (Drahokoupil and Fabo, 2019). Foreign advanced technologies and management practices, better access to foreign markets and economies of scale raise the productivity of foreign firms while domestic firms often face financial, technological and capacity constraints (Zámborský and Jacobs, 2017). Lack of diversification in the economy can also affect differences in productivity. The narrower the specialisation of a small economy, the more resources flow into developing a small number of industries. This hampers the economy's ability to reallocate resources flexibly among sectors as a way to boost productivity and competitiveness (EC, 2024).

Comparisons between sectors must not overlook differences in industry structure, company size and the demand that they serve. The higher productivity of foreign firms in the Slovak business environment is partly due to their concentration in more productive industries, their larger size and their saturation of massive foreign demand (motor vehicle production, refineries, shared services centres, metal processing) or local demand (retail chains, telecommunications) where there is a high concentration of foreign ownership. Concentration may imply greater or even decisive market power in the procurement of intermediate consumption, labour and capital inputs, or when setting price mark-ups for outputs. An increase in profit due to relatively cheaper inputs or more expensive outputs means more value added, and thus potentially higher productivity.

Domestic firms are much more likely to serve the specific or intrinsic needs of the relatively small domestic market. Half of the domestic sector consists of firms with under 50 employees while micro-firms with less than 10 employees make more than a quarter. Low productivity is associated with areas of consumption such as retail, food and beverages, repair and construction services. For domestic firms, it is often the case that the smaller the enterprise, the lower the productivity. Large companies have greater capacity to implement new technologies, develop talent, invest and export.

Foreign firms' two-fold lead over domestic firms in productivity also reflects the significance of the informal economy in Slovakia. Low reported productivity may indicate that revenues are being understated, or expenses overstated, and value added is not faithfully reported. When microenterprises are removed, the productivity gap narrows from 2-fold to 1.7-fold.

This horizontal productivity gap shows no shrinkage and is observed throughout the period under consideration (2014 – 2022). The conclusion is that foreign firms have long been creating more resources for labour remuneration and have deeper reserves for overcoming crises and the triple transformation (ecological, digital and the transition to economic security).

The vertical productivity gap between laggards and leaders is one of the largest in Europe. Slovakia has firms with productivity that is extremely high even by European standards alongside firms whose productivity is the lowest in Europe. The vertical gap had a shrinking trend prior to 2019, though partly at the cost of stagnation in the productivity of the best-performing firms.

The main cause of the vertical gap in productivity is the difference between extremely productive trade firms and construction firms, hostels, restaurants and certain manufacturing companies with low productivity. The gap in corporate productivity at the aggregate level reflects the nature of a small, converging, export-oriented economy with significant import intensity and limited household purchasing power. The most productive firms are mainly exporters (wholesalers and manufacturers) and importers of goods for intermediate consumption and import-intensive consumption or investment demand. Low-productivity firms mainly serve local demand. The economic activities of the firms at the extreme ends of the distribution are varied and the spillovers of pro-growth impulses between them are limited.

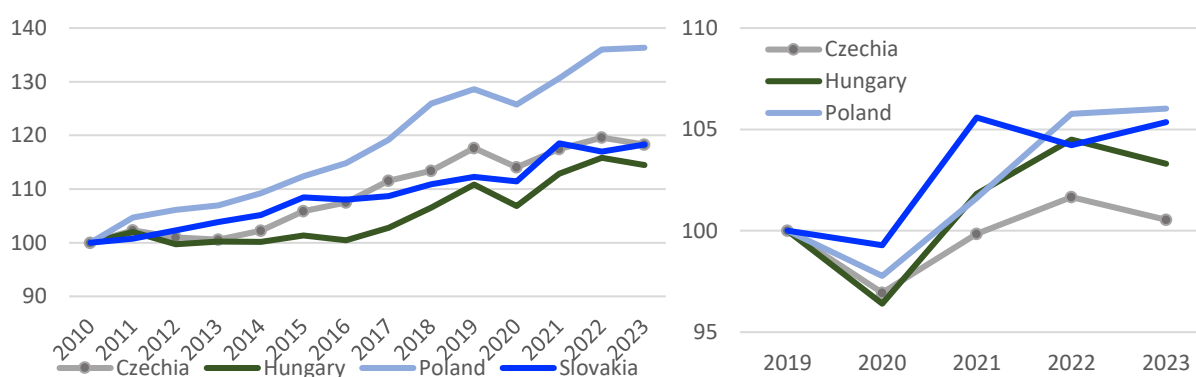
Productivity is likely to benefit more from studying the differences between firms in particular industries than looking at the aggregate level. The highest industry inequality – which deviates significantly from the same industries in other European countries – is found in trade and manufacturing. Manufacturing lacks a stronger spillover of productivity factors from high-performing corporations to less productive firms. The inequality in the trade sector, especially retail, reflects the higher concentration of income in a small number of firms, which leads to high productivity compared to the rest of the market. High-productivity wholesalers tend to be foreign-owned firms with narrow specialisation and low labour intensity.

Societal goals must also be considered when pursuing productivity growth as an economic goal. Knowing that maximising aggregate productivity cannot be considered the ultimate goal of policy, the material notes the dilemma facing public policy. Some low-productivity entities provide essential civic services. However, it is beyond the scope of this material to propose a compromise solution, though ideally the aim should be a synergy between societal goals and measures promoting productivity growth.

1. Evolution of productivity on the national level

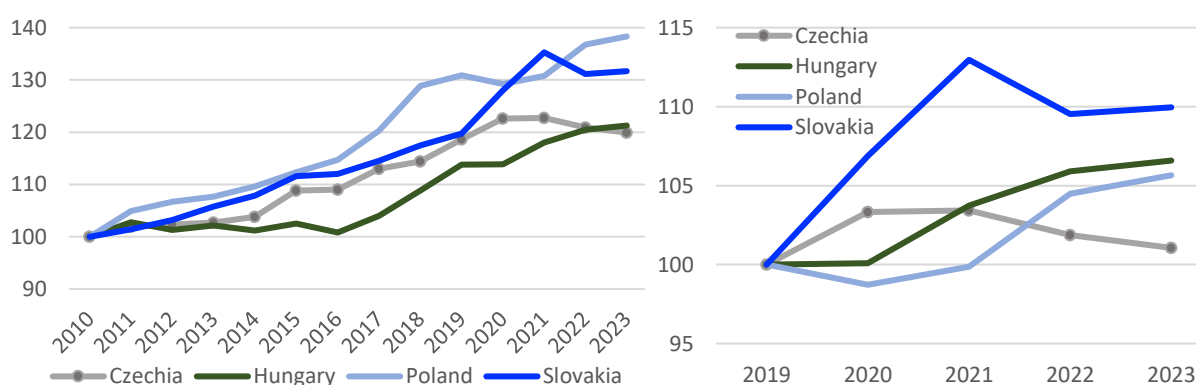
Since 2019, growth in real labour productivity in Slovakia has accelerated. It had the fastest increase in hourly productivity (the gross domestic product of the entire economy per hour worked) of the V4 countries (Chart 1). It was the sixth fastest among EU Member States and candidate countries after Ireland, Serbia, Latvia, Malta and Croatia. Over the long term (since 2010), Poland is the only V4 country with faster growth, while among other catching-up countries, only Romania, Lithuania, Latvia and Bulgaria were faster.

Chart 1: Evolution of real economic productivity per hour worked (left chart: index 2010=100, right chart: index 2019=100)



Source: Eurostat (nama_10_lp_ulc)

Chart 2: Evolution of real economic productivity per person employed (left chart: index 2010=100, right chart: index 2019=100)



Source: Eurostat (nama_10_lp_ulc)

Slovakia's accelerated productivity reflects the economy advancing with limited total working time; nevertheless, increasing value added was generated. In 2023, there were 11,000 fewer persons employed (-0.5%) than in 2019. Employment decreased the most in manufacturing and trade. Productivity growth in manufacturing was the fastest in the V4 and the productivity increase in trade together with transporting and storage was almost the fastest in the EU (after Latvia).

The decrease in number of hours worked (-5.4%) was much more significant than the decline in employment. Besides productivity growth (per hour worked and to a lesser extent per person employed), this indicates hoarding of workers. They kept their jobs despite a decrease in work or orders. Labour hoarding can be seen as a rational measure for firms to adopt in a tight labour market when there are many vacancies at the same time as a low rate of unemployment. The number of hours worked decreased in all economic activities except information and communication.

Net fixed assets helped to compensate for the low volume of working time. At least until 2022 (the last available data), the volume of net fixed assets per work unit was growing at almost the fastest rate among EU countries for which data are available (after Malta). The productivity of fixed assets (value added per unit of assets) increased most significantly in services such as accommodation and food services, transporting and storage. This supported the results for hourly productivity in these industries.

2. The horizontal (sectoral) productivity gap between foreign and domestic firms

As a result of the economic model applied to the small Slovak economy, foreign-owned firms are twice as productive as domestically owned firms, and their personnel costs per employee are 2.2 times higher. This calculation is based on the newly created database of firm-level labour productivity (hereinafter “D3P” based on the Slovak name *databáza podnikovej produktivity práce*; see the methodological notes in the Appendix). Productivity (nominal value added from firms’ financial statements per full-time equivalent) is measured only for the business enterprise sector, excluding the public and financial sectors. To prevent the results from being distorted by extreme observations, as in the case of mean productivity, gaps are quantified at median values.

2.1. Effect of size on sectoral gaps

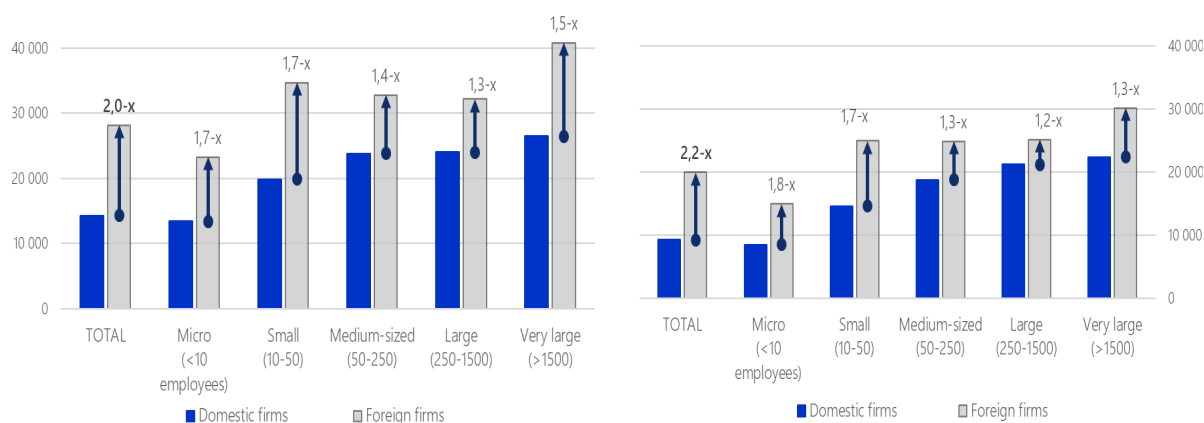
The foreign sector (enterprises with majority foreign ownership) has higher productivity than the domestic sector (enterprises with majority domestic ownership) in all size categories. The gap is wider in smaller enterprises and narrower in larger ones.¹ Increased productivity is not pursued simply for its own sake; pay rises depend on productivity increases. The foreign sector pays higher wages, other personnel costs and the related compulsory contributions.

The productivity gap in smaller enterprises is widened by trade companies with a foreign owner (Chart 4). They have over twice the productivity of domestic trade companies of the same size (Charts 5 and 6). Foreign trade companies have the highest productivity of all industry categories at the micro, small and medium-sized levels. The same conclusion can be drawn from

¹ Size categories determined by the number of employees converted to full-time equivalents (x): micro-enterprises: $0 < x < 10$, small enterprises: $10 \leq x < 50$, medium-sized enterprises: $50 \leq x < 250$, large enterprises: $250 \leq x < 1500$, very large (XL) enterprises: $x > 1500$.

the calculations of the CompNet database (Chapter 3) on the impact of trade on one of the highest dispersions in Europe (the productivity ratio of the top and bottom deciles, 90/10).

Chart 3: Productivity (left) and personnel costs per employee (right) by ownership and size (EUR / year, 2022)



Sources: Finstat, Social Insurance Agency, IHA calculations

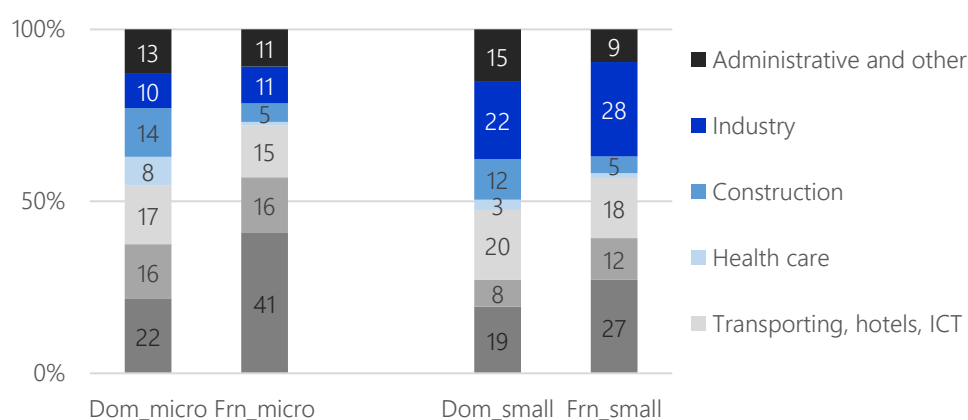
Note: The overall gap is larger than the gaps for the individual categories because these are more homogeneous than the aggregate (category-level variability is lower than overall variability).

Even after deducting intermediate consumption expenses from their massive revenues, foreign micro-trading firms generate high value added with low labour intensity. Foreign microenterprises generate 2.5 times more value added than domestic microenterprises in wholesale and retail, and this lead increases to 5 times in vehicle sales and repairs. The large gap in wholesale is due to highly specialised foreign enterprises. They trade in foreign markets with solid and gaseous fuels, metals and other raw materials and intermediate products for manufacturing, defence industry products, pharmaceuticals and medical supplies, vehicles and consumer goods. With large turnovers for import-intensive production, consumption and investment, they achieve economies of scale.

The gap in retail is due to the low productivity of domestic firms which perform important supply and societal functions despite not always being in line with policies aimed at productivity growth. Domestic firms serve narrow local, complementary and specialised markets that do not offer economies of scale which would raise productivity through lower expenses or higher competitiveness. In motor vehicle sales and repair, productive foreign car importers operate alongside domestic car repair shops with low value added.

Besides trade, a significant cause of the productivity gap in microenterprises is the low productivity of many domestic construction firms. On the other hand, domestic medical and dental practices reduce the gap. They represent one of the few areas where domestic enterprises have higher productivity than foreign ones (Chart 5). Provision of health care is dominated by domestically owned businesses with an average of three employees. Domestic microenterprises account for more than 90% of the total number of facilities providing hospital activities, medical practice activities and residential care. Foreign firms in the health sector have a productivity advantage mainly in the area of innovative diagnostic methods.

Chart 4: Structure of micro-enterprises and small enterprises by industry²



Sources: Finstat, Social Insurance Agency, IHA calculations

Note: Administration and others: call centres, leasing companies, labour, travel, security and cleaning agencies, education and social assistance, gambling and betting services, art, agriculture.

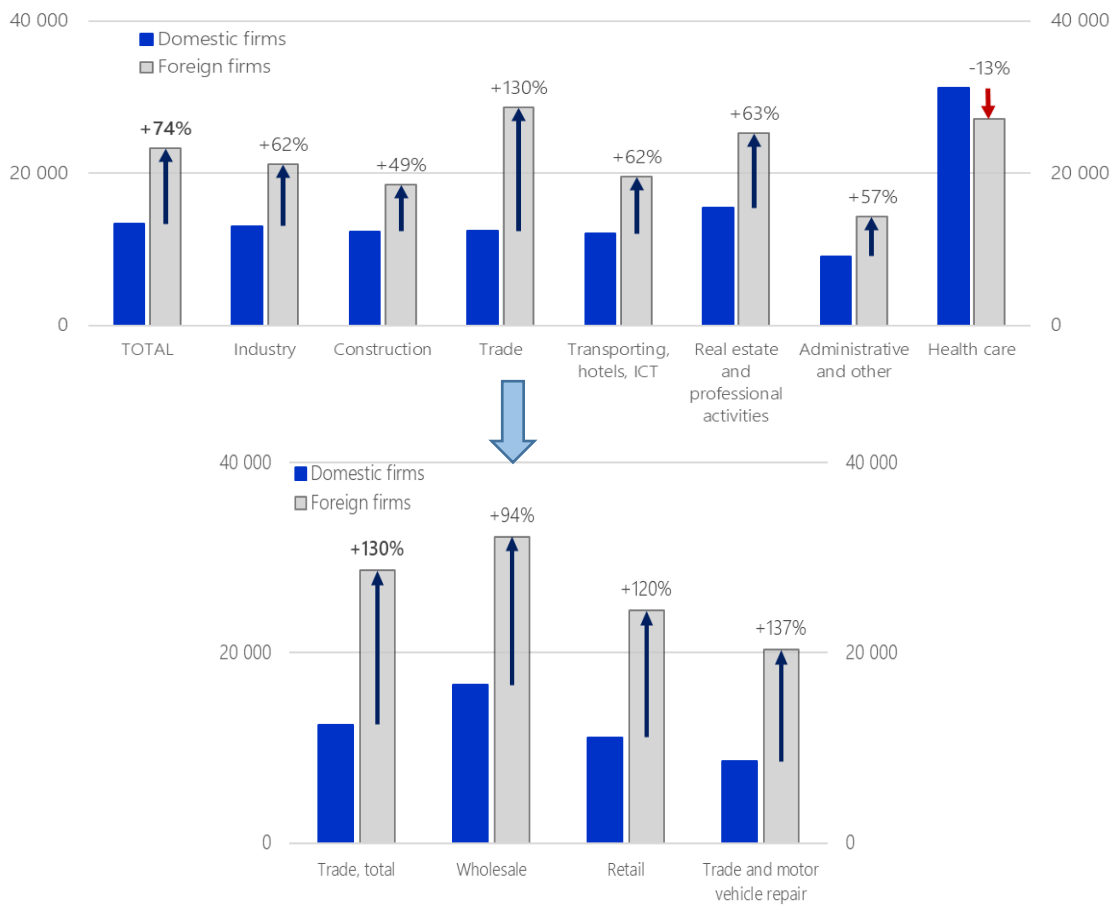
In the case of construction, real estate and professional activities, the gap widens with business size. There remains a significant difference in the case of large construction firms even though both domestic and foreign enterprises focus on infrastructure projects. The gap in real estate and professional activities reflects domestic firms' focus on less productive activities while foreign firms are concentrated in operations with higher productivity. The most common domestic firms are housing cooperatives and research institutes with long traditions. Some domestic firms (to a greater extent than foreign firms) provide services and specialised activities that are less interesting as regards profitability. Foreign firms operate medium-sized and large, highly productive centres for shared services and business services. In Slovakia there are some very large (XL) foreign shared services centres that have no equivalent in domestic ownership. The domestic XL firms provide mainly administrative services (recruitment) where productivity is lower compared to activities like shared services ("Other" in Chart 11).

In trade and industry, the gap narrows as size increases but opens again for the largest firms. The largest XL foreign trade companies are over 80% more productive than domestic ones. They include multinational chains where food and furniture sales predominate.

In large industrial enterprises, the productivity of the domestic and foreign sectors is almost equal. The high productivity of domestic, state-controlled energy and water companies contributes to these results. These are amongst the largest (XL) enterprises, where productivity is sufficient to "compete" with the foreign-owned companies such as car manufacturers and their suppliers, refineries or the manufacturer of nitrogen compounds. The largest XL foreign companies have 40% higher productivity than domestic companies in the same size category.

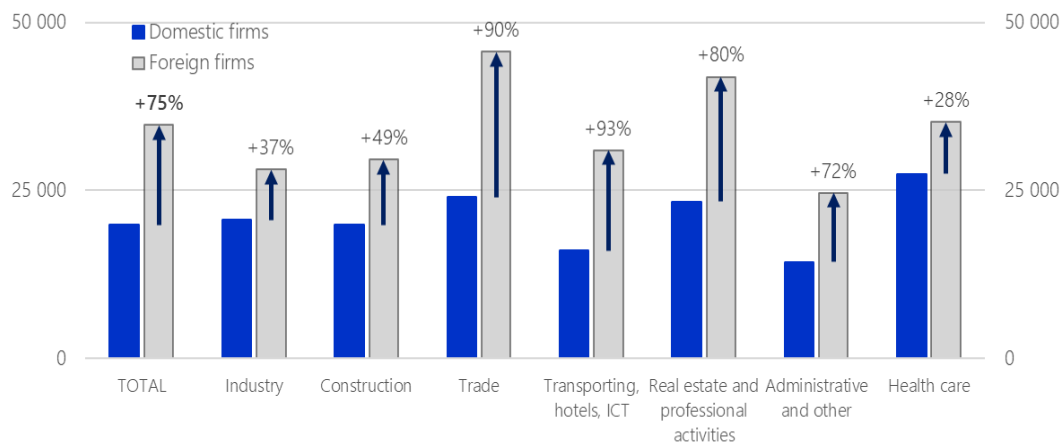
² Throughout the material, percentages in stacked bar charts may have totals that are not 100% due to rounding, data are for 2022, "Dom" means the domestic sector, "Frn" means the foreign sector.

Chart 5: Microenterprise productivity – foreign firms outperform domestic firms in trade



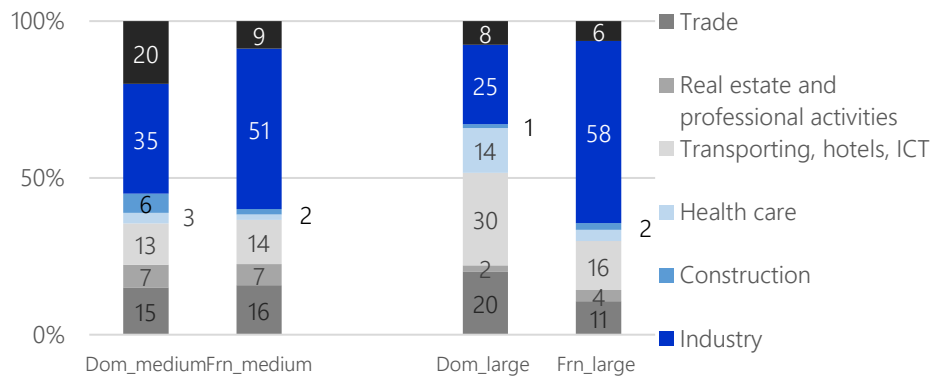
Sources: Finstat, Social Insurance Agency, IHA calculations

Chart 6: Small enterprise productivity – foreign-owned trade companies lead here too



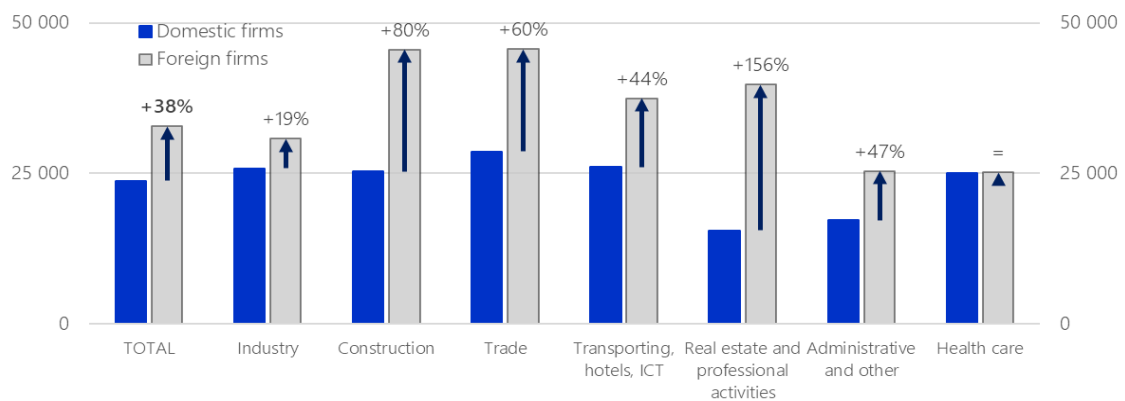
Sources: Finstat, Social Insurance Agency, IHA calculations

Chart 7: Structure of medium-sized and large enterprises by industry



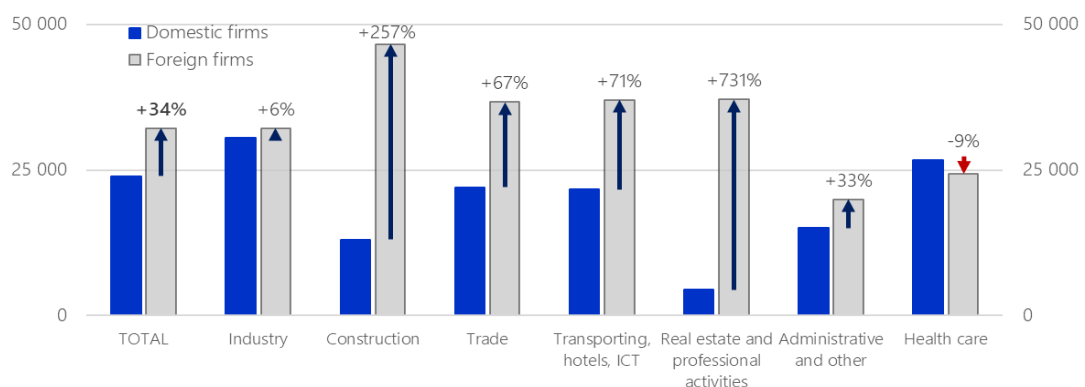
Sources: Finstat, Social Insurance Agency, IHA calculations

Chart 8: Productivity of medium-sized enterprises – the widest gap is in real estate



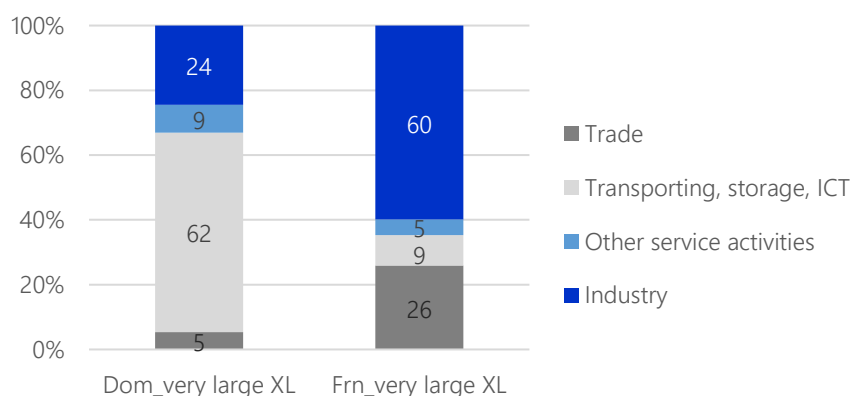
Sources: Finstat, Social Insurance Agency, IHA calculations

Chart 9: Productivity of large enterprises – dominated by foreign construction firms



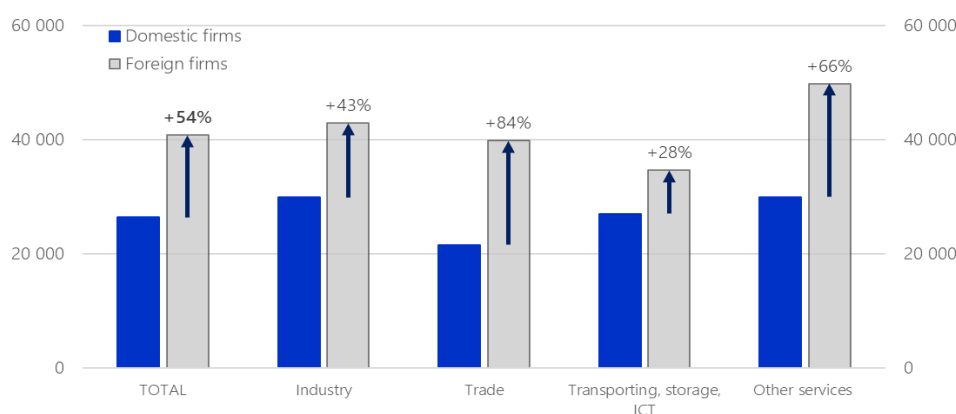
Sources: Finstat, Social Insurance Agency, IHA calculations

Chart 10: Structure of very large (XL) enterprises by industry



Sources: Finstat, Social Insurance Agency, IHA calculations

Chart 11: Productivity of very large (XL) enterprises – led by foreign retail chains



Sources: Finstat, Social Insurance Agency, IHA calculations

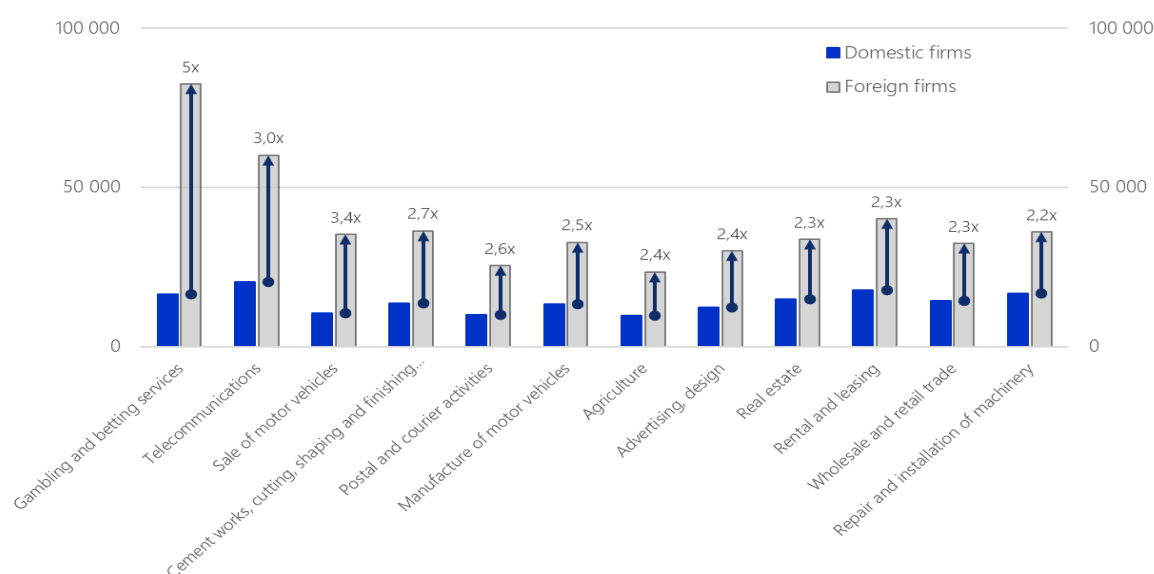
Note: "Other" covers mainly professional activities in the foreign sector and administrative services in the domestic sector.

The differences in productivity between foreign and domestic firms of the same size is due not just to their internal characteristics but also to the industries in which they operate. The largest gap (1.7-fold) is found in the small size categories (microenterprises and small enterprises), where there are the most highly productive foreign trade companies. The gap is smaller (1.3-fold and 1.4-fold respectively) for medium-sized (50 to 250 employees) and large enterprises (250 – 1,500 employees). This is due to the large numbers of manufacturing firms which have almost equal productivity in both sectors, with the domestic sector being supported by regulated entities. Very large (XL) companies have the highest euro productivity levels in their sector. Even so, the foreign firms are 1.5 times more productive than the domestic XL firms. Foreign owners are concentrated in well-capitalised export-oriented industries, large retail chains and professional activities with high productivity. Domestic XL firms mainly provide less knowledge-intensive services (transporting and storage services).

2.2. The foreign/domestic gap in various industries

Each industry has its own typical level of productivity depending on its technology, labour and capital intensity. Within these industries, domestic firms with lower productivity operate side by side with foreign firms with higher productivity. According to the D3P database, this is the case in 52 of the 60 industries studied in the Slovak economy. They generate approximately 75% of the value added for the whole economy. The gap is larger than twofold in industries making up almost 40% of the economy (see Chart 12).

Chart 12: Industries where foreign-owned firms have almost two-fold greater productivity



Sources: Finstat, Social Insurance Agency, IHA calculations
Note: Excluding refineries. Sorted by the size of the productivity gap.

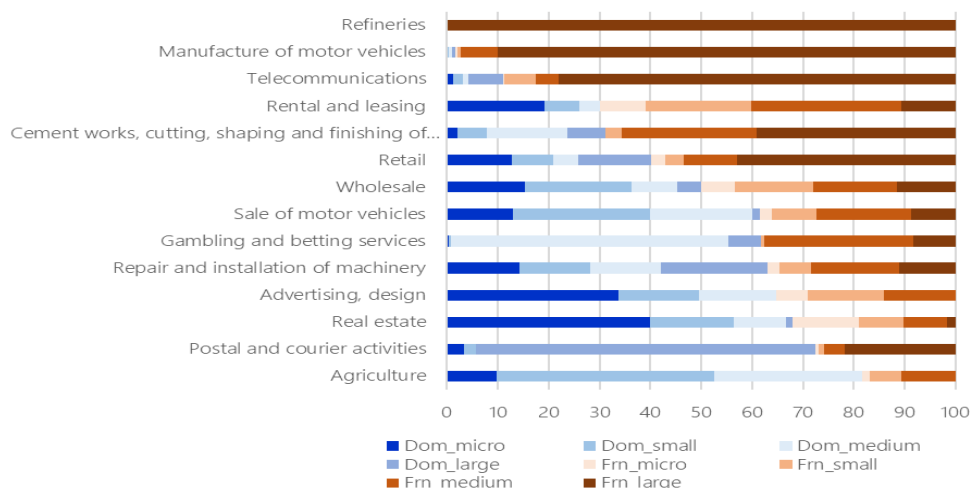
Domestic firms have higher or comparable productivity in industries making up 10% of the economy. They have higher productivity in hospitals, medical practices and logging companies, where there are very few or no foreign firms (Chart 14). Foreign and domestic firms have equal productivity in regulated activities (energy, water) and two industries with higher foreign competition (quarrying of stone and pharmaceutical production). Domestic pharmaceutical manufacturers are an example of enterprises that can be just as productive as foreign firms.

Refineries are a unique case because the monopoly in this area of activity makes any quantification of a gap pointless. Nearly the whole industry consists of one very large (XL) enterprise in foreign ownership (see Chart 13) with 42 times higher productivity than the median for business (as a whole).

In the case of the network industries, quantification of the gap is justified, despite the controlled use of infrastructure, because foreign and domestic firms operate side by side. The technical systems through which companies provide services (electricity and gas grids, telecommunications networks) are a highly significant factor for business in network industries. In the energy and water supply industries, foreign and domestic firms are almost equal. In

telecommunications and postal services, foreign firms are almost 3 times more productive than domestic ones. In postal services, the state post office has exclusivity and a two-thirds share of the market. While it is considered to be a business entity (rather than part of the public sector), it carries out low-profit, labour-intensive activities (and is one of the largest employers in Slovakia).

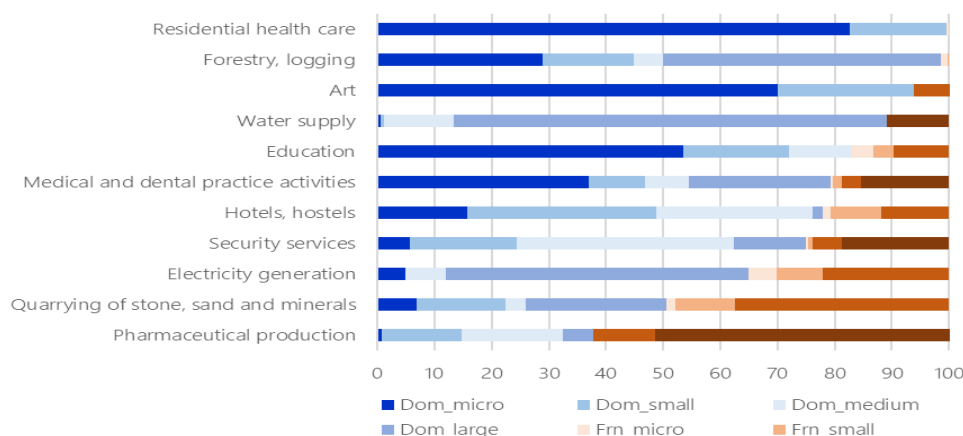
Chart 13: Structure of sectors with the largest productivity gap (value added in %)



Sources: Finstat, Social Insurance Agency, IHA calculations

Note: The "large" category includes both large and very large enterprises for better visualisation.

Chart 14: Structure of sectors with productive domestic firms (value added in %)



Sources: Finstat, Social Insurance Agency, IHA calculations

Note: The "large" category includes both large and very large enterprises for better visualisation.

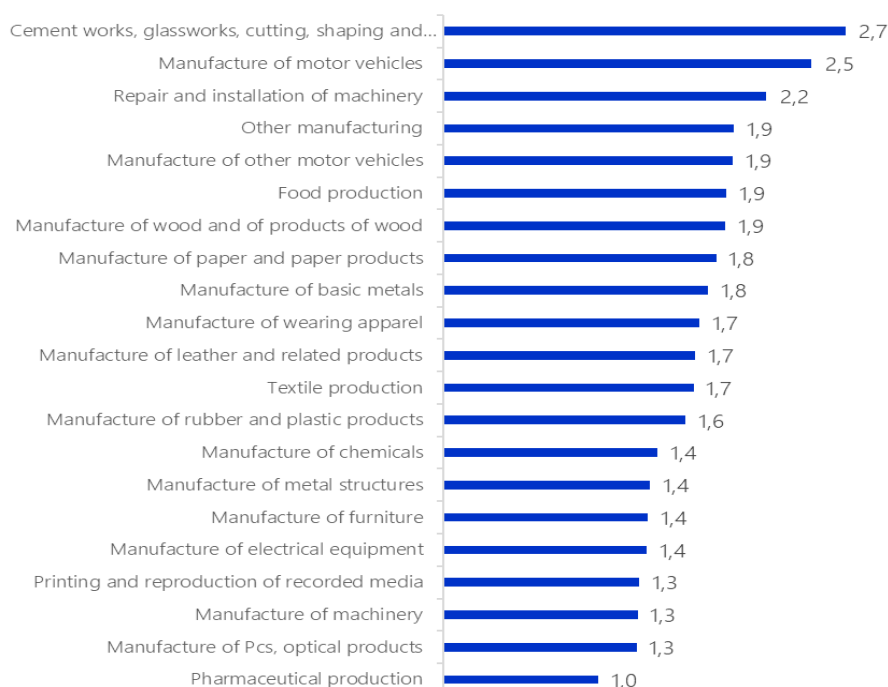
The gaps within certain industries are widened by smaller domestic low-productivity firms.

A concentration of many small enterprises has an impact in real estate, agriculture, advertising, rental and trade. There are also smaller domestic firms in gambling and betting services despite the dominant position of the state lottery company, a medium-sized company with extremely high productivity.

In manufacturing, foreign firms are 1.8 times more productive than domestic ones. The highest lead in industrial activities (leaving out refineries) is in cement works and similar production operations as well as in motor vehicle manufacturing (Chart 15). Foreign companies dominate both sectors (Chart 13). They are compared to smaller domestic companies with activities such as producing automobile fittings, stonemasonry and concreting.

Neither the share of foreign firms in an industry nor the predominant size category are sufficient to explain the intra-industry gaps. For example, in the engineering industry, nearly 80% of the sector is foreign owned, especially the large and very large firms. However, large domestic engineering firms have the same or higher productivity compared to large and very large (XL) firms with foreign ownership.

Chart 15: Ratio of the productivity of foreign and domestic firms in manufacturing



Sources: Finstat, Social Insurance Agency, IHA calculations

Note: Excluding refineries.

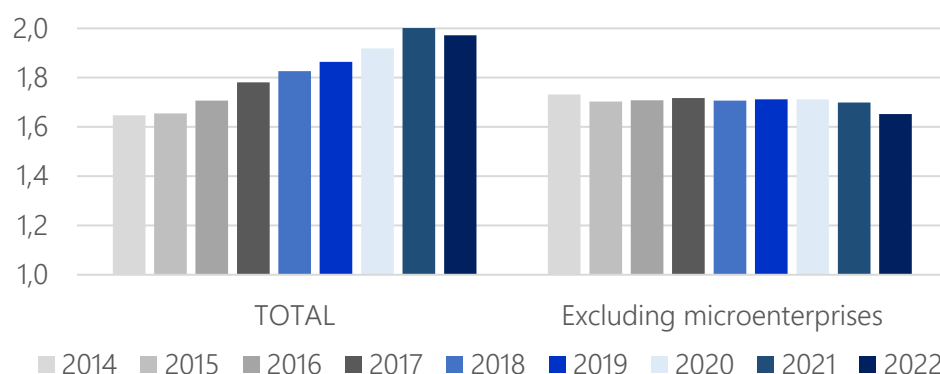
The industries with the largest gaps between foreign and domestic firms are gambling and betting services, telecommunications and trade and vehicle repair. In manufacturing, the largest gaps are in the manufacture of mineral products and motor vehicles. Domestic pharmaceutical firms are just as productive as their foreign competitors. Large domestic engineering firms are more productive than similarly sized firms with foreign ownership.

2.3. The evolution of a gap is more important than its size

The gap between foreign and domestic firms has increased since 2014, with a slight decrease to just under a 2-fold lead in 2022 (Chart 16). Microenterprises make a large contribution to this

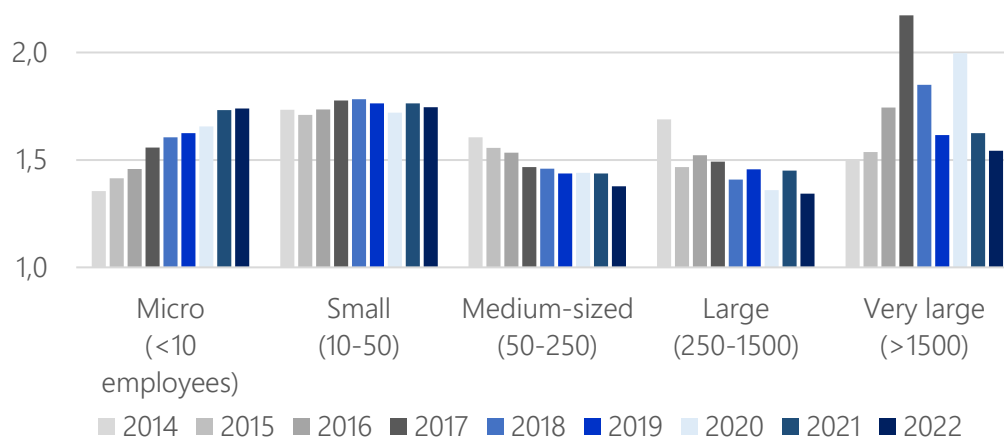
gap. If they are excluded, the gap is narrower, long oscillating around 1.7-fold with signs of a slight decrease.

Chart 16: Evolution of firm-level productivity gaps (foreign vs. domestic firms)



Sources: Finstat, Social Insurance Agency, IHA calculations

Chart 17: Evolution of gaps by enterprise size category (ratio)

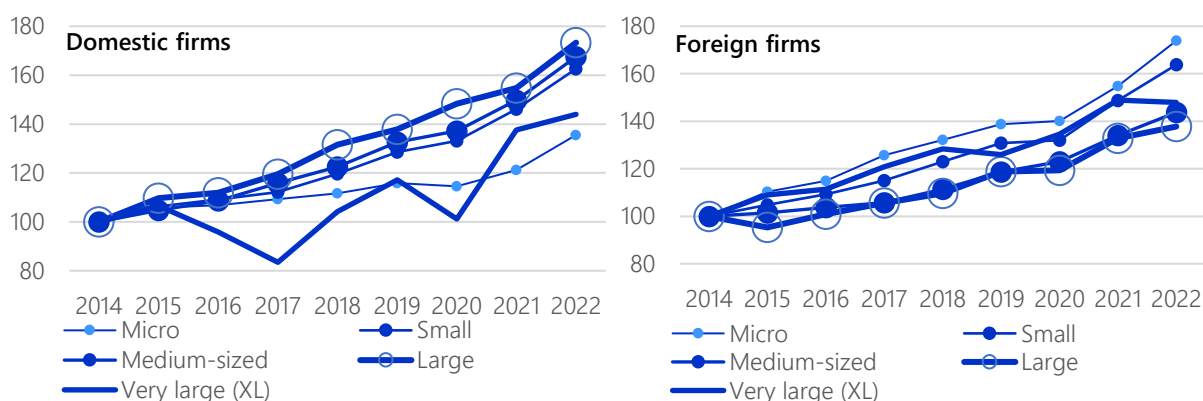


Sources: Finstat, Social Insurance Agency, IHA calculations

Note: Among XL enterprises, productivity increased in 2017 in the wholesale of electronics, in the automotive industry, refineries and telecommunications.

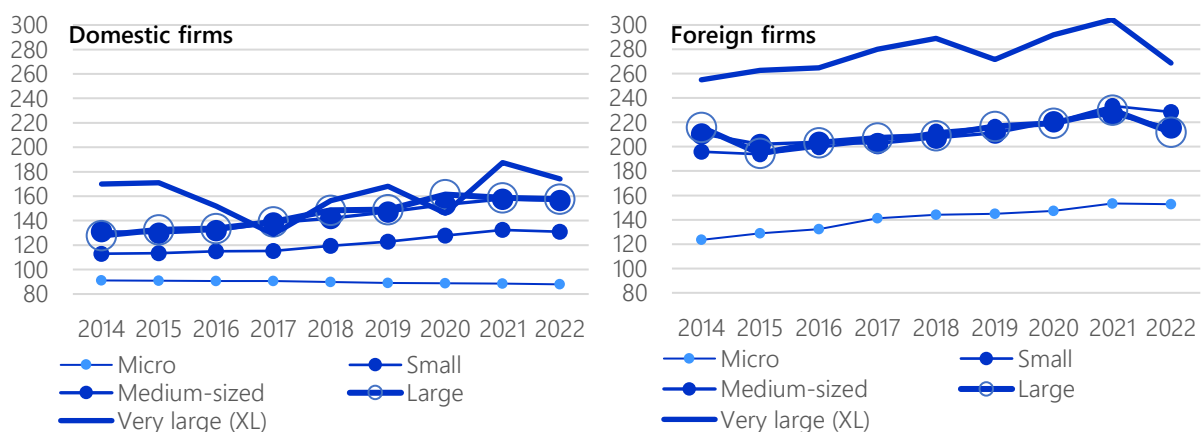
The gap narrowed in medium-sized and large enterprises. Domestic firms in these size categories are catching up with the productivity of foreign firms (Chart 17). Since 2014, medium-sized and large domestic enterprises have been the size categories with the strongest growth (Chart 18). This was driven by dynamic productivity growth in domestic firms in the regulated energy and water sectors. The identification of regulated entities as “hidden champions of productivity growth” was helped by breaking out the size category “250 to 1,500 employees” from the group “large enterprises with 250+ employees”).

Chart 18: Evolution of sectoral productivity (index 2014=100, current prices)



Sources: Finstat, Social Insurance Agency, IHA calculations

Chart 19: Sectoral productivity in relation to businesses as a whole (median business productivity = 100%, current prices)



Sources: Finstat, Social Insurance Agency, IHA calculations

The productivity of foreign enterprises (other than microenterprises) has long exceeded that of even the largest domestic companies (Chart 19). Foreign firms entered the Slovak market with higher productivity than domestic firms. This determined the initial gap. It is important to note that (excluding microenterprises) this gap has persisted at a stable level and it is not possible to reduce it. When microenterprises are taken into account, there is even significant growth.

Domestic microenterprises are the only size category where there is a continuous decline in productivity (Chart 19). At the same time, Slovakia, together with Czechia, has the largest number of microenterprises per inhabitant and their growth in the period under consideration (2014 – 2022) has been among the largest in the EU. The number of microenterprises increased the most in industries that serve domestic demand, especially household demand. There were increases in real estate services, restaurants and couriers. The number of microenterprises in the construction sector increased by more than a quarter (especially specialised services), and support for small businesses also grew by a quarter (accounting, administration for self-employed workers who

consider themselves part of the household sector). A quarter of new microenterprises were established in professional and technical activities, mostly in areas where household demand was increasing. Input-output tables show that the share of households as end-users of such services increased from 28% in 2014 to over 42%. Although market and government support for the creation of microenterprises has contributed to a rise in employment, it has channelled resources into a low-productivity sector.

2.4. Findings, hypotheses and recommendations

The conclusions of this chapter are formulated as hypotheses because the ability of descriptive studies to identify causal relationships is limited. The hypotheses are based on the following findings:

- Foreign businesses operating in Slovakia are twice as productive as domestic ones. This gap has increased since 2014 due to the low productivity of domestic microenterprises.
- The widest gaps between firms in the same size category is in microenterprises and small enterprises, where there is concentration of highly productive foreign enterprises and low-productivity domestic entrepreneurs in trade, construction and services.
- If microenterprises are excluded, the gap is narrower and relatively stable at the level of a 1.7-fold lead of foreign firms over domestic firms.
- There are signs of narrowing among medium-sized and large enterprises. The increase in productivity in the domestic sector is driven mainly by regulated companies in the energy and water sectors.
- The domestic sector outperforms foreign businesses in health care, where it has an almost exclusive position, or low-profit areas where the proportion of foreign ownership is small.
- Positive highlights include the equal levels of productivity in the pharmaceutical industry and the higher productivity of large domestic engineering firms compared to foreign ones.
- The productivity gap largely explains the wage gap whereby foreign businesses pay workers 2.2 times higher wages than domestic ones.

Our first hypothesis relates to the definition of the informal sector based on low productivity. The dominant approach to the definition of the informal sector is based on compliance with laws and regulations. Such legalistic definitions see firms as informal when they operate at the margin of the law (Perry et al., 2007 in Ulyssea, 2020). An alternative approach is to define informal firms based on their productive characteristics such as low productivity (or low employee skills). Many formally registered firms comply with the law to some extent but evade taxes by underreporting their income (Ulyssea, 2020). Understatement of revenues or overstatement of expenses artificially suppresses productivity. A part of the small-scale domestic sector in Slovakia suggests the concealment of actual productivity, especially considering the empirical observation that as enterprise size increases, the proportion of informal firms decreases (Ulyssea, 2020). Empirical research shows that informal firms in various countries and various datasets are, on average, smaller (in terms of headcount and turnover) because as company size increases, operating costs also increase and there is less benefit from informal activities. Formal and informal firms coexist in the same industries and may produce similar products (Ulyssea, 2020). From this follows the recommendation to use existing tools vigorously to detect informal economic activity.

Based on the structure of their economic activities, it is reasonable to conclude that foreign firms cherry-pick areas with higher productivity and leave the less productive (less profitable) activities to domestic firms. Both the smallest and largest foreign firms are concentrated in trade, the smaller in foreign trade and the larger in internal trade. Four large chains serve 40% of the food-dominated retail market, which is one of the highest concentrations in Europe, while achieving the highest productivity in the market (IHA, 2024). Productivity gaps between foreign and domestic firms within an industry may be due to differences in their market power. They may exercise such power when purchasing inputs and selling outputs. The resulting additional profits could contribute to the productivity gap. Compliance with competition rules should be closely monitored. Future research should focus on an econometric estimate of the productivity gap with control of relevant variables and determining how much of it is due to the concentration of foreign investment in more productive activities.

Participation in global value chains has its largest impact on productivity growth in capital-intensive, technology-intensive, and general trading enterprises, whereas the effect is unclear in labour-intensive enterprises. Intensity of research and development can strengthen the effect of GVC on productivity in foreign-owned enterprises, while government subsidy intensity can have the same effect for domestic enterprises (Ge et al., 2018). According to ME SR data, most state investment aid was dedicated to foreign owners, more than half of which subsidised fixed assets and 44% of which took the form of tax relief. Firms originating in Slovakia (including joint Slovak-foreign-owned firms) have received just under a tenth (7%) of state aid since 2014. The foreign-controlled firms are technological leaders. The majority of innovation, the digital transition and R&D are concentrated in sectors under foreign control (IHA, 2023). Domestic enterprises need stronger state support for innovation-oriented activities, the upgrading of technology in relation to smart specialisation and the integration of FDI into local innovation systems (Radosevic and Ciampi Stancova, 2018). In this regard, the provision of state aid should be made conditional on building supplier relationships with domestic entities.

Innovative and technology-intensive companies can be motors of productivity and growth so it is important to help firms implement new technologies, go digital and develop talent. Many emerging economies have a large proportion of small, informal companies that find it difficult to increase productivity (Mischke et al., 2024). This group is particularly large in Slovakia. The reallocation of human capital to enterprises with higher productivity is one of the desirable ways to raise aggregate productivity, incomes and living standards without an influx of labour to the market, which is a considerably depleted source of growth, especially considering the ageing population. Our recommendation is to monitor changes in the number of low-productivity microenterprises, to refocus state aid on employment in established enterprises rather than self-employment and to motivate the transfer of working capital to more productive activities.

Productivity in Slovakia's regulated sector may be increasing at the expense of the productivity of the rest of the business sector. Energy prices for business are among the highest in the region (IHA, 2024). It would be useful to make a full review of this phenomenon from the cause of the high prices to changes that may be useful.

3. The vertical gap (dispersion) between the most and least productive enterprises

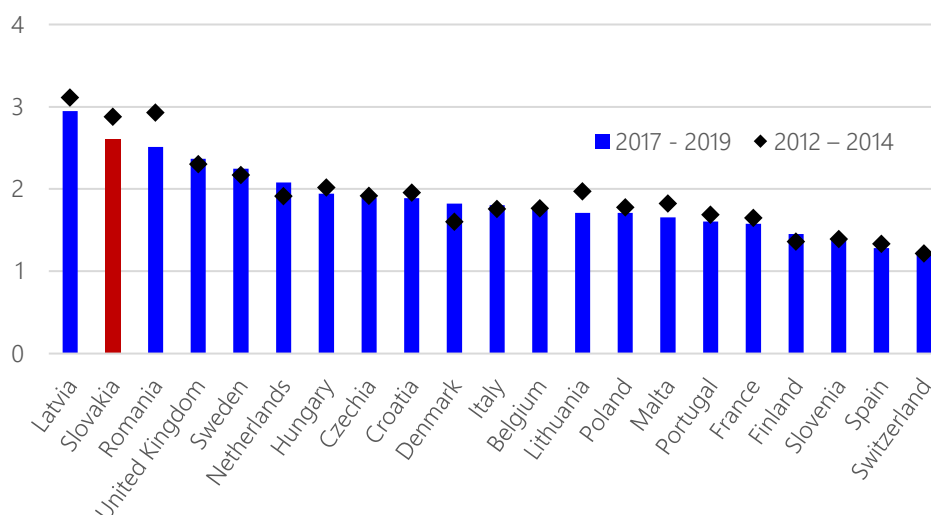
This chapter quantifies the productivity ratio between the top 10% and the bottom 10% of firms (the 90/10 ratio³) ranked by productivity (real value added per person employed). In the present material, this ratio is referred to as dispersion and is used to describe the state of the most productive enterprises compared to those lagging behind. The term aggregate productivity refers to the productivity of the business sector including manufacturing, construction, trade and other market services (excluding energy, mining and quarrying, agriculture, finance and the public sector).

3.1. Aggregate and industry-level dispersion

Slovakia is one of the European countries (from a sample of 21 countries) with the highest dispersion of productivity in the business sector (Chart 20). Before the COVID-19 pandemic, the top 10% most productive firms were 14 times more productive than the bottom 10% (Table 1). In Hungary and Czechia, the difference was 7-fold, and the median difference was 6-fold.

As many as ¾ of Slovak firms have below-average productivity. The concentration of so many firms at the low-productivity end of the scale increases the economy's vulnerability to shocks, which is a particularly significant risk in a small open economy. Firms with low productivity do not have sufficient reserves to get through the shock, which creates the risk that burdens will be transferred to consumers or the state, especially where there are inflexible conditions for companies to leave the market.

Chart 20: Productivity dispersion in European countries (log, 3-year average)



Sources: CompNet, 9th edition (Unconditional_country_20e_weighted), IHA calculations

³ The 90/10 ratio is used as one of the most common measures used when investigating distributions. Despite leaving out the 80% of firms in the middle, it captures firms that create around 50% of the value added in the Slovak business sector.

Note: a 3-year average was used to avoid the risk of distortion by a single year.

A company with median productivity would not have even half the mean productivity (Table 1). This means that half of the firms in the market had productivity below 47% of the mean (average) productivity while the other half had higher productivity. Although the manufacturing is the area where dispersion is mentioned most often, it is far from the only industry affected. Dispersion is even higher in trade. The productivity of the top-performing decile of trade firms was nearly 17-fold higher than the bottom decile during the period under consideration.

Table 1: Intra-industry productivity dispersion in Slovakia (average 2017 to 2019)

| Industry (share of total gross value added) | 90/10 ratio (median) | Median/Average |
|--|----------------------|----------------|
| BUSINESS SECTOR, AGGREGATE | 13.7 | 47%* |
| Manufacturing (21%) | 8.3 | 62% |
| Construction (8%) | 5.8 | 81% |
| Trade (11%) | 16.8 | 60% |
| Transporting and storage (6%) | 4.0 | 80% |
| Accommodation and food services (1.6%) | 4.9 | 87% |
| Information and communication (5%) | 4.9 | 83% |
| Real estate activities (10%) | 6.7 | 63% |
| Professional, scientific and technical activities (7%) | 6.8 | 67% |
| Administrative and support service activities (3%) | 6.2 | 53% |

Sources: CompNet, 9th edition (Unconditional_industry2d_20e_weighted), SO SR, IHA calculations
Note: In addition to the listed areas of activity, gross value added also includes contributions from the public sector, agriculture, mining and energy.

* The result for the sector as a whole (47%) is lower than the results of individual areas of activity because the difference in productivity between sectors is larger than the differences in firm-level productivity within each area.

Table 2: Intra-sectoral productivity dispersion in Slovakia (average 2017 to 2019)

| Sector (share of total gross value added) | 90/10 Ratio (median) | Median/Average |
|---|----------------------|----------------|
| BUSINESS SECTOR, AGGREGATE | 13.7 | 47% |
| Industry: highest tech. intensity (1%) | 11.8 | 70% |
| Industry: medium tech. intensity (8%) | 6.4 | 66% |
| Industry: medium-low tech. intensity (8%) | 5.1 | 71% |
| Industry: low tech. intensity (4%) | 5.7 | 69% |
| Services: high knowledge intensity (12%) | 9.0 | 69% |
| Services: low knowledge intensity (32%) | 22.4 | 40% |

Sources: CompNet, 9th edition (Unconditional_industry2d_20e_weighted), SO SR, IHA calculations
Note: In addition to the listed sectors, gross value added also includes contributions from the public sector, agriculture, construction, mining and energy.

In terms of technological intensity, the largest dispersion is in the low-knowledge-intensity service sector, which includes both high-performing trade enterprises and low-productivity hostels. The most productive firms have 22 times higher productivity (Table 2) compared to firms at the other end of the scale (the median country has a 7-fold gap). In industries with medium technological intensity (automotive, engineering, electrical equipment and chemical products), half the firms achieve no more than two-thirds of mean productivity. The mean is pulled higher by a few outlying firms.

In the high-tech sector, Slovakia has few observations (around 50 firms in electronics and pharmaceuticals). With this caveat, local high-tech firms in the highest decile rank with French, Swiss and Swedish firms among the most productive high-tech companies in Europe.

The most productive local⁴ firms rank with the most productive even on the European scale. The least productive are among the weakest. The areas of activity⁵ with the highest productivity in Europe are telecommunications, water transport and air transport in Belgium, France and Denmark, pharmaceutical production in Switzerland and France and wholesale in Sweden, Latvia and also Slovakia. At the other end of the scale, the lowest productivity is found in Romanian, Hungarian, Baltic, Czech and Slovak firms producing clothing and leather products, providing food, accommodation or professional services or operating in construction. In Slovakia, such laggard firms operate side by side with extremely productive trade companies. This accounts for much of the large aggregate dispersion (based on the CompNet database), which reflects the characteristics of a small, open, converging economy. The most productive firms include many exporters and importers of goods for intermediate consumption and import-intensive consumption or investment demand. Low-productivity firms mainly supply domestic demand, which is constrained by relatively low income levels.

3.2. The industries with the highest dispersion

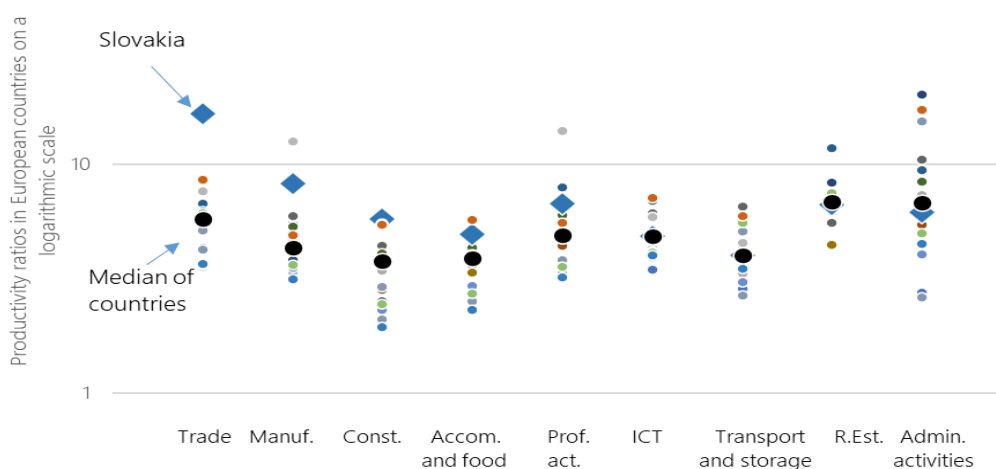
The industries with the largest inequalities in Europe are trade, manufacturing and construction (Chart 21). This is the outcome of a comparison of these industries by country (industries are not compared directly due to their specific nature of their activities with different needs for labour and capital). The three industries with the largest dispersion generate 40% of value added in the Slovak economy outside crisis periods. Productivity dispersion in accommodation, food services and professional activities is slightly above the median for countries. Other services are close to the median for European countries.

If firms with extremely high productivity operate alongside low-productivity firms in the same area, it is worth asking how this situation arose. The main causes are institutional barriers, the situation in the labour market, low levels of entrepreneurship in the population and weak technology transfer which holds back the transfer of productive resources to more productive firms and slows the dynamics of firms (IHA, 2023). The presence of heterogeneous entities in the same industry indicates differences in resource efficiency and performance management at the firm level and a distortion of the market environment. The main drivers of productivity in catching up are digital transition and automation in lagging enterprises, improving the educational system, aligning it with the needs of companies and setting appropriate incentives in the business environment (IHA, 2023).

⁴ Firms located in Slovakia regardless of whether they have domestic or other majority ownership.

⁵ group at NACE 2-digit level, average for the period 2017 to 2019.

Chart 21: Intra-industry dispersion in European countries (average 2017 to 2019)



Sources: CompNet, 9th edition (Unconditional_industry2d_20e_weighted), IHA calculations⁶

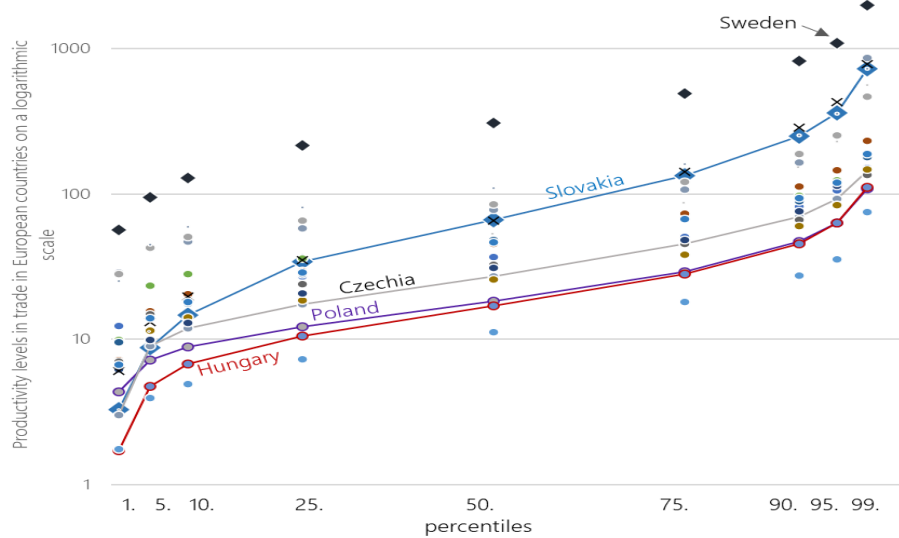
The industry with the largest dispersion is trade (Wholesale and retail trade; trade and repair of motor vehicles). The bottom 1% of the least productive trade firms (with 20 or more employees) are some of the weakest in Europe (Chart 22). The bottom 10% of trade firms have productivity slightly above the level of the other V4 countries. The more productive firms have productivity far above not just them but also other European countries. The top 25% trade firms (not just the 10% previously referred to) are among the most productive in Europe (along with Latvia and Sweden).

The top 10% most productive companies in Slovakia stand out from other countries through their high level of productivity and their low pay relative to productivity (Chart 23). This is the result of the distribution of value added between workers and the owner. Workers receive a relatively small share of the value added (wages) and the rest (profits, depreciation) is retained by the company. The key to the high productivity of the top trade firms is their ability to generate profit from the sale of purchased goods with good capitalisation and low labour intensity. Wholesale is supported by companies specialising in the import and export of goods in large volumes.

Slovak retail stands out in the database of European companies due to its concentration and a higher proportion of older companies. The older market may indicate a lack of creative destruction or weakness in the start-up of new companies. Long-lasting customer-supplier relationships and adherence to business management principles may not always meet the needs of an efficient and competitive market. The local retail industry is one of the most concentrated in Europe (concentration of turnover and value added measured by the Herfindahl-Hirschman index, Chart 24). Although the level of concentration does not appear to be a significant explanatory variable for the variance in productivity in European countries, higher concentration is associated with productivity growth (CompNet, 2023).

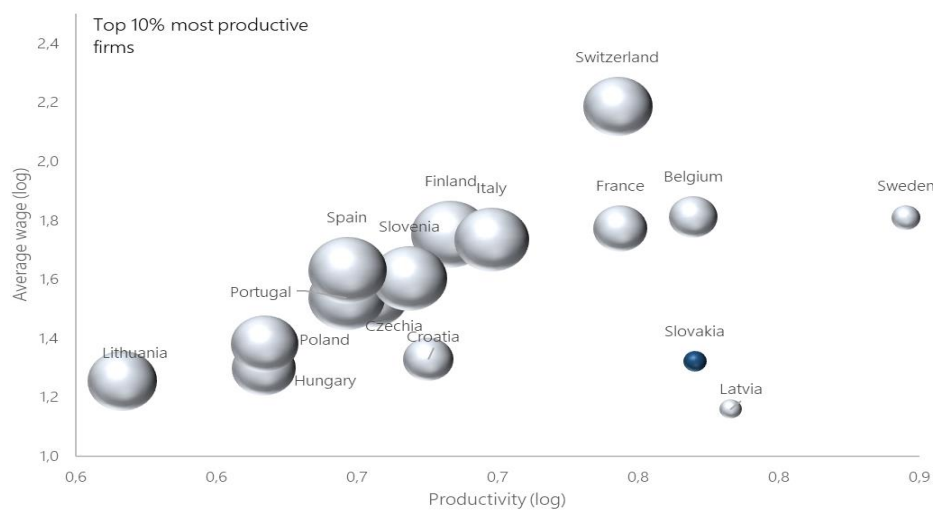
⁶ Selected charts in the material use a logarithmic scale for indicators (y-axis) for better visualisation of the full range of values.

Chart 22: Trade productivity from least to most productive firms (2019)



Sources: CompNet, 9th edition (Joint Distributions), IHA calculations

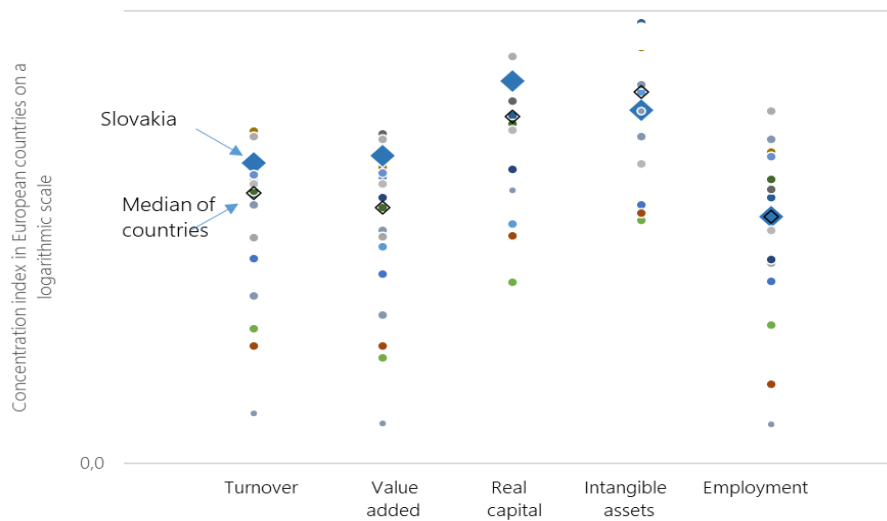
Chart 23: The most productive trade firms pay relatively low wages (2019)



Sources: CompNet, 9th edition (Joint Distributions), IHA calculations
Note: Bubble size represents the labour share of value added.

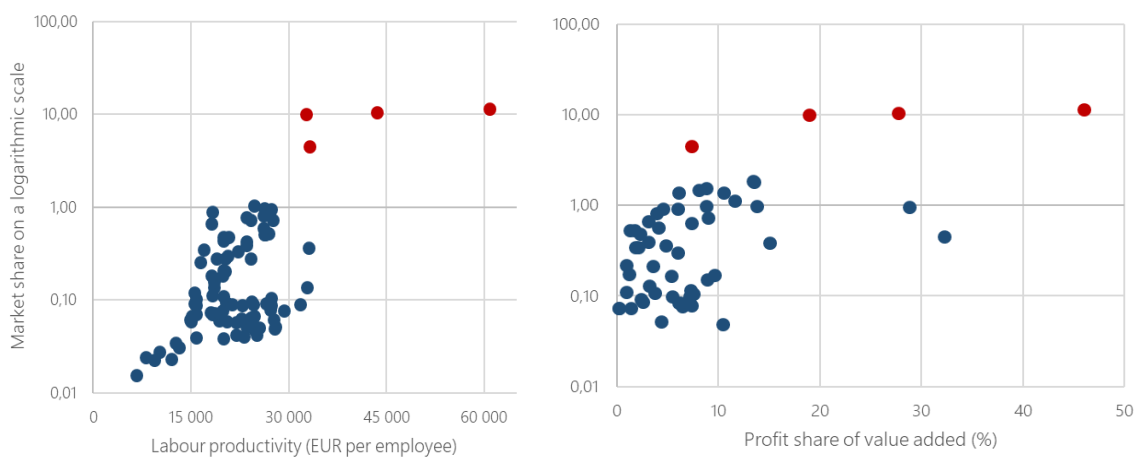
The four largest chains in Slovakia are among the most productive retail stores with food, beverages or tobacco predominating. Larger firms retain more value added from revenues after the deduction of intermediation consumption than other retailers. They stand out from the rest of the market by their ability to generate profit and thus support the creation of value added (Chart 25). The result is a significantly greater concentration of value added than turnover in retail. The intangible assets that large firms accumulate also play a role here (Vladová, 2024).

Chart 24: Retail concentration in European countries (HHI, average 2017 to 2019)



Sources: CompNet, 9th edition (Unconditional_industry2d_20e_weighted), IHA calculations.

Chart 25: Market share, productivity and profit of retail stores with food, beverages or tobacco predominating in Slovakia (2022)

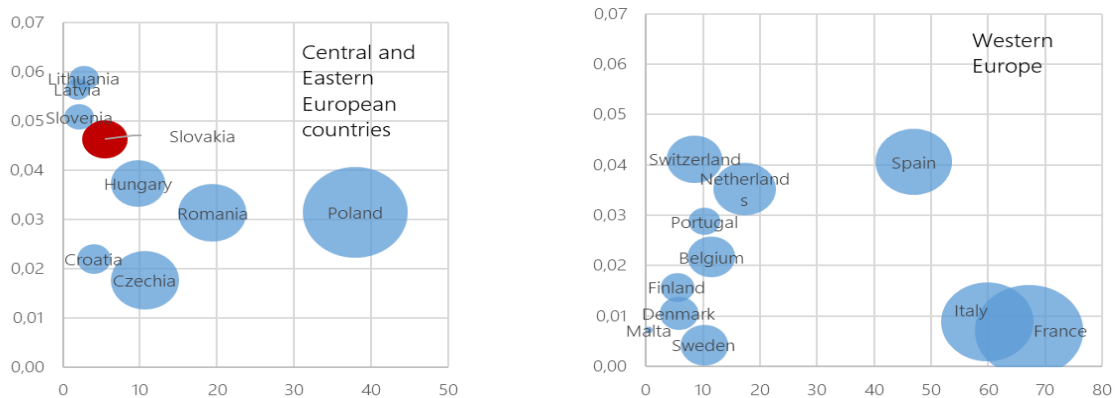


Sources: Finstat, Social Insurance Agency, IHA calculations.

Note: Enterprises with NACE code 471. The red dots represent the top four Slovak retail chains.

The degree of concentration in retail need not be automatically related to market size although there is a correlation in Central and Eastern European countries: the smaller the market, the more concentrated it is (Chart 26). This relationship has not been confirmed in the countries of Western Europe. The relationship between concentration in retail and market size is variable, depending also on non-economic factors (consumer and cultural habits) and regional specificities.

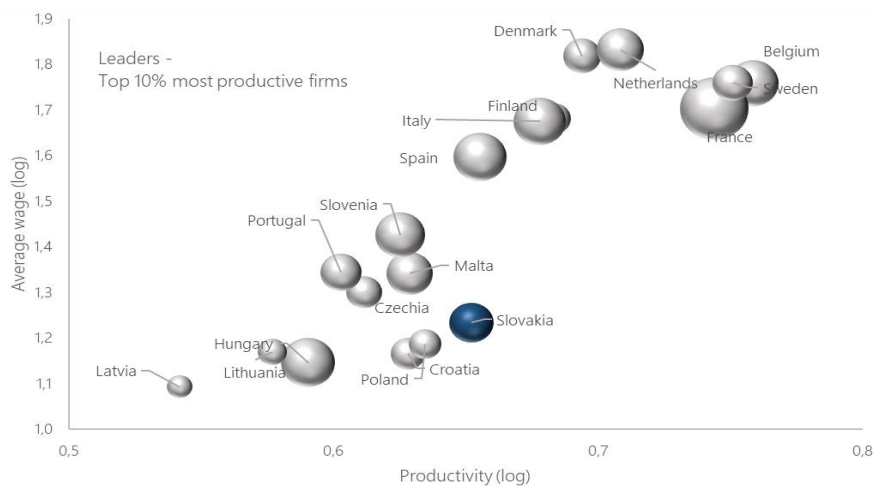
Chart 26: Degree of concentration of value added in retail vs. market size (2019)



Sources: CompNet, 9th edition (Unconditional_industry2d_20e_weighted), Eurostat, IHA calculations.
Note: Bubble size is determined by the volume of GDP (the retail industry serves not only households but also other entities and therefore the volume of GDP is another indicator of market size).

Slovakia (like Latvia and Hungary) has sizeable dispersion in the manufacturing industry where there are multinational companies interconnected within global value chains. The most productive manufacturing firms have long maintained an 8-fold productivity lead over laggard firms. The lead is 6-fold in Latvia and Hungary and 4-fold in the median country.

Chart 27: Productivity and wage in the most productive manufacturing companies (2017 to 2019)

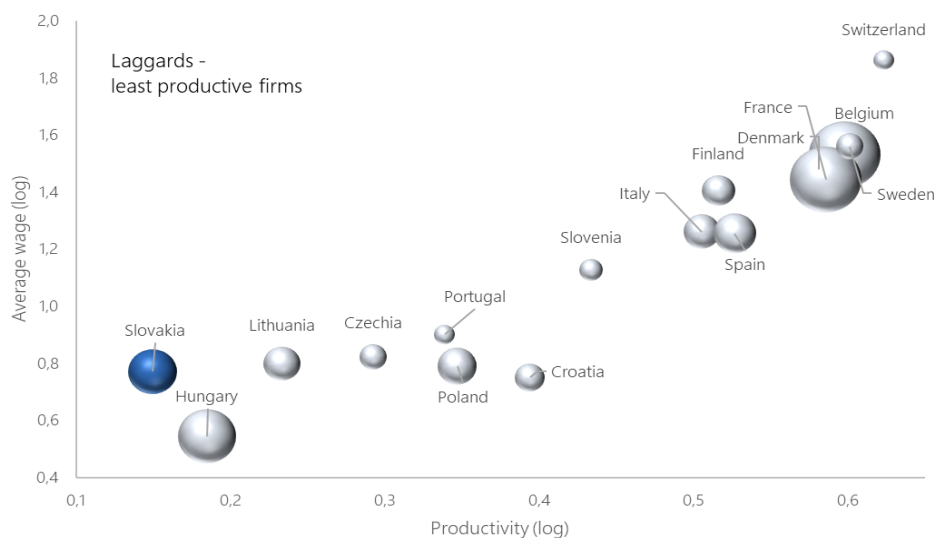


Sources: CompNet, 9th edition (Joint Distributions), IHA calculations.
Note: Bubble size represents capital intensity (capital per worker).

Despite the substantial productivity gap in manufacturing, there is a tendency toward equal pay in this industry. The high productivity of the top manufacturing companies creates space for higher pay, but they mainly seek to maintain cost competitiveness while retaining less skill-intensive jobs (and pay levels). In terms of capital intensity, Slovak manufacturing ranks with the better capitalised countries.

The dispersion in construction is largest in Slovakia and Hungary. The sources of dispersion in this industry differ from those in trade and manufacturing, where the most productive firms create the dispersion. Slovak construction firms are among the least productive in Europe across all deciles. In fact, the bottom decile has the lowest productivity of all the studied European countries. Wages are at a level comparable to most countries in Central and Eastern Europe (Chart 28). This may be related to wage equalisation in the single European market resulting from the free movement of workers.

Chart 28: Productivity and wage in the least productive construction firms (2017 to 2019)



Sources: CompNet, 9th edition (Joint Distributions), IHA calculations
Note: Bubble size represents capital intensity (capital per worker).

The whole construction sector shows low productivity, probably also due to fragmentation and the (related) shortcomings in automation and the digital transition. The largest enterprises account separately for 5%, the four largest firms together for 14% of value added in the industry (SK NACE 41,42,43, only medium-sized and large enterprises).

3.3. Evolution of aggregate dispersion

Over the long term, aggregate dispersion has a declining trend (Chart 29). In recent years, the productivity of the weakest firms has increased but a less welcome change is a loss of productivity growth in top firms (Chart 30) faced with insufficient talent and innovation. The low productivity firms were unable to compensate for the stagnation of the leading firms. This may explain the slowdown in aggregate productivity.

Highly productive factories and traders are connected to GVCs through trade flows and the productivity growth of their business partners has an immediate impact on them (di Mauro and Matani, 2023). As the cited article warns, it is vital to strengthen the resilience and robustness of GVCs operating within Europe to withstand global shocks and not pass on impacts to connected countries, as these are major firms that would immediately disrupt a small economy like Slovakia.

Chart 29: Evolution of productivity dispersion in the business sector

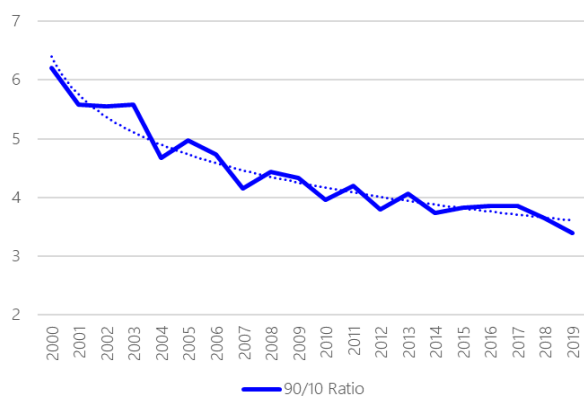
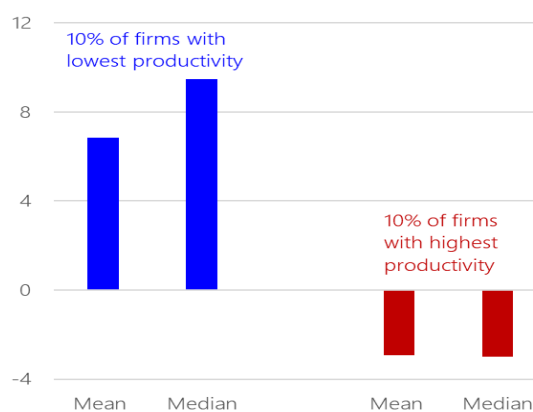


Chart 30: Productivity in the top and bottom deciles (change from 2014 to 2019 in %)



Sources: CompNet, 9th edition (JD_lab_prod_reduced), IHA calculations.
Note: the dotted line on the chart 21 indicates the trend

3.4. Findings and recommendations

The dispersion of productivity between the best-performing and worst-performing Slovak firms is large, but it has a declining trend over the long term. Dispersion has been mitigated in recent years mainly by faster productivity in less productive enterprises.

The dispersion at the aggregate level reflects the characteristics of a small, open, converging economy. At the industry level, there are problems that need to be analysed in more depth. Wages remain relatively equal across the economy and highly productive firms pay relatively low wages.

The causes of dispersion are industry specific. In wholesale, high productivity is associated with large-scale import-export activities that bring economies of scale. Manufacturing is still in need of a stronger spillover of factors supporting productivity from multinational corporations to domestic firms, which need greater integration into global value chains (OECD, 2023). While many see the intensity of the diffusion of know-how and technology between enterprises as the source of differences between top firms and laggards (e.g. Berlingieri et al., 2020), such diffusion is hampered in Slovakia by the limited integration of domestic suppliers into industrial and commercial chains.

Concentration is associated with higher productivity, especially in domestic trade. There should be continuous monitoring of changes in concentration but also in the bargaining power of firms in the markets for labour, intermediate consumption and capital. Likewise, it is necessary to evaluate the potential welfare losses in product markets and measure whether excessive market power is causing prices to rise. Measures to protect competition and prevent excess market power can sometimes conflict with the goal of raising productivity so competition protection policy should also consider its effect on productivity growth (CompNet, 2023).

List of Acronyms and Abbreviations

D3P – IHA database of firm-level labour productivity (the acronym D3P comes from the Slovak name *databáza podnikovej produktivity práce*)

EC – European Commission

EIB – European Investment Bank

GVC – global value chain

HHI – Herfindahl-Hirschman index

High-tech – industries with high levels of technology and knowledge-based services

IHA – Institute of Economic Analysis (in Slovak, *Inštitút hospodárskych analýz*) at the Ministry of Economy of the Slovak Republic

ICT – Information and communication technologies

OECD – Organisation for Economic Co-operation and Development

SO SR – Statistical Office of the Slovak Republic

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Appendix: Methodological notes on the D3P database

The quantitative analysis is based on the newly created database of firm-level labour productivity (known as D3P based on the Slovak name *databáza podnikovej produktivity práce*) in firms filing financial statements and reporting paid labour of any type (a full- or part-time employee, an agreement on work outside employment). The database includes enterprises reporting a non-zero number of hours worked to the Social Insurance Agency. Jobs were recorded as full-time equivalents. This was matched with the financial statements. D3P covers 53% of Slovak employment and 50% of total value added as estimated by the SO SR.

Firms are classified as domestic if they have majority domestic ownership and as foreign if they have majority foreign or international ownership. A firm is also classified as a foreign firm if it has a domestic owner but is registered abroad. If foreign registration was chosen to obtain better business conditions than those provided by the home country, it is reasonable to classify them as a foreign firm and interpret the choice as an effort to optimise business performance and improve productivity.

The D3P includes business enterprises outside the financial sector (where foreign ownership predominates) and also includes public sector corporations that report value added from revenues (Slovenská pošta, Železnice SR, Železničná spoločnosť Slovensko etc.). The financial sector performs specific functions guaranteeing the flow of money, which is an essential service for the business environment. Financial institutions have their own regulatory framework and are exposed to different risks so their operations are not so easily comparable. For such reasons, it is usual to exclude the financial sector from a standard analysis of the business environment.

The D3P database excludes natural persons who are not obliged to submit or who have not submitted financial statements, as well as entities that do not report value added (mostly start-ups, enterprises in difficulty with debts for taxes or contributions). The database also excludes one-person limited liability companies if they do not record any employees, because even if they create value added, they may substitute for an employment relationship. A sign of this would be average monthly income approximately equal to the average salary left for the company director after the deduction of intermediate consumption from revenues. Out of the volume of unclassified value added from one-person limited liability companies, nearly half came from real estate agencies without employees and another 12% came from builders and wholesalers.

In the material, productivity is defined as nominal value added from the financial statements per full-time equivalent employee. The value added is the difference between a firm's turnover and its expenses for consumed material, energy and services and the purchase of goods sold. A firm pays wages and other personnel costs and other operating and financial costs from value added. If a firm does not have proceeds from assets sold or other income (e.g. Interest), its profit is the remainder of the value added.

The productivity gap between domestic and foreign sectors is quantified by industry (60 divisions of SK NACE Rev. 2) **and size of enterprise** (5 categories). The criterion for assignment of a firm to a size category is the number of full-time equivalent employees (x): microenterprises: $0 < x < 10$, small enterprises: $10 \leq x < 50$, medium-sized enterprises: $50 \leq x < 250$, large enterprises: $250 \leq x < 1500$, very large (XL) enterprises: $x > 1500$.