

Short economic and financial analyses

Immediate macroeconomic importance of the pharmaceutical sector

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November 2025

Collection: Short economic and financial analyses

Title: Immediate macroeconomic importance of the pharmaceutical sector

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Issue: November 2025

Place of issue: Ljubljana

Issued by:
Banka Slovenije
Slovenska 35, 1505 Ljubljana, Slovenia
www.bsi.si

Electronic edition:

<https://www.bsi.si/en/publications/research-publications>

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Kataložni zapis o publikaciji (CIP) pripravili v Narodni in univerzitetni knjižnici v Ljubljani

COBISS.SI-ID 258436355

ISBN 978-961-7230-30-7 (PDF)

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Introduction¹

The pharmaceutical sector is one of the main pillars of manufacturing in Slovenia. Its value-added in 2024 was up 134.3% in real terms on 2008 at close to EUR 1.8 billion. Without its direct contribution, the increase in value-added in manufacturing over this period would be 10.1 percentage points lower at 27.7%, while the increase in GDP would be 1.9 percentage points lower at 22.1%. The pharmaceutical sector accounted for 14.0% of aggregate nominal value-added in manufacturing in 2024, the largest of any sector, and 2.7% of GDP. Its contribution to the increase in aggregate employment was also positive. It accounted for 6.2% of employment in manufacturing in 2024, up 3.6 percentage points on 2008, and for 1.2% of employment in the total economy, up 0.7 percentage points.

The pharmaceutical sector has remained in good shape even after 2021, when manufacturing in general saw a sharp deterioration in its business conditions as a result of the energy crisis and geopolitical tensions. This is attributable to the low elasticity of demand for its products, its exemption from EU sanctions against Russia, and the low energy-intensity of pharmaceutical manufacturing. Value-added in manufacturing increased by 3.0% between 2021 and 2024 but would have declined by 0.5% without the direct contribution of the pharmaceutical sector. The corresponding increase in GDP of 6.4% would also have been 0.6 percentage points lower without it. The effects on employment were also positive over the aforementioned observation period. These trends are continuing this year according to the monthly data.

Based on the differences between nominal and real value-added, it could be concluded that the pharmaceutical sector is largely building its success on an increase in output, and not a rise in prices. Between 2008 and 2024 its nominal value-added increased by 133.1%, 1.2 percentage points less than the increase in real value-added, while the nominal increase in aggregate value-added in manufacturing outpaced the real increase by 42.4 percentage points.

These developments in value-added in the pharmaceutical industry might be related to the geographical focus of its exports, and to changes in the values of certain currencies, most notably the Russian rouble. Another potential factor is the prevalence of the manufacture of generics, where the market is characterised by fierce competition and relatively low margins. The rise in prices of chemicals and chemical products, which are an input cost for pharmaceutical manufacturing, has also been relatively large, particularly in recent years. The ratio of nominal value-added in the pharmaceutical sector to GDP therefore does not necessarily reflect its overall direct impact on the economy over the longer term. The ratio of real value-added to GDP is significantly higher.

Demand for labour was stable and above-average between 2008 and 2024, although the share of aggregate employment accounted for by the pharmaceutical sector nevertheless remained relatively low. The average level of qualifications of the workforce in the pharmaceutical sector is significantly higher than in the total economy: almost half of the workforce holds a tertiary qualification. The average gross wage in the sector

¹ The analysis uses data available by 1 October 2025. This paper examines the pharmaceutical sector's direct impact on certain basic macroeconomic aggregates. An assessment of its indirect effects on suppliers, customers and the government's fiscal position lies outside the boundaries of this analysis. We would like to thank Milan Damjanović, Ana Selan and Gašper Ploj for reading over our work, and for their comments.

is consequently higher than the overall average, although its growth over the observation period was slower. This data is indicative of sustained demand for highly skilled labour, and the high value-added in the pharmaceutical sector.

Real labour productivity in the pharmaceutical sector as measured by national accounts data is notably high but is not growing. Value-added per employee stood at EUR 128,999 in 2024, fully 161.9% higher than the average in manufacturing, and 199.3% higher than the average in the total economy. The figure for 2024 was actually down 0.5% on 2008, amid major fluctuations. Real labour productivity was up 42.9% over the same period in manufacturing overall, and up 15.9% in the total economy.

The pharmaceutical sector's importance to the economy in Slovenia is one of the highest in the EU. Based on the data available for 22 Member States in 2022, Slovenia was ranked fourth and second respectively in terms of the pharmaceutical sector's share of aggregate nominal value-added in manufacturing and of GDP, while it ranked fourth and first respectively in terms of the sector's share of employment in manufacturing and in the total economy. The ratio of nominal value-added to GDP stood at 2.5% in 2022, 1.7 percentage points higher than the weighted average of the 22 Member States, while the pharmaceutical sector's share of aggregate employment was 0.9 percentage points higher at 1.1%.

Impact of pharmaceutical sector's value-added on economic activity

Activity in the pharmaceutical sector is still increasing, even though the conditions facing manufacturing have worsened significantly since 2021.

Real value-added in the pharmaceutical sector² is growing at a significantly faster pace than in manufacturing overall when viewed over the longer term. It reached EUR 1,765 million in 2024, up 134.3% on 2008, i.e. before the peak of the global economic recession a year later, and up 47.1% on 2019, i.e. before the pandemic. Growth in aggregate value-added in manufacturing stood at 37.8% and 11.5% respectively over the same periods and would have been 10.1 percentage points and 4.9 percentage points lower respectively without the pharmaceutical sector's contribution. The increase in GDP over the same periods would be 1.9 percentage points and 0.9 percentage points lower respectively at 22.1% and 10.3% (see Figures 1 and 2).³

Between 2022 and 2024, years which were marked by the energy crisis and a sharp deterioration in geopolitical relations, value-added in the pharmaceutical sector increased by 26.4% in real terms. This reflects the inelasticity of demand for its products, and also the exemption of pharmaceutical products from the EU sanctions against Russia. The pharmaceutical sector also has one of the lowest energy intensities (as measured by the ratio of energy consumption to value-added) in manufacturing.⁴ Real value-added in the rest of the manufacturing sector declined by 0.5% between 2021 and 2024, while the increase in GDP would have been 0.6 percentage points lower without the pharmaceutical sector's direct contribution at 6.4% (see Figures 1 and 2).

The gap between output in the pharmaceutical sector and in manufacturing overall has remained even after 2024. Output in high technology manufacturing, which is dominated by the pharmaceutical sector, over the 12 months to July of this year was up 1.7% in year-on-year terms, compared with a decline of 1.1% in manufacturing overall.⁵

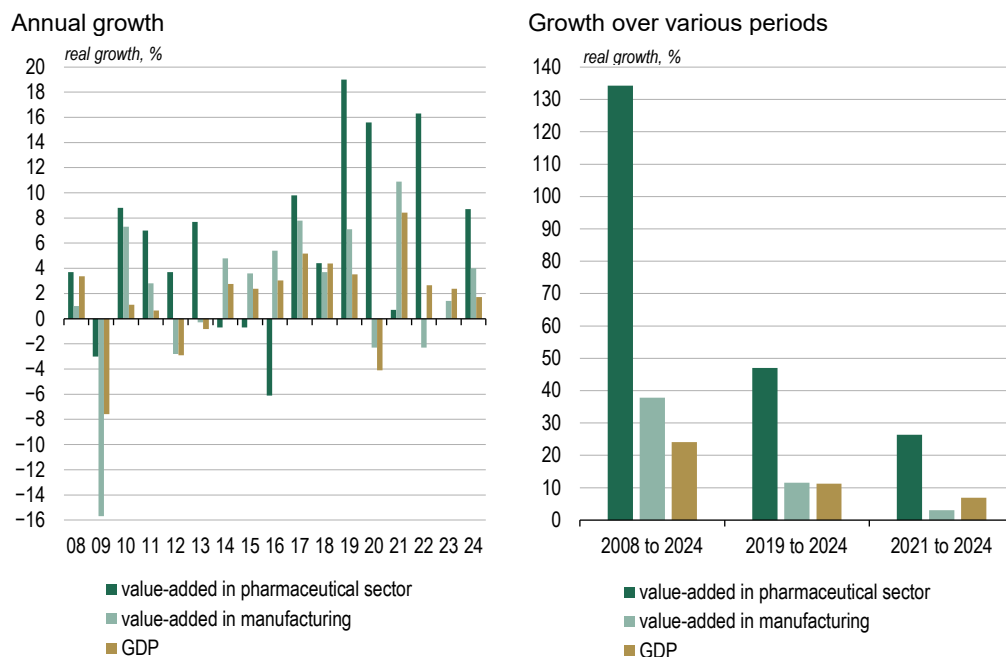
² The manufacture of basic pharmaceutical products and pharmaceutical preparations (C21) is abbreviated to "the pharmaceutical sector" for the purposes of this analysis.

³ According to the investment planned by pharmaceutical firms, the pharmaceutical sector's importance to the Slovenian economy is set to increase even further. See for example: [The pharmaceutical sector is growing: will Slovenia be able to retain it?](#) (article in Slovene).

⁴ Source: Luka Žakelj: Situation in energy-intensive manufacturing sectors in Slovenia. Available online at: [Research publications | Banka Slovenije](#).

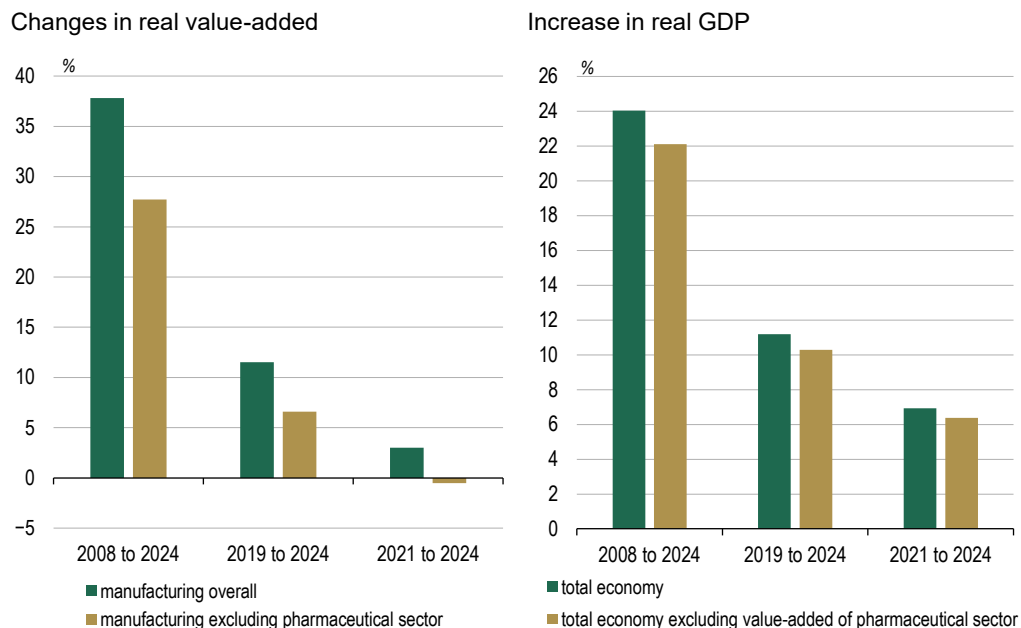
⁵ For the sake of confidentiality, the SORS does not release monthly data for output in the pharmaceutical sector. Output in the manufacture of computer, electronic and optical products, which forms part of high technology manufacturing alongside the pharmaceutical sector, over the first seven months of this year was down 2.9% in year-on-year terms.

Figure 1: **Comparison of pharmaceutical sector with manufacturing and with GDP**



Sources: Eurostat (national accounts), authors' calculations
Note: Timeseries with fixed 2020 prices are used.

Figure 2: **Impact of pharmaceutical sector's value-added on economic activity**

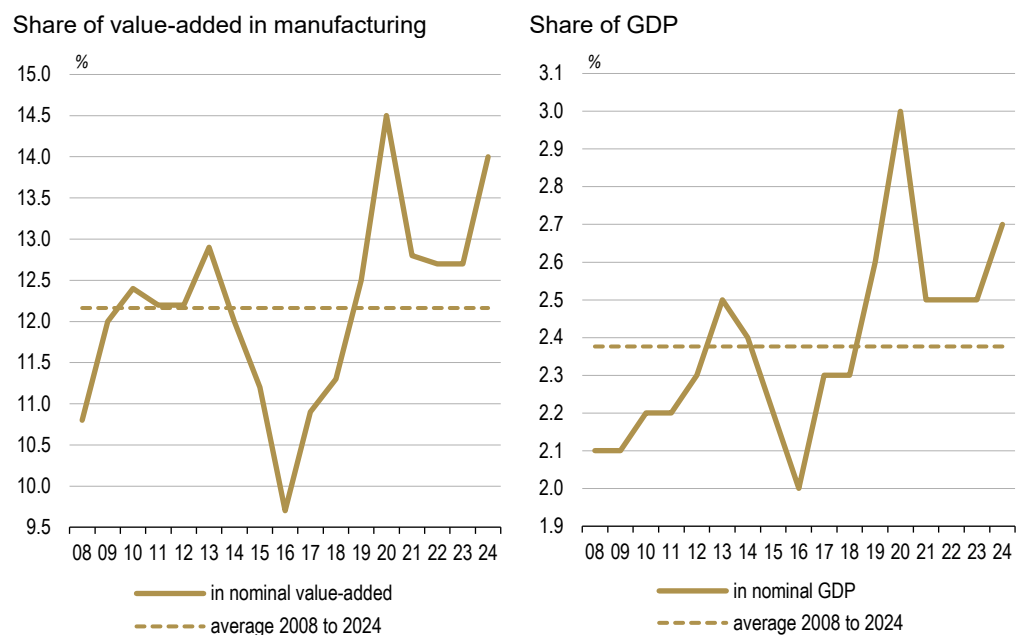


Sources: Eurostat (national accounts), authors' calculations
Note: Timeseries with fixed 2020 prices are used.

The pharmaceutical sector's value-added accounted for a larger share of GDP than any other manufacturing sector in 2024.

The pharmaceutical sector's share of aggregate nominal value-added in manufacturing fluctuated sharply between 2008 and 2024. It stood at 14.0% in 2024, slightly higher than the figure for the manufacture of fabricated metal products except machinery and equipment as the second most important sector. This figure was also 1.8 percentage points higher than the average over the observation period. It is a similar case with the share of GDP accounted for by value-added in the pharmaceutical sector. It accounted for 2.7% of nominal GDP in 2024, the highest figure of any manufacturing sector, and 0.3 percentage points higher than the average over the observation period (see Figure 3).

Figure 3: Shares of value-added in manufacturing and GDP accounted for by the pharmaceutical sector



Sources: Eurostat (national accounts), authors' calculations

Real growth in value-added in the pharmaceutical sector between 2008 and 2024 did not deviate notably from nominal growth, in contrast to manufacturing overall.

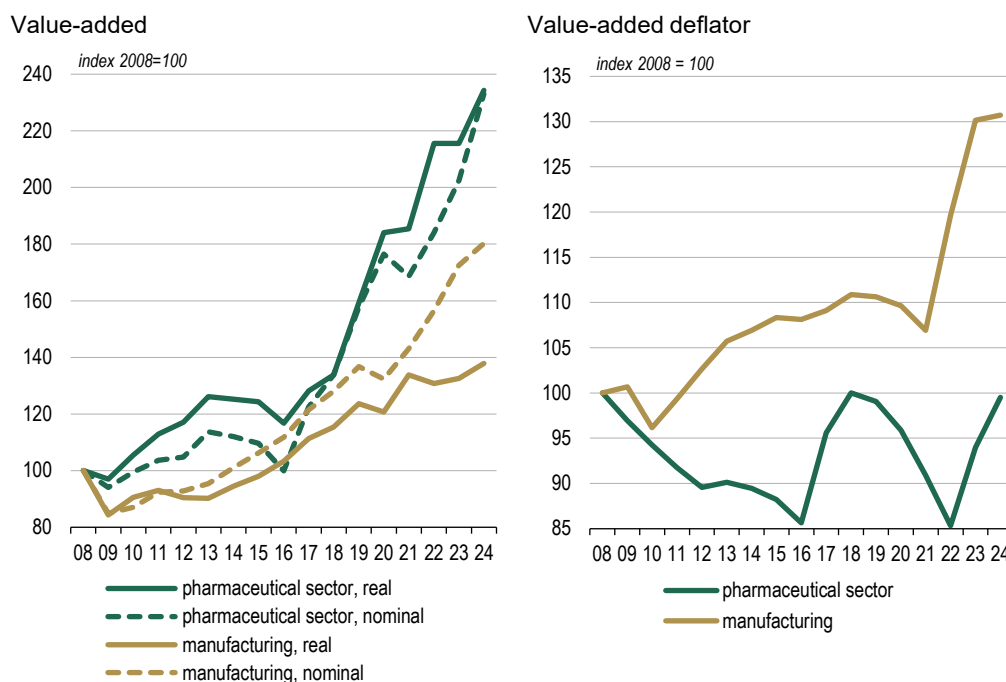
Value-added in 2024 was up 133.1% on 2008 in nominal terms, 1.2 percentage points less than its increase in real terms.⁶ Nominal growth in value-added in manufacturing overall was 42.4 percentage points higher than real growth. The gap is also evident in the two value-added deflators, which differ sharply from each other (see Figure 4).⁷

This is partly attributable to a fall in the currencies of some of the main export markets for pharmaceutical firms outside the euro area. The euro rose by 166.7% against the

⁶ Real value-added in the pharmaceutical sector in 2024 (expressed in fixed 2020 prices) was just EUR 66.8 million less than nominal value-added (expressed in current prices).

Russian rouble between 2008 and 2024, and by 22.4% against the Polish zloty.⁸ Another potential factor is the prevalence of generics manufacturing, where competition is fierce and the margins are lower than patent-protected drugs, which is further increasing the importance of expanding output and sales to each firm's performance.⁹ Another factor is the gap between growth in input commodity prices and growth in output prices, which is indicative of faster growth in the intermediate consumption deflator than in the output deflator.¹⁰

Figure 4: **Gap between real and nominal value-added**



Sources: Eurostat (national accounts), authors' calculations

The pharmaceutical sector's share of aggregate nominal value-added in manufacturing therefore does not reflect its full direct impact on economic growth. Its share of aggregate real value-added stood at 16.1% in 2024, 3.6 percentage points more than its average between 2008 and 2024, and 2.1 percentage points more than the nominal share. It is a similar case with the share of GDP accounted for by value-added in the pharmaceutical sector. It accounted for 3.3% of real GDP in 2024, 0.9 percentage points more than the average for the observation period, and 0.5 percentage points more than the nominal figure.

⁸ For an illustration of the currency breakdown of sales revenue at Krka, see for example page 64 of the [Annual Report 2024](#).

⁹ See for example (articles in Slovene): [Jože Colarič: Generics market evolving rapidly in western Europe](#), [World's largest generic manufacturer reinforces its market position](#), [ABC of health: generics](#) and [Pharmaceutical industry facing takeover challenges because of upcoming patent losses](#) | Exports window.

¹⁰ The decomposition of the value-added deflator into the output deflator and the intermediate consumption deflator shows the intermediate consumption deflator to be growing faster. This means that the value of goods and services that firms consume in the production process is growing faster than the basic prices that firms receive from the customer for unit output.

Contribution to aggregate employment, and qualifications breakdown in the sector

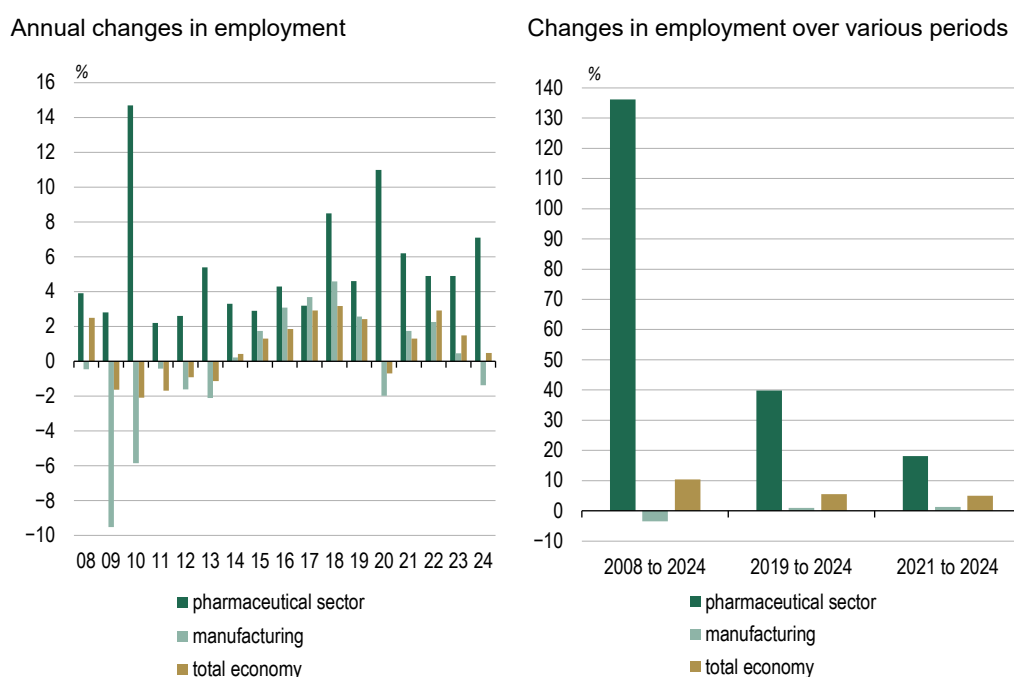
Alongside its contribution to value-added, the pharmaceutical sector's importance to aggregate employment is also strengthening.

The national accounts show that employment in the pharmaceutical sector in 2024 was up 136.2% on 2008, and up 39.8% on 2019. Aggregate employment in manufacturing was down 3.5% and up 1.0% respectively over the same periods, but excluding the pharmaceutical sector was down 7.1% and 0.8% respectively. Excluding the pharmaceutical sector, aggregate employment in the total economy in 2024 would be up 9.6% on 2008, 0.7 percentage points less than the actual increase, and up 5.2% on 2019, 0.3 percentage points less than the actual increase (see Figures 5 and 6).

The pharmaceutical sector accounted for 6.2% of aggregate employment in manufacturing in 2024, up 3.6 percentage points on 2008 and up 1.7 percentage points on 2019, and for 1.2% of aggregate employment in the total economy, up 0.7 percentage points and 0.3 percentage points over the same periods.

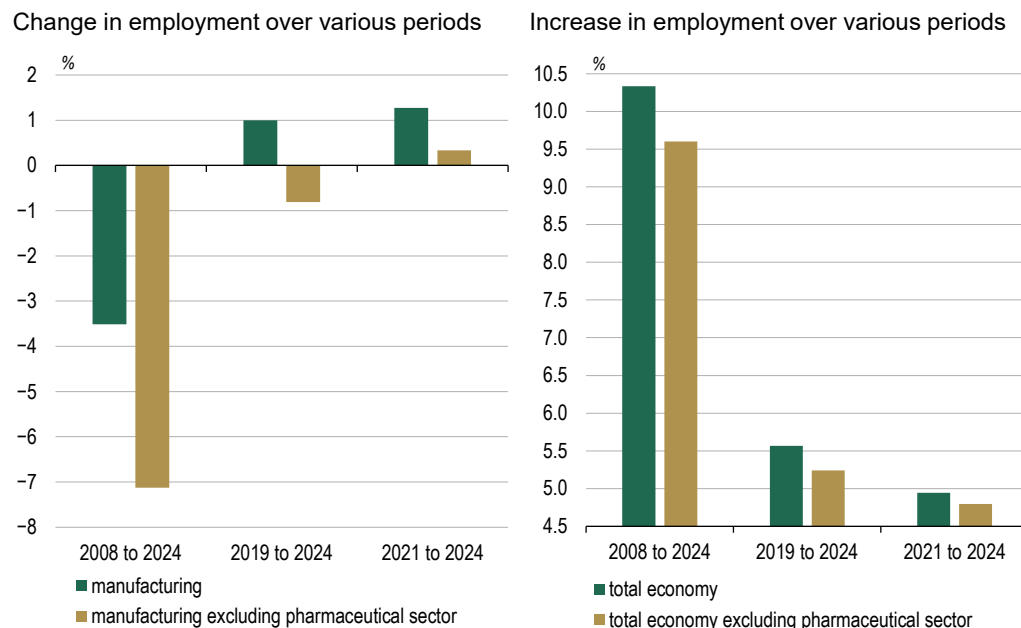
The situation in the pharmaceutical sector remains conducive to hiring this year. The workforce in employment in the pharmaceutical sector in July was up 12.1% in year-on-year terms. The total workforce in employment in manufacturing and in the total economy was down 1.9% and 0.4% respectively over the same period. Excluding the pharmaceutical sector, the year-on-year falls in the workforce in employment would have been 0.7 percentage points and 0.1 percentage points larger respectively. According to the monthly statistics, the workforce in employment in the pharmaceutical sector amounted to 12,438 in July of this year.

Figure 5: **Employment in the pharmaceutical sector, manufacturing, and the total economy**



Sources: Eurostat (national accounts), authors' calculations

Figure 6: **Pharmaceutical sector's impact on employment**



Sources: Eurostat (national accounts), authors' calculations

The average qualification level of the workforce and the average gross wage in the pharmaceutical sector are well above the averages for the total economy.

The improvement in the pharmaceutical sector's qualifications breakdown between 2008 and 2024 was even more pronounced than that in the total economy (see Figure 7, left).¹¹ Almost half of the workforce in the pharmaceutical sector hold a tertiary qualification, compared with less than a third of the population overall.¹² Conversely the workforce in the pharmaceutical sector has a lower share of people with no more than a primary or secondary qualification.

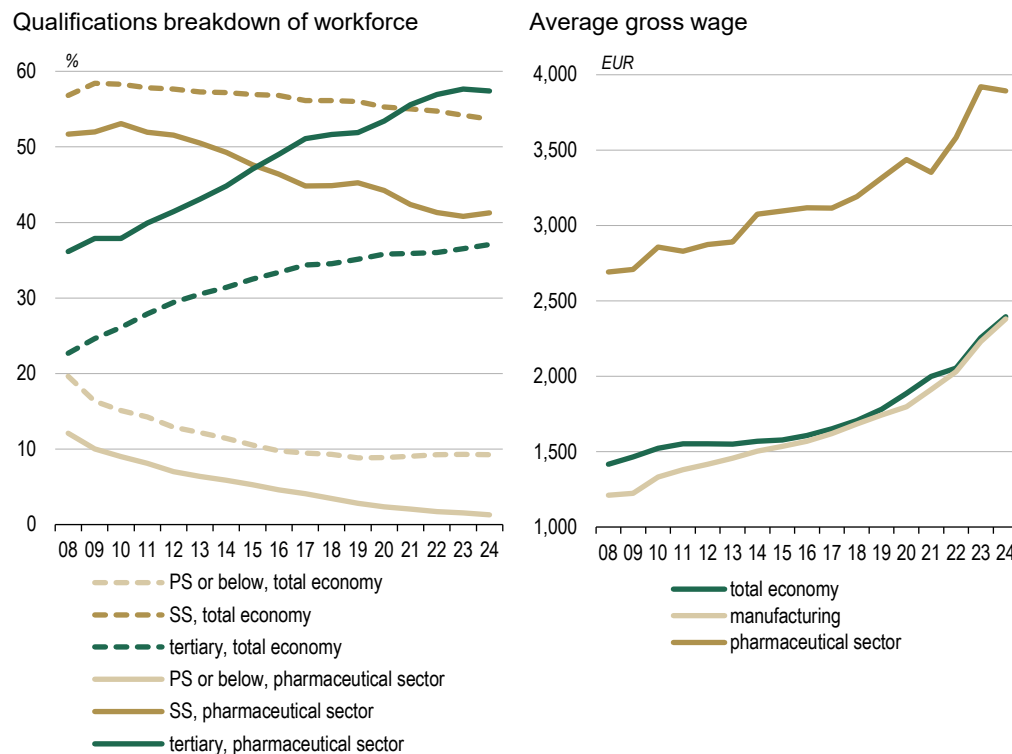
The superior qualifications breakdown of the workforce is also reflected in a higher average gross wage, which in the pharmaceutical sector was 81.0% higher than the overall average during the observation period (see Figure 7). Growth in the average gross wage in the pharmaceutical sector by contrast was lower than average: the average gross wage in the total economy in 2024 was up 69.0% on 2008, while in the pharmaceutical sector it was up 44.5%.

The high and stable employment growth and the above-average share of the workforce with a tertiary qualification are indicative of the sustained demand for highly skilled labour in the pharmaceutical sector. The qualifications breakdown and the above-average wages are also indicative of the technological complexity and high value-added in the sector, and consequently its high labour productivity.

¹¹ The analysis uses SORS data on the workforce in employment according to register sources (structural data), which allows more detailed insight into the qualifications breakdown of the workforce in individual sectors. The data is available for the period of 2005 to 2024 and relates to the situation as of 31 December of the year in question.

¹² Tertiary qualifications include higher or university education levels.

Figure 7: **Qualifications breakdown of the workforce and average gross wage in the pharmaceutical sector**



Sources: SORS, author's calculations

Note: In the left chart PS refers to a primary school qualification, SS to a secondary school qualification, while tertiary refers to those who have completed higher or university education level.

3

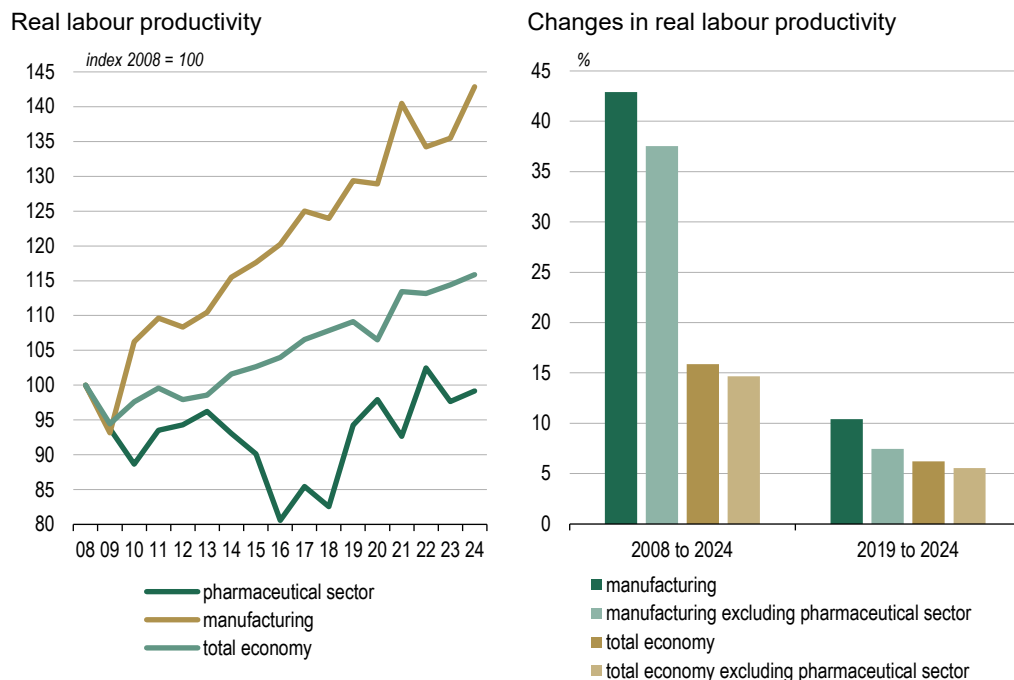
Changes in labour productivity

Labour productivity in the pharmaceutical sector is well above the averages in manufacturing overall and in the total economy but has not grown since 2008.

Labour productivity as measured by real value-added per employee stood at EUR 128,999 in 2024, EUR 79,736 or 161.9% higher than the average in manufacturing, and EUR 85,900 or 199.3% higher than the average in the total economy. Labour productivity in the pharmaceutical sector fluctuated sharply between 2008 and 2024, but a trend of growth was only evident in the second half of this period. Labour productivity in 2024 was up 5.8% on 2019 but was actually down 0.5% on 2008. Labour productivity in manufacturing was up 10.4% and 42.9% over the same periods, and up 7.4% and 37.5% respectively excluding the pharmaceutical sector. Labour productivity in the total economy in 2024 as measured by real value-added was up 6.2% on 2019, and up 15.9% on 2008. Excluding the pharmaceutical sector, the increase would be 0.6 percentage points smaller over the first period, and 1.2 percentage points smaller over the second period (see Figure 8).¹³

¹³ The positive contributions by the pharmaceutical sector are primarily attributable to the increase in its share of value-added in manufacturing and its share of value-added in the total economy.

Figure 8: **Labour productivity in the pharmaceutical sector, and its impact on aggregate productivity**



Sources: Eurostat (national accounts), authors' calculations

Note: Labour productivity is calculated as real value-added (fixed basis of 2020) per employee.

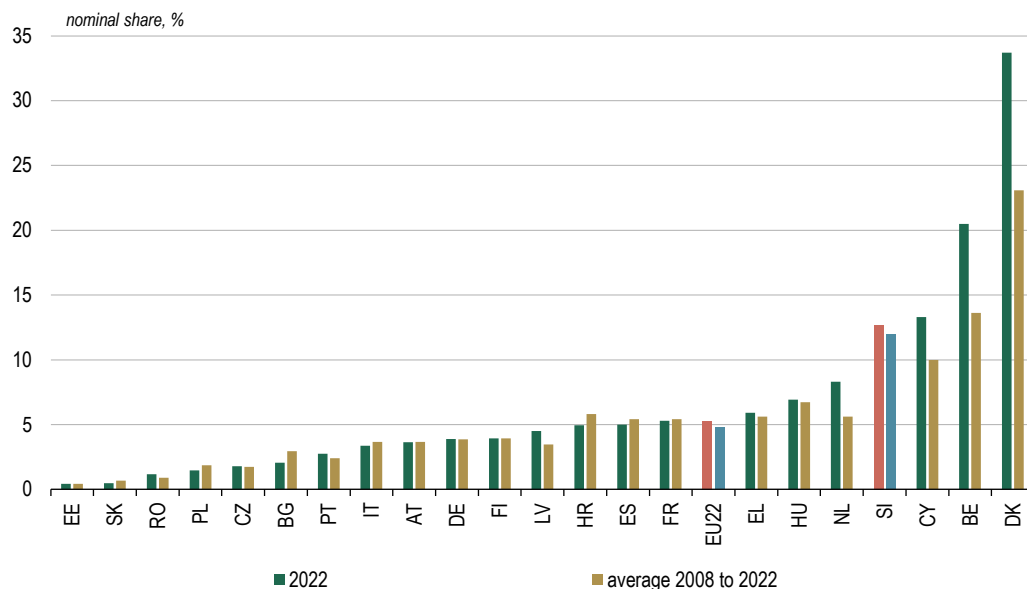
4 Pharmaceutical sector in Slovenia compared with other EU Member States

The importance of the pharmaceutical sector in Slovenia in terms of value-added in manufacturing, GDP and employment is among the highest in the EU.

Slovenia ranked fourth among the EU Member States with available data in terms of the pharmaceutical sector's share of aggregate value-added in manufacturing in 2022. It stood at 12.7%, 7.4 percentage points more than the EU22 average.¹⁴ Only Denmark and Belgium had notably higher figures, which deviated visibly from their averages between 2008 and 2022 (see Figure 9).

¹⁴ Data on value-added in the pharmaceutical sector for 2024 was unavailable for the vast majority of Member States at the time of writing. Data for 2023 was unavailable for Germany, Spain, Portugal, Sweden, Lithuania, Latvia, Luxembourg, Cyprus, Ireland and Poland. Data for 2022 was missing for Sweden, Lithuania, Luxembourg and Ireland. Malta also has incomplete data for the period of 2008 to 2024. After 2014 Eurostat no longer publishes aggregates for the euro area and the EU. Aggregate value-added in the EU22 is formulated in the analysis as the sum of the Member States other than Sweden, Lithuania, Luxembourg, Ireland and Malta. For the sake of a more accurate comparison, the same aggregation is also applied to other indicators in Section 4.

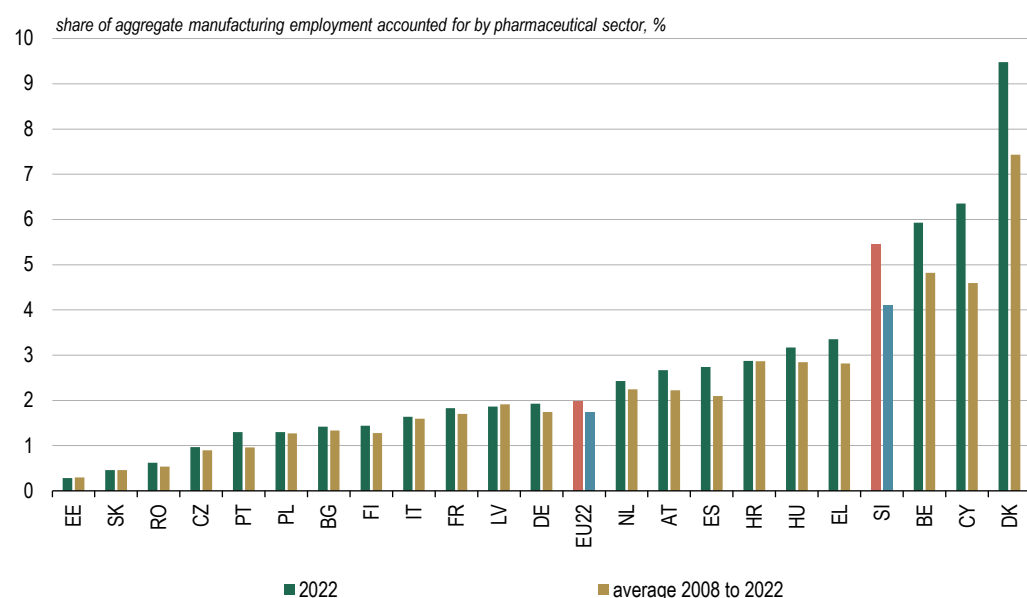
Figure 9: **Pharmaceutical sector's share of aggregate value-added in manufacturing, comparison with the EU**



Sources: Eurostat, authors' calculations

Slovenia also ranks highly according to the pharmaceutical sector's share of aggregate employment in manufacturing. Its figure stood at 5.4% in 2022, 1.3 percentage points higher than the average between 2008 and 2024, and 3.5 percentage points higher than the EU22 average. Only Belgium, Cyprus and Denmark had higher figures than Slovenia in 2022, the last of these again a notable outlier in this respect (see Figure 10).

Figure 10: **Pharmaceutical sector's share of aggregate employment in manufacturing, comparison with the EU**

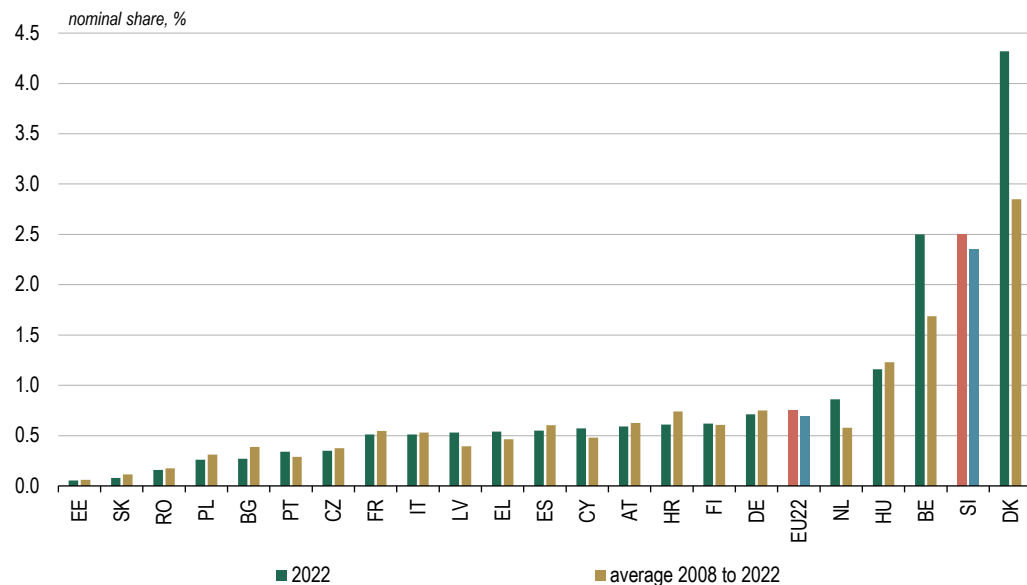


Sources: Eurostat, authors' calculations

Note: Aggregate employment based on national accounts.

Slovenia is even more notable for the importance of its pharmaceutical sector to the total economy. Nominal value-added in the pharmaceutical sector accounted for 2.5% of its GDP in 2022, 1.7 percentage points more than the EU22 average, and comparable to the figure in Belgium. Denmark is once again far ahead, with a figure of 4.3% (see Figure 11).

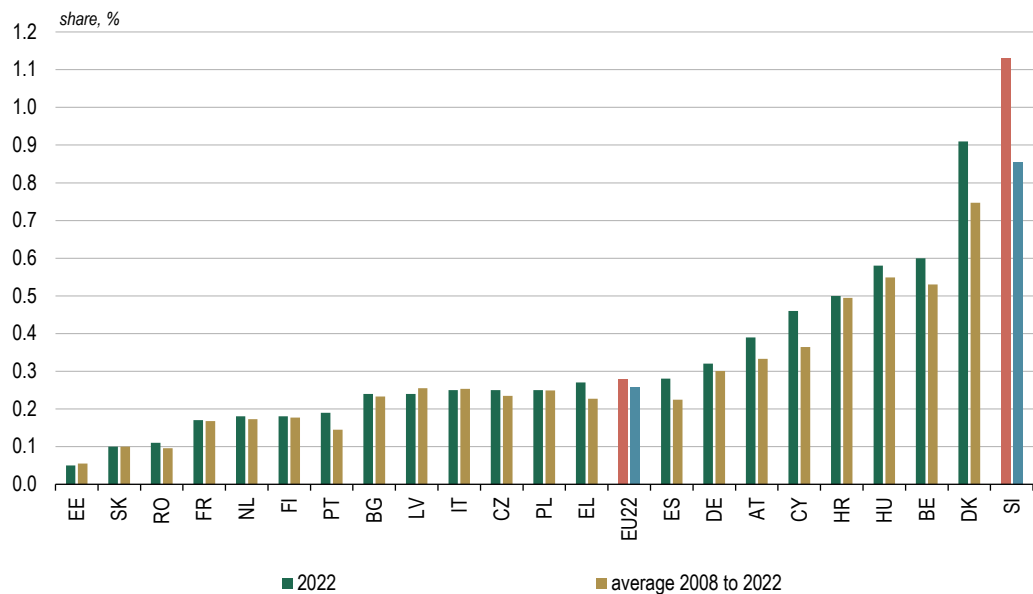
Figure 11: **Share of GDP accounted for by value-added in the pharmaceutical sector, comparison with the EU**



Sources: Eurostat, authors' calculations

In terms of the share of employment in the total economy accounted for by the pharmaceutical sector in 2022, Slovenia was ranked first among the countries with available data with 1.1%. This was 0.9 percentage points higher than the EU22 average and exceeded its average for 2008-2022 period by 0.2 percentage points. Of the other countries, only Denmark came close to matching it (see Figure 12).

Figure 12: **Pharmaceutical sector's share of aggregate employment, comparison with the EU**



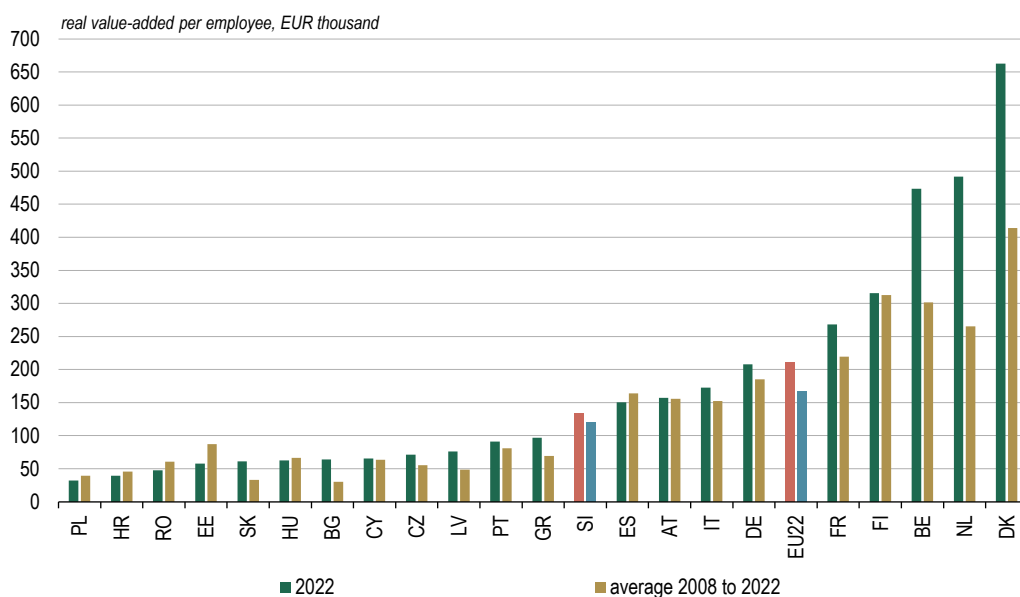
Sources: Eurostat, authors' calculations

Note: Aggregate employment based on national accounts.

The gap by which real labour productivity in the pharmaceutical sector trails the EU average is wider than in manufacturing overall and in the total economy.

Real labour productivity in the pharmaceutical sector stood at EUR 133,418 per employee in Slovenia in 2022, down EUR 76,690 or 36.5% on the EU22 average, although there was considerable variation between Member States (see Figure 13).¹⁵ The increase in productivity between 2008 and 2022 was also lower in Slovenia, at 11.1% versus the figure of 26.3% for the EU22.¹⁶ The gap by which labour productivity trailed the EU22 in 2022 was larger in the pharmaceutical sector than in manufacturing overall, where it stood at 32.7%. The corresponding gap in the total economy was 30.2%.¹⁷

Figure 13: Labour productivity in the pharmaceutical sector, comparison with the EU



Sources: Eurostat, authors' calculations

Note: Labour productivity is calculated as real value-added (fixed basis of 2020) per employee.

¹⁵ One of the possible factors in the sluggish labour productivity growth was the lower level of innovation seen in the Slovenian pharmaceutical sector compared with the EU average, when measured by the number of applications in the area of pharmacy to the European Patent Office per million inhabitants. This averaged 3.9 in Slovenia between 2015 and 2024, compared with 5.4 in the EU overall. The number of patent applications in the area of pharmacy per million inhabitants has risen significantly in Slovenia since 2019, and in 2024 slightly exceeded the EU average at 6.1.

The gap by which nominal labour productivity in the Slovenian pharmaceutical sector trails the EU average is similar to the real-terms figure. Nominal labour productivity stood at EUR 118,792 per employee in 2022, EUR 80,525 or 40.4% less than the EU average.

¹⁶ The increase in real labour productivity in the pharmaceutical sector in 2022 relative to its average between 2008 and 2022 was less than 14% in seven EU Member States, while six countries actually saw a decline. There is marked variation: for example, Estonia saw a decline of 34.0%, while Bulgaria saw an increase of 110.9%.

¹⁷ Labour productivity in the total economy is calculated as aggregate value-added per employee.

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