

Searching for value added in the CESEE-8

This paper describes 52 manufacturing and business services sectors in eight CESEE countries. It analyzes their size, value-added content, technological level, productivity and labor resources used, identifying sectors with high levels of productivity and value-added content. Developing these sectors can build a stronger economy. The paper also identifies sectors that consume too many resources for too little income and may need to be downsized or reoriented toward a higher value-added profile.

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CESEE-8 need to raise domestic value-added content

Compared to the EU average, the domestic value added tends to be lower in the CESEE-8, but there are big differences between countries and sectors. In business services, value added is generally higher than in manufacturing.



Need to move up the value chain

While higher levels of knowledge intensity seem to pay off in the form of higher value added, the presence of high-tech manufacturing industries in the CESEE-8 alone is not a magic bullet: There is a need to move toward higher value-added activities.



Unused potential and wasted resources in some sectors

Various combinations of value-added content, hours worked and levels of productivity indicate possible misallocations, unused potentials and wasted resources in some sectors.

Opinions expressed by the authors of studies do not necessarily reflect the official viewpoint of the Oesterreichische Nationalbank or the Eurosystem.

1. Introduction

It is a well-known policy recommendation for middle-income economies, including those in Central, Eastern and Southeastern Europe (CESEE), to steer production toward activities in higher value-added segments in order to raise income levels. This paper is intended to be a stocktaking exercise giving information about the current production structure in eight CESEE EU countries (CESEE-8¹), in general and relative to other EU member states. It provides an overview of around 50 manufacturing and business services sectors, describing their size, value-added content, technological level, productivity and labor resources used. This may help to identify sectors where CESEE economies already have high levels of productivity and value-added content. Building on these sectors can serve as a pathway to a more competitive economy. At the same time, the analysis reveals possible dead ends, which consume too many resources without generating reasonable income and thus may have to be downsized or – in so far this is realistic – reoriented toward a higher value-added profile.

Many studies have proposed strategies to overcome the middle-income trap. These include innovation, digitization, investment in R&D, a high labor participation rate with a skilled workforce, good governance following best practices including the rule of law, low corruption, the lack of entry and exit barriers for firms (thereby strengthening sound competition) and an efficient public sector contributing to a lower tax burden on the economy. Other recommendations relate to an institutional framework striking a careful balance between the interests of employers and employees and to providing sufficient access to finance at reasonable costs, especially for SMEs and young innovative businesses (see for example European Commission (2020), Grieveson et al. (2021), Slačik (2024) and World Bank (2024)). While this is valuable input for middle- to long-term action, short-term opportunities are often given less attention. Our analysis fills this gap, pointing to actionable steps that are already on the table and await implementation.

The main findings of this paper can be summarized as follows:

As has been shown in the literature, recent data confirm that CESEE EU countries have positioned themselves in relatively low-value-added activities. Three of the CESEE-8 countries are among the four EU member states with the lowest value-added content in manufacturing. With respect to value-added content in business services, the majority of the CESEE-8 rank in the mid-range of EU member states or somewhat higher.

In general, higher-tech manufacturing activities offer higher value added. Across EU member states, in manufacturing, there is a clear positive correlation between the average technological level and the average value-added content. There are notable differences in average manufacturing technology levels across the CESEE-8, with Hungary, Slovenia, Czechia and Slovakia standing out positively. However, this favorable technological position is not reflected in a comparable value-added advantage except in Slovenia, possibly due to a less favorable position in individual sectors' value chains.

Beyond this positive correlation, in most EU countries, high-tech sectors have a far higher value added than the manufacturing sector on average. However, this value-added premium is much smaller or absent in most of the CESEE-8. Coupled with their comparatively lower value-added content in manufacturing overall, this points to an area where substantial catch-up is necessary.

¹ Bulgaria, Croatia, Czechia, Hungary, Poland, Romania, Slovakia, Slovenia.

In business services, the CESEE-8 show a rather homogenous level of knowledge intensity. They are in the mid-range within the EU, with Slovenia standing out positively. However, in this sector, there is no clear relationship between the average level of knowledge intensity and value-added content. In contrast to the situation in other EU member states, however, knowledge-intensive business services in the CESEE-8 clearly outperform wider business services on value-added content.

In the following sections, we present detailed data of individual sectors within each country. In almost all manufacturing sectors, the value-added content in the CESEE-8 is substantially lower than in the top three EU member states. In most sectors, it is also below the EU average. In contrast, in five of the CESEE-8, the value-added content is above the EU average in the majority of business services sectors. Moreover, the findings about value-added content, hours worked and levels of productivity point to possible misallocations, unused potentials and wasted resources in some sectors.

2. Low value-added content of manufacturing in the majority of the CESEE-8

It is a frequent economic policy recommendation for many CESEE countries that they should steer production toward products with a higher domestic value-added content. In fact, three CESEE-8 countries, Slovakia, Hungary and Bulgaria, are among the four EU member states with the lowest gross value-added (GVA) content² in manufacturing. Czechia and Poland are also in the lower half of the EU³ (chart 1a). The ranking is somewhat different in business services⁴, where differences between EU countries tend to be less pronounced and the majority of the CESEE-8 are in the mid-range of EU member states, with Croatia and Hungary being relatively strong performers, while Czechia is in a relatively weaker position (chart 1b).

Chart 1a

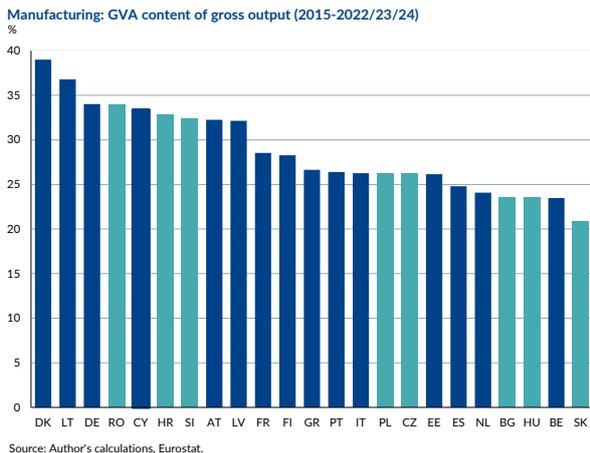
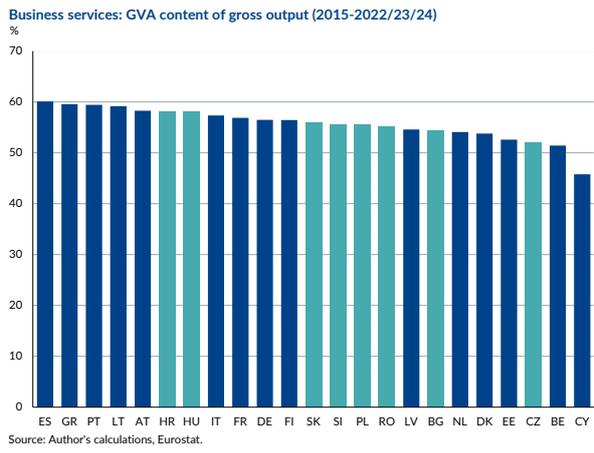


Chart 1b



We base our calculations on data from Eurostat⁵ and distinguish between knowledge intensity and technology content using the classification provided by Eurostat. The value-added content is by nature

² We define value-added content as gross value added as a percentage of gross output.

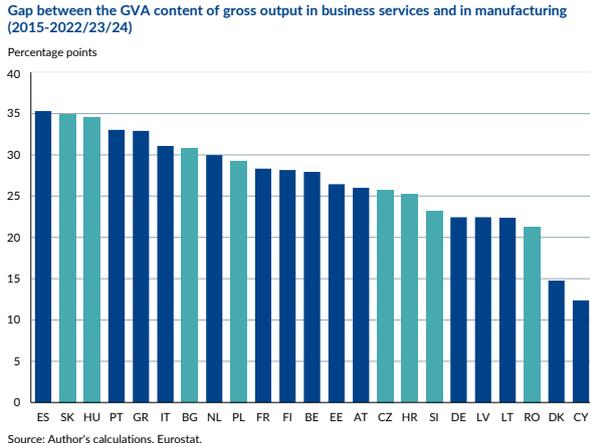
³ Due to missing data in some countries, "EU" refers to 23 countries in this sample.

⁴ We define business services as the sections G to N, P to R and divisions S95 and S96 according to NACE Rev. 2.

⁵ As of writing, data availability differs among countries, with data available for most countries until 2023, for some until 2024, and for a few only until 2022.

higher in business services than in manufacturing (e.g. due to higher labor intensity and fewer imported input components), with the gap between these two aggregate sectors (chart 2) being the highest (among the CESEE-8) in Slovakia and Hungary, i.e. in countries with the lowest value-added content in manufacturing and a relatively high (Hungary) or medium (Slovakia) value-added content in business services. The gap is also large in Spain, Portugal and Greece, but this is due to their outstanding value-added content in business services, which is coupled with a medium (Greece and Portugal) or relatively low (Spain) value-added content in manufacturing.

Chart 2



3. Heterogenous technological level in manufacturing, medium level in business services

The average technological level⁶ of manufacturing is heterogenous across the CESEE-8 (chart 3a). Hungary, Slovenia and Czechia have a relatively strong position within the EU, Slovakia ranks in the mid-range, while the other four countries are placed in the lower half. As for business services (chart 3b), the average knowledge intensity of the CESEE-8 economies is broadly in the mid-range of EU member states (with Slovenia being somewhat ahead of the other seven countries).

⁶ The average technological level of manufacturing and knowledge intensity of business services are calculated according to Eurostat's indicators on High-tech industry and Knowledge-intensive services, annex 3 - High-tech aggregation by NACE Rev. 2. Manufacturing sectors are divided into four groups: high-technology, medium-high-technology, medium-low-technology and low-technology. Business services are divided into two groups: knowledge-intensive services and less knowledge-intensive services. The average technological level / knowledge intensity is calculated by using the nominal gross value added of individual sectors (19 in manufacturing and 33 in business services) as weights (the average values are then normalized).

Chart 3a

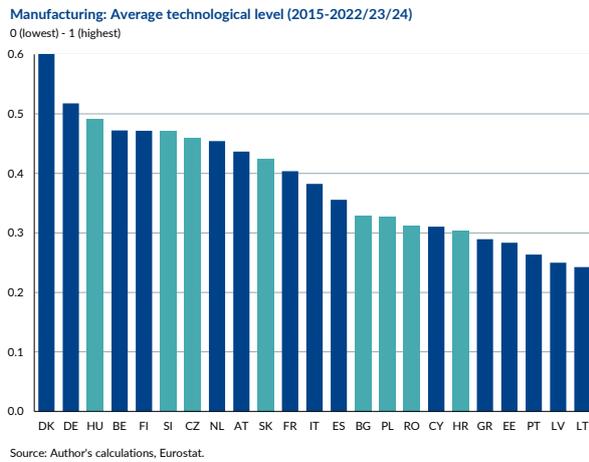
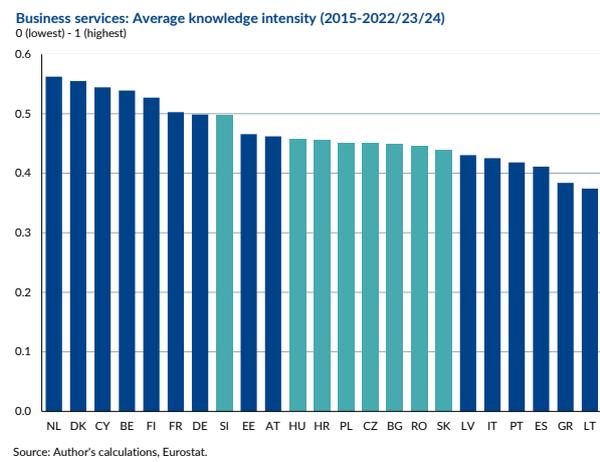


Chart 3b



Mapping the technological level of manufacturing and the knowledge intensity of business services against their respective domestic value-added content reveals interesting differences between the two economic sectors.

First, for the manufacturing sector (chart 4a) there is – despite some outliers – a relatively clear positive correlation between the average technological level and the average value-added content among EU member states. By contrast, and rather surprisingly, the correlation is negative in business services (chart 4b).

Chart 4a

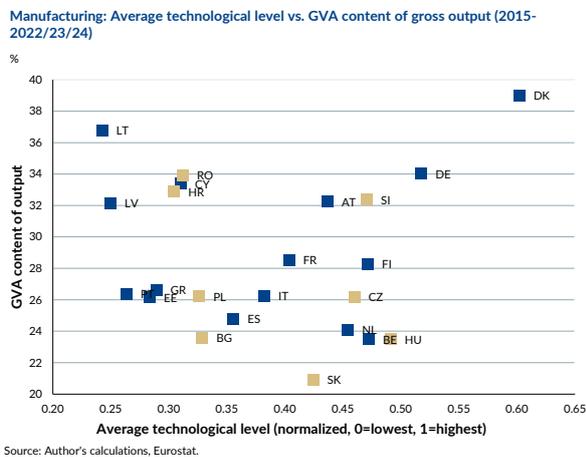
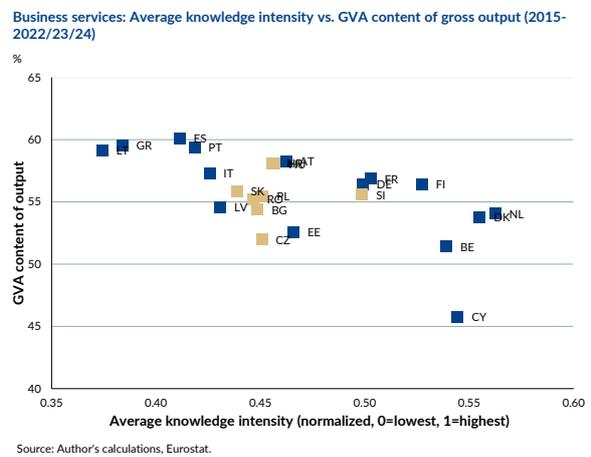
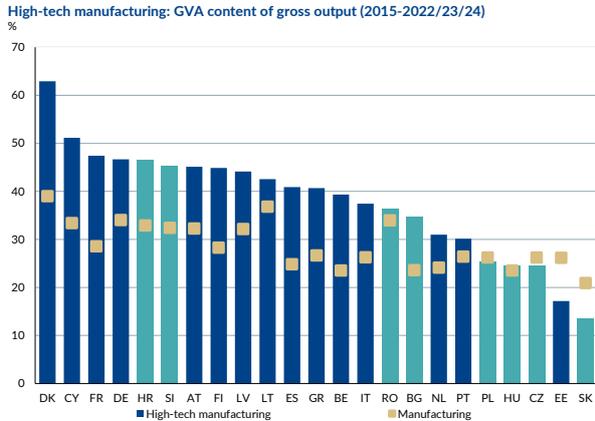


Chart 4b



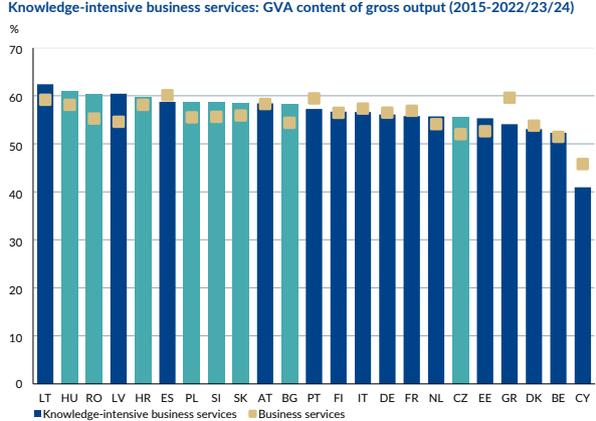
Second, in the business services sector, there is no big difference between the value-added content of knowledge-intensive sectors and business services as a whole (chart 5b). By contrast, in the manufacturing sector, it is striking that the value-added content in high-technology sectors is (in most EU countries) substantially higher than in manufacturing as a whole (chart 5a). Among the CESEE-8, this is the case only for Croatia, Slovenia and Bulgaria. In the remaining CESEE-8, high-tech sectors do not show such a value-added premium over manufacturing as a whole.

Chart 5a



Source: Author's calculations, Eurostat.

Chart 5b



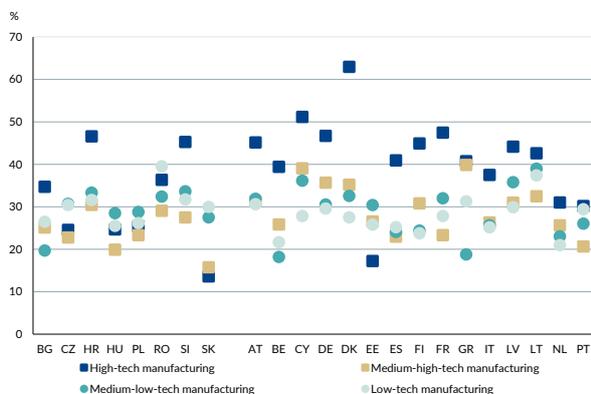
Source: Author's calculations, Eurostat.

A similar pattern arises when comparing the value-added content of four different technological levels in manufacturing and two different levels of knowledge intensity in business services (chart 6a and 6b). In manufacturing, there is a sizable gap in most EU countries between the value-added content in high-tech sectors and the technology group with the second-highest value-added content. In most cases, this gap is substantially larger than the differences in the value-added content among the remaining three technology levels. This suggests that a notable improvement in the domestic value-added content in manufacturing can be best achieved by moving into sectors in the high-technology segment. By contrast, in business services, there is not much difference between the two levels of knowledge intensity in the majority of EU countries.

There are some notable observations, however, concerning especially the CESEE-8: In the majority of these countries (Czechia, Hungary, Poland, Romania and Slovakia), lower-tech manufacturing sectors have a higher value-added content than high-technology manufacturing sectors. This may indicate that these countries are positioned at earlier stages of the high-tech value chain, engaging in relatively low value-added production activities (e.g. assembling). This is in line with findings in the literature: While a significant share of production activities in European manufacturing has been moved to Central and Eastern Europe, more knowledge-intensive value chain functions have been retained in the more advanced headquarter economies (see e.g. Stöllinger, 2019). As for business services, knowledge-intensive sectors exhibit a notably higher value-added content than less knowledge-intensive sectors in all CESEE-8 countries. This is in stark contrast to the rest of the EU, where there is no clear gap in value-added content.

Chart 6a

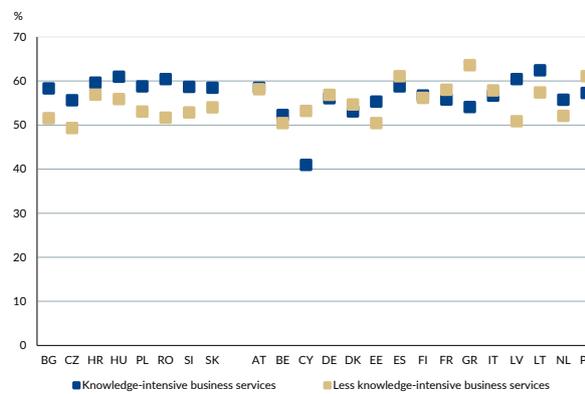
Manufacturing: GVA content of gross output at different technological levels (2015-2022/23/24)



Source: Author's calculations, Eurostat.

Chart 6b

Business services: GVA content of gross output at different levels of knowledge-intensity (2015-2022/23/24)



Source: Author's calculations, Eurostat.

4. Wide range of combinations of value-added content and value-added share in individual sectors...

The charts in the annex 1 present more detailed information about the main characteristics of manufacturing and business services sectors in individual CESEE-8 countries with respect to their value-added size, value-added content, productivity and hours worked.

The first two charts on each country page give information about the size of the gap in the value-added content compared to the top three EU countries and the EU average⁷, respectively, for each individual sector in manufacturing and business services.

In the manufacturing sector, the value-added content across the CESEE-8 is substantially below the level of the top three EU countries, but Romania, Slovenia and Croatia show a smaller gap. The majority of CESEE-8 countries and sectors perform also worse than the EU average, in some cases notably. This low value-added content appears to be problematic especially in sectors with a relatively big share in total manufacturing value added in the respective country (e.g. in car production in Czechia, Hungary and Slovakia, basic metal production in Bulgaria, production of computer, electronic and optical products in Czechia and Hungary, or electrical equipment in Hungary). Again, there are favorable exceptions, such as Romania, Slovenia and Croatia. Positive examples (i.e. above EU average domestic value-added content combined with a relatively large share of the sector in manufacturing) are the production of fabricated metal products (except machinery and equipment) in Croatia and Slovenia.

The situation is substantially better in business services. In the large majority of these sectors, the value-added content in the CESEE-8 is considerably lower than in the top three EU countries (with a few exceptions mostly in Hungary and Romania). However, in the majority of sectors, CESEE-8 countries perform better than the EU average, except Czechia, Poland and Slovenia.

The third and fourth charts on each country page relate the value-added content of a sector to its share in total value-added, with data expressed as differences from the EU average. The third chart focuses on manufacturing, while the fourth addresses business services. They show a pattern similar to the previous two charts (e.g. car production seems to be overrepresented in Czechia, Hungary and Slovakia compared

⁷ Both the best three EU countries and the EU (arithmetic) average are calculated without Ireland, Luxembourg, Malta and Sweden (for which no sufficiently detailed data are available).

to the EU average but seems to deliver a substantially lower value-added content, meaning that it is in the top left quarter of the charts; relative to the EU average, the CESEE-8 typically have a higher value-added content in business services than in manufacturing). By combining information on the value-added content with the contribution of individual sectors to total value-added in manufacturing/business services, these charts allow for conclusions with respect to unused potentials or wasted resources. Sectors which are substantially underrepresented despite offering a bigger value-added content than the EU average (in the bottom right quarter of the charts) could – if strengthened – potentially support economic convergence. These sectors can be found mostly in manufacturing, examples being production of food and beverages in Czechia, car production in Croatia, but also in business services (e.g. accommodation and food services in Slovakia and real estate activities in Slovenia). By contrast, sectors which are substantially overrepresented but offer comparatively low value-added content (in the top left quarter of the charts) could have resources moved elsewhere unless higher value-added content can be achieved, e.g. by technological upgrading and moving up the value chain (e.g. the automotive industry in Czechia, Hungary and Slovakia and the production of computer, electronic and optical products in Hungary). At the same time, there are also several favorable “outliers” (in the top right quarter of the charts): these “pull-sectors” across the CESEE-8 (both in manufacturing and business services) already have a higher value-added content than the EU average and an above-average share in the value-added of manufacturing and business services, respectively.

5. ...driven by differences in labor productivity levels and the share of hours worked

The last four charts relate the value-added content to the two components of the value-added share (in manufacturing and business services value added, respectively) in individual sectors: the share of hours worked and value added per hour worked (in current EUR⁸), with data expressed as differences from the EU average. This helps to explain where the “outlier” positions in the previous two charts stem from. For example, Czechia, Hungary and Slovakia have a relatively high share of value added in the automotive sector despite a relatively low value-added content, which seems to reflect both a bigger share in hours worked and (especially in Czechia) a higher level of labor productivity (i.e. value added per hour worked) – both relative to the EU average – than in other manufacturing sectors. As pointed out above, both Czechia and Hungary have a relatively low value-added content in the production of computer, electronic and optical products, combined with a relatively large (Hungary) or slightly above-average (Czechia) share of this sector in total manufacturing value added. The reasons for this are, however, different in these two countries: in Hungary, this sector is characterized by relatively low labor productivity and a substantially above-average share of the number of hours worked; in Czechia the sector performs well compared to other sectors in terms of labor productivity (relative to the EU average) while accounting for an average share of hours worked. Romania’s food and clothing industries – both characterized by a relatively high value-added content and value-added share compared to the EU average – are also interesting examples. In the food industry, this position stems from a formidable level of labor productivity in combination with a relatively low share of hours worked compared to the EU average. The clothing industry, by contrast, accounts for a very high share of hours worked but has one of the lowest productivity levels relative to the EU average compared to other manufacturing sectors. Similarly,

⁸ Gross value-added data for 64 NACE sectors are not available in purchasing power standard (PPS) terms. Differences in sectoral price levels render cross-country comparisons (and thus comparisons with the EU average) in current EUR somewhat problematic.

the clothing industry in Bulgaria is characterized by a combination of low labor productivity and a much higher share of hours worked than the EU average.

Various combinations of the level of productivity and the share of hours worked can also be found among business services in the CESEE-8. For example, Czechia's combination of high value-added content and value-added share (relative to the EU average) in "computer programming, consultancy and information service activities" results from relatively high productivity and a large share of hours worked. By contrast, Slovenia's favorable positions in terms of the value-added content and the value-added share in "other professional, scientific and technical activities and veterinary activities" and in "employment services" stem from below-average productivity and a high share of hours worked compared to the EU average in both sectors.

However, the CESEE-8 broadly share a common feature: In contrast to the EU average and the majority of other EU economies, labor productivity is higher in business services than in manufacturing across the CESEE-8 with the exception of Hungary and Slovenia. Even in the latter two countries, the productivity advantage of manufacturing is substantially smaller than in most other EU countries. Moreover, across the CESEE-8, the negative labor productivity gap (in current EUR) to the EU average is smaller in business services than in manufacturing. Therefore, it seems that due to their higher value-added content and more favorable productivity levels, strengthening business services could also be a useful way to increase income levels in the CESEE-8.

6. Conclusions

In an EU-wide comparison, the majority of CESEE-8 countries are characterized by relatively low levels of value-added content in gross output both in manufacturing and business services. However, there are significant differences between various sectors in terms of their value-added content and value-added share (in total value added of manufacturing and business services, respectively), relative to the EU average. One way forward for the CESEE-8 to narrow the income gap to the EU average could be to raise the value-added content of their production in general. Such efforts could be supported by moving toward high-technology manufacturing sectors and higher value-added generation in international value chains. In addition, the share of sectors with high value-added content should be bolstered by raising labor productivity levels and – in sectors with high productivity – their share of hours worked. Efforts should not be limited to manufacturing sectors, since value-added content and productivity levels are higher in business services than in manufacturing sectors across the CESEE-8 and the negative gaps compared to the EU average are also smaller. Special attention may be given to sectors with rather unfavorable combinations of value-added content and value-added share, or of labor productivity and share of hours worked. In such cases, solutions could be found by either scaling down such sectors, especially if they seem "oversized" compared to other economies, or by making additional efforts to improve their productivity.

7. References

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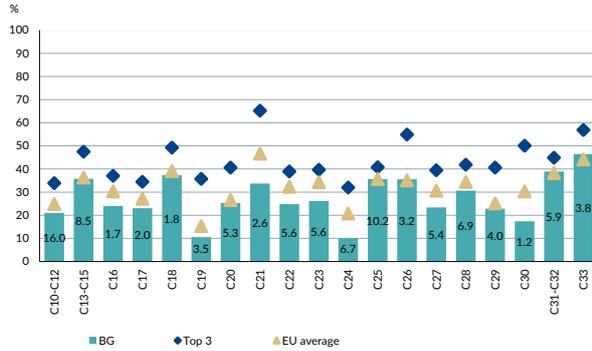
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8. Annex 1: Charts

Bulgaria

Chart BG 1a

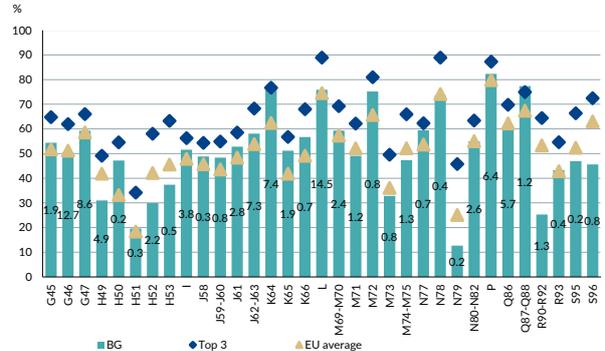
Bulgaria: GVA content of gross output versus top 3 and EU average - Manufacturing (2015-2023)



Note: The values in the columns represent the weight of the sector as a share of total manufacturing (in the country). EU average is calculated as the arithmetic average of countries with available data.
Source: Author's calculations, Eurostat.

Chart BG 1b

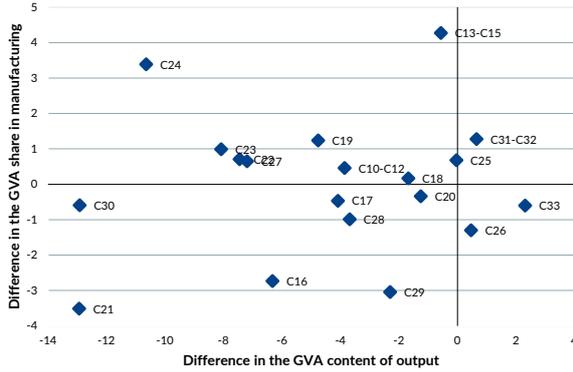
Bulgaria: GVA content of gross output versus top 3 and EU average - Business services (2015-2023)



Note: The values in the columns represent the weight of the sector as a share of total business services (in the country). EU average is calculated as the arithmetic average of countries with available data.
Source: Author's calculations, Eurostat.

Chart BG 2a

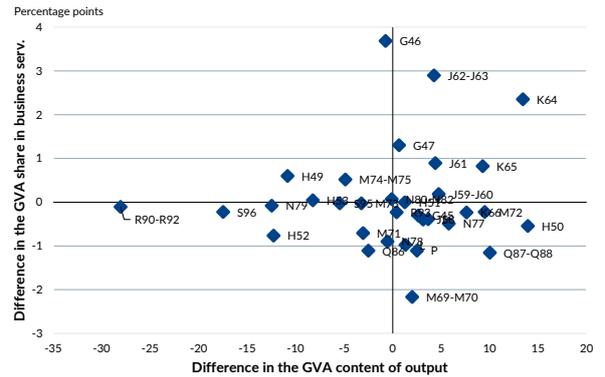
Bulgaria: Gap to EU average in GVA content and size - Manufacturing (2015-2023)



Note: EU average is calculated as the arithmetic average of countries with available data.
Source: Author's calculations, Eurostat.

Chart BG 2b

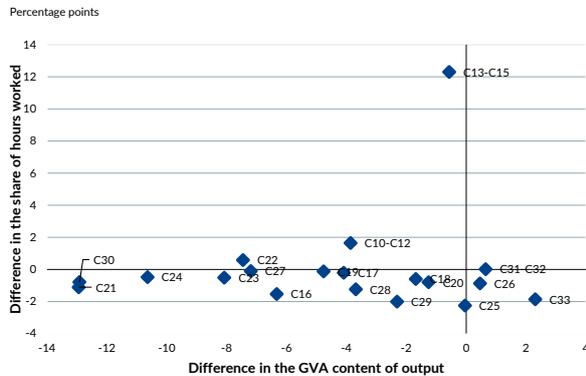
Bulgaria: Gap to EU average in GVA content and size - Business services (2015-2023)



Note: EU average is calculated as the arithmetic average of countries with available data.
Source: Author's calculations, Eurostat.

Chart BG 3a

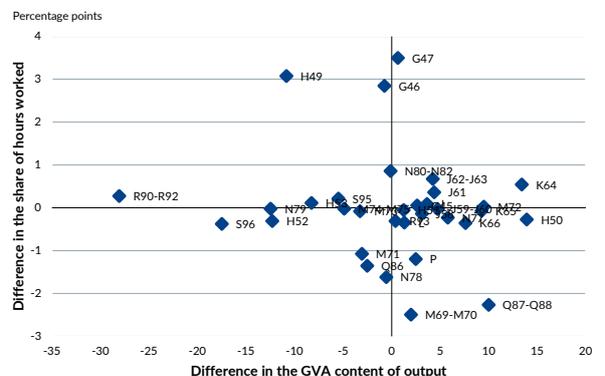
Bulgaria: Gap to EU average in GVA content and the share of hours worked - Manufacturing (2015-2023)



Note: EU average is calculated as the arithmetic average of countries with available data.
Source: Author's calculations, Eurostat.

Chart BG 3b

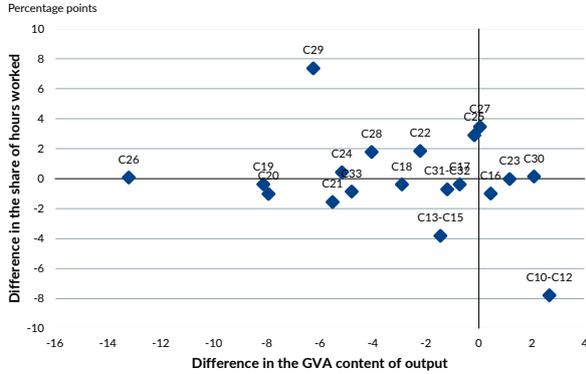
Bulgaria: Gap to EU average in GVA content and the share of hours worked - Business services (2015-2023)



Note: EU average is calculated as the arithmetic average of countries with available data.
Source: Author's calculations, Eurostat.

Chart CZ 3a

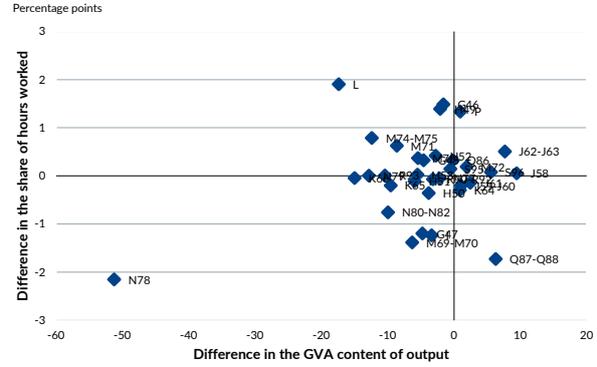
Czechia: Gap to EU average in GVA content and the share of hours worked - Manufacturing (2015-2024)



Note: EU average is calculated as the arithmetic average of countries with available data.
Source: Author's calculations, Eurostat.

Chart CZ 3b

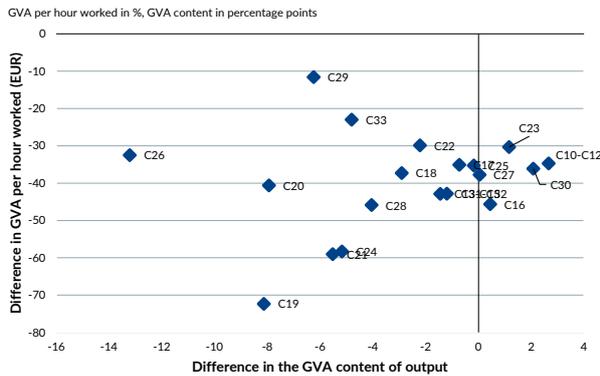
Czechia: Gap to EU average in GVA content and the share of hours worked - Business services (2015-2024)



Note: EU average is calculated as the arithmetic average of countries with available data.
Source: Author's calculations, Eurostat.

Chart CZ 4a

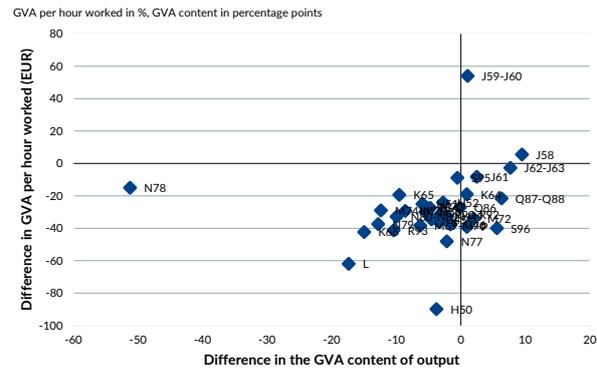
Czechia: Gap to EU average in GVA content and GVA per hour worked (in EUR) - Manufacturing (2015-2024)



Note: EU average is calculated as the arithmetic average of countries with available data.
Source: Author's calculations, Eurostat.

Chart CZ 4b

Czechia: Gap to EU average in GVA content and GVA per hour worked (in EUR) - Business services (2015-2024)

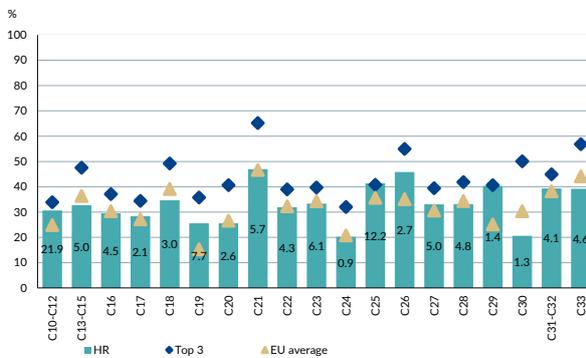


Note: EU average is calculated as the arithmetic average of countries with available data.
Source: Author's calculations, Eurostat.

Croatia

Chart HR 1a

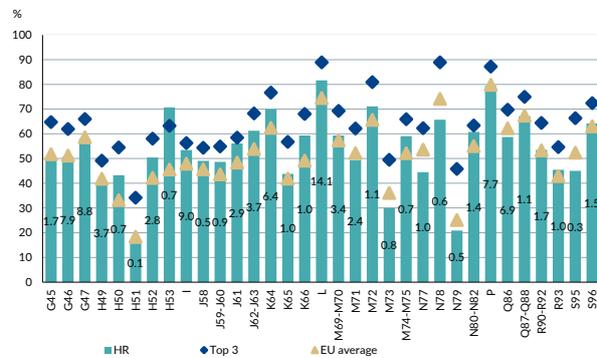
Croatia: GVA content of gross output versus top 3 and EU average - Manufacturing (2015-2023)



Note: The values in the columns represent the weight of the sector as a share of total manufacturing (in the country). EU average is calculated as the arithmetic average of countries with available data.
Source: Author's calculations, Eurostat.

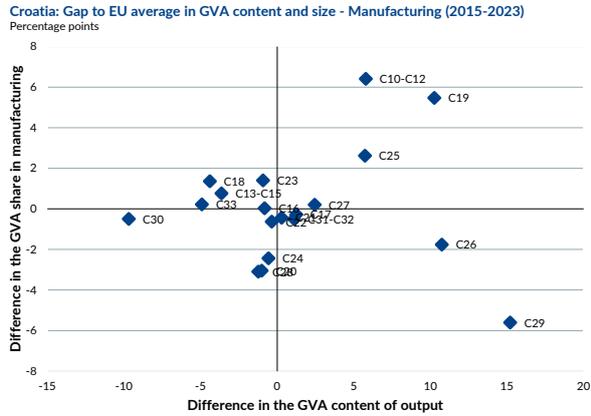
Chart HR 1b

Croatia: GVA content of gross output versus top 3 and EU average - Business services (2015-2023)



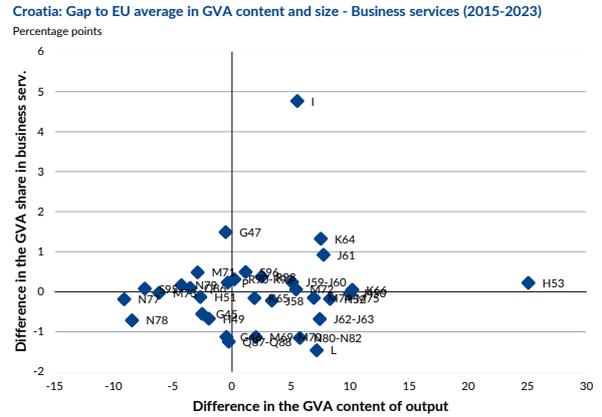
Note: The values in the columns represent the weight of the sector as a share of total business services (in the country). EU average is calculated as the arithmetic average of countries with available data.
Source: Author's calculations, Eurostat.

Chart HR 2a



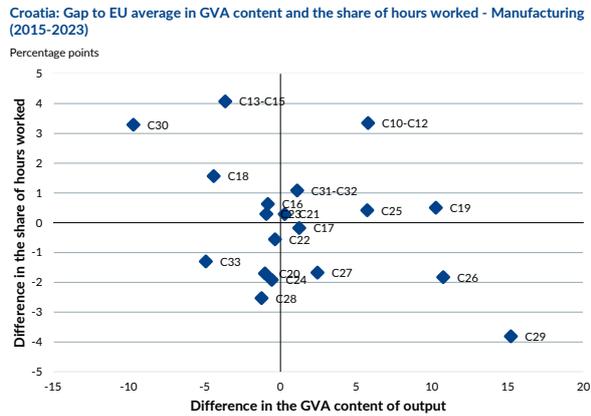
Note: EU average is calculated as the arithmetic average of countries with available data.
Source: Author's calculations, Eurostat.

Chart HR 2b



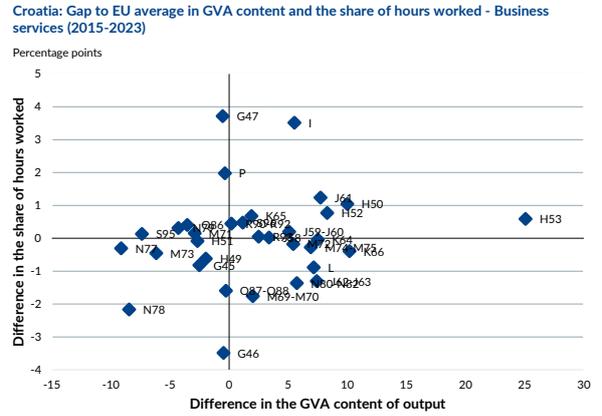
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Source: Author's calculations, Eurostat.

Chart HR 3a



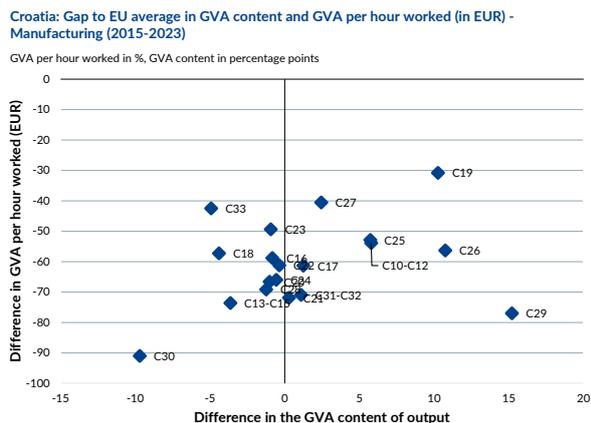
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Source: Author's calculations, Eurostat.

Chart HR 3b



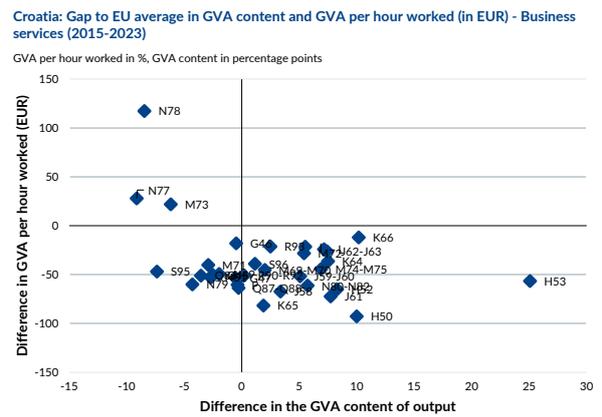
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Source: Author's calculations, Eurostat.

Chart HR 4a



Note: EU average is calculated as the arithmetic average of countries with available data.
Source: Author's calculations, Eurostat.

Chart HR 4b

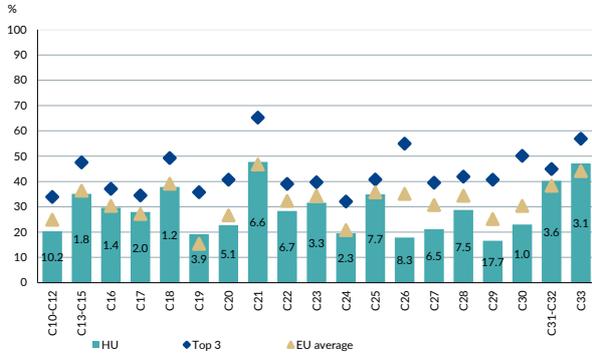


Note: EU average is calculated as the arithmetic average of countries with available data.
Source: Author's calculations, Eurostat.

Hungary

Chart HU 1a

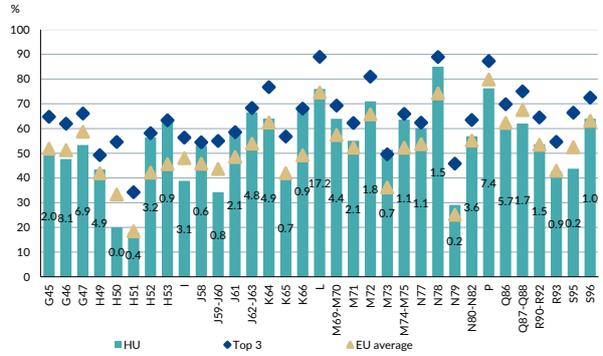
Hungary: GVA content of gross output versus top 3 and EU average - Manufacturing (2015-2024)



Note: The values in the columns represent the weight of the sector as a share of total manufacturing (in the country). EU average is calculated as the arithmetic average of countries with available data.
Source: Author's calculations, Eurostat.

Chart HU 1b

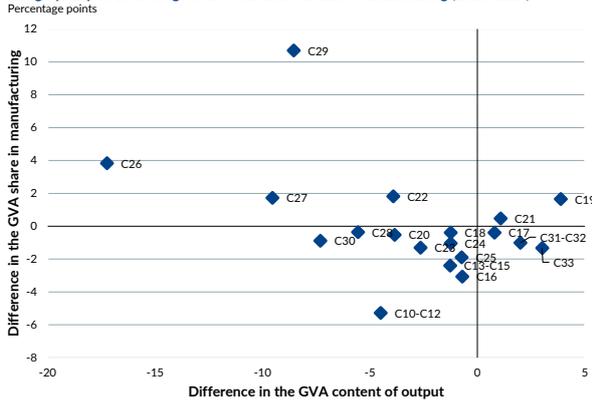
Hungary: GVA content of gross output versus top 3 and EU average - Business services (2015-2024)



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Source: Author's calculations, Eurostat.

Chart HU 2a

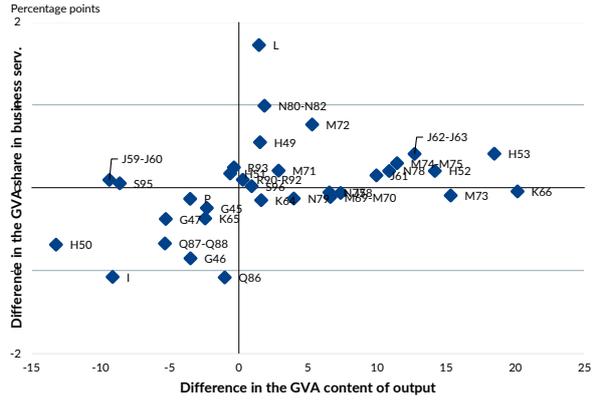
Hungary: Gap to EU average in GVA content and size - Manufacturing (2015-2024)



Note: EU average is calculated as the arithmetic average of countries with available data.
Source: Author's calculations, Eurostat.

Chart HU 2b

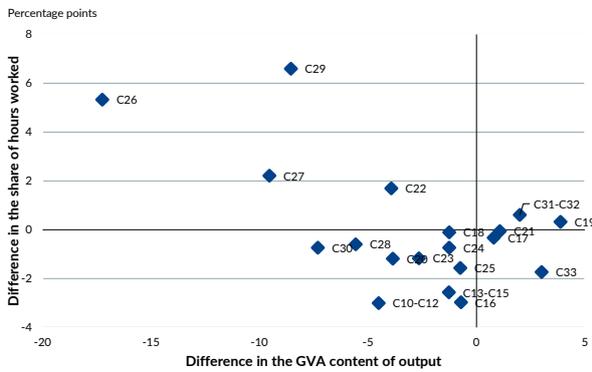
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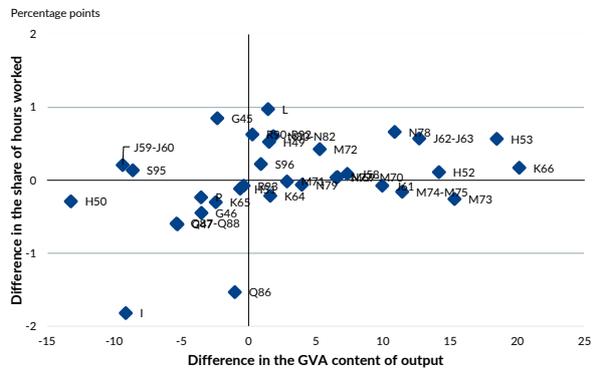
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Chart HU 3b

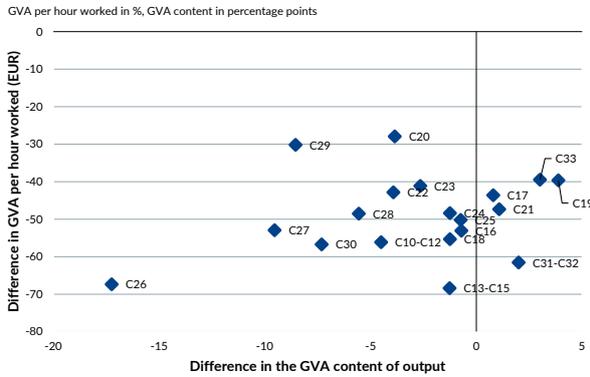
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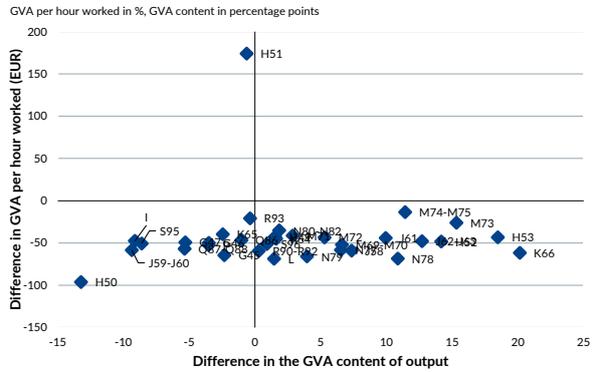
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Note: EU average is calculated as the arithmetic average of countries with available data.
Source: Author's calculations, Eurostat.

Chart HU 4b

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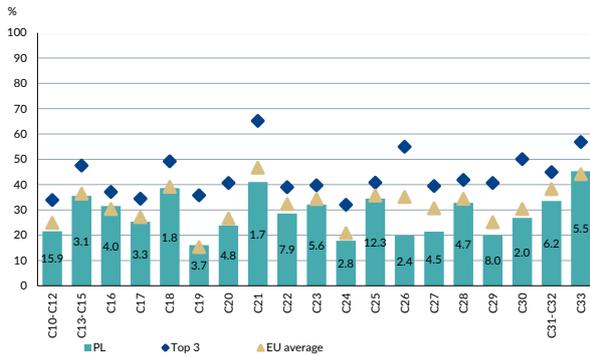


Note: EU average is calculated as the arithmetic average of countries with available data.
Source: Author's calculations, Eurostat.

Poland

Chart PL 1a

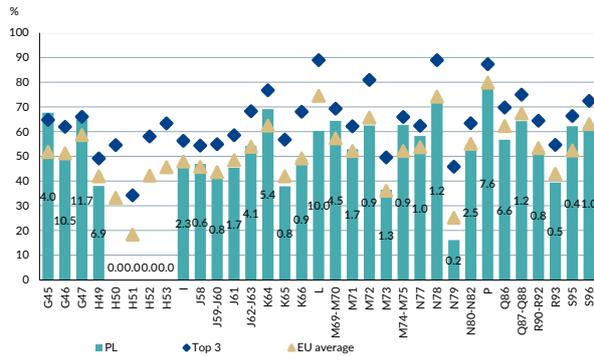
Poland: GVA content of gross output versus top 3 and EU average - Manufacturing (2015-2022)



Note: The values in the columns represent the weight of the sector as a share of total manufacturing (in the country). EU average is calculated as the arithmetic average of countries with available data.
Source: Author's calculations, Eurostat.

Chart PL 1b

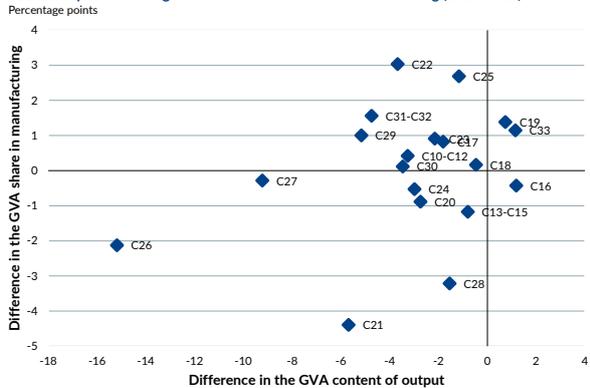
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Note: The values in the columns represent the weight of the sector as a share of total business services (in the country). EU average is calculated as the arithmetic average of countries with available data.
Source: Author's calculations, Eurostat.

Chart PL 2a

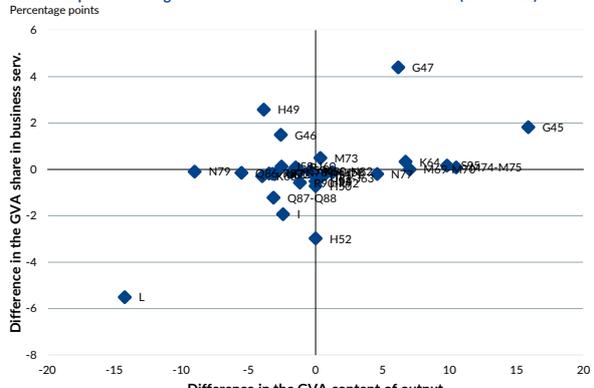
Poland: Gap to EU average in GVA content and size - Manufacturing (2015-2022)



Note: EU average is calculated as the arithmetic average of countries with available data.
Source: Author's calculations, Eurostat.

Chart PL 2b

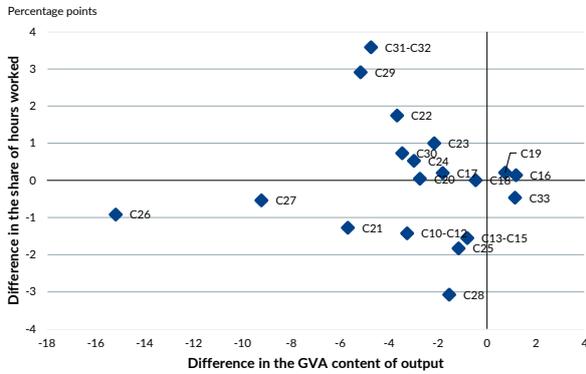
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Source: Author's calculations, Eurostat.

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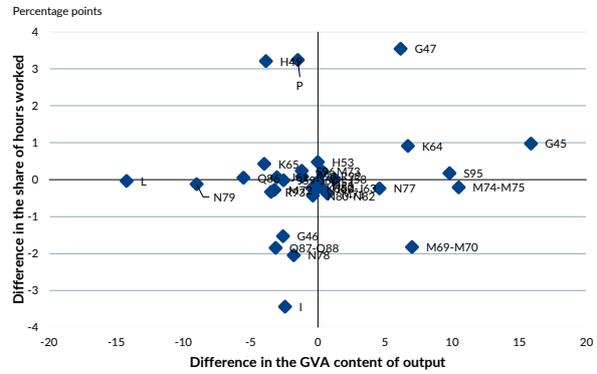
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Chart PL 3b

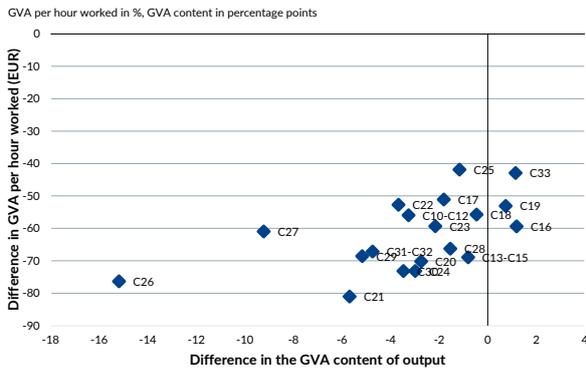
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Chart PL 4a

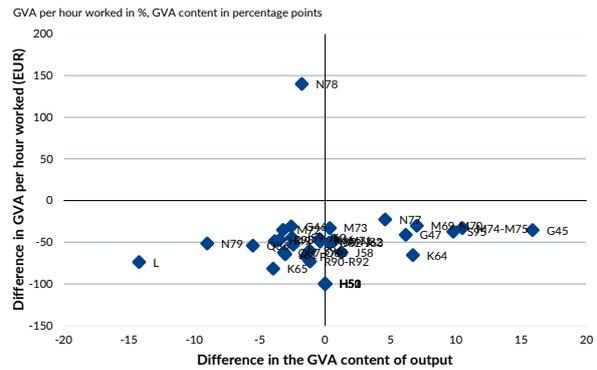
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Note: EU average is calculated as the arithmetic average of countries with available data.
Source: Author's calculations, Eurostat.

Chart PL 4b

Poland: Gap to EU average in GVA content and GVA per hour worked (in EUR) - Business services (2015-2022)

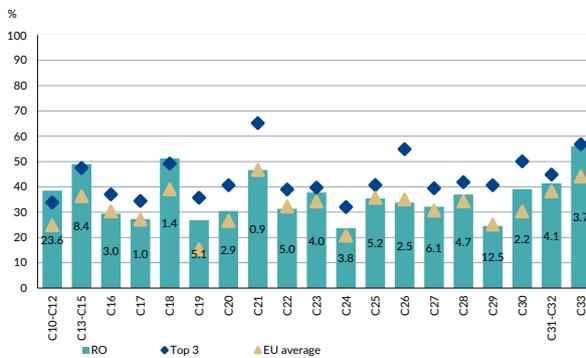


Note: EU average is calculated as the arithmetic average of countries with available data.
Source: Author's calculations, Eurostat.

Romania

Chart RO 1a

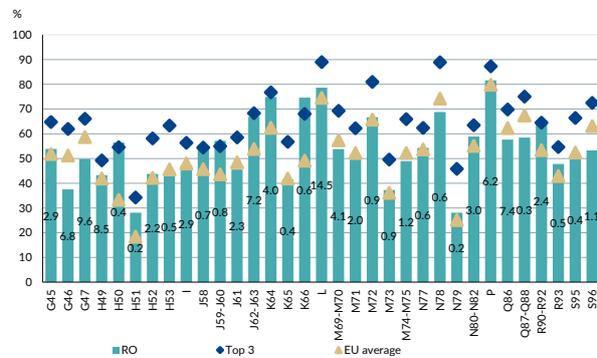
Romania: GVA content of gross output versus top 3 and EU average - Manufacturing (2015-2022)



Note: The values in the columns represent the weight of the sector as a share of total manufacturing (in the country). EU average is calculated as the arithmetic average of countries with available data.
Source: Author's calculations, Eurostat.

Chart RO 1b

Romania: GVA content of gross output versus top 3 and EU average - Business services (2015-2022)



Note: The values in the columns represent the weight of the sector as a share of total business services (in the country). EU average is calculated as the arithmetic average of countries with available data.
Source: Author's calculations, Eurostat.

Chart RO 2a

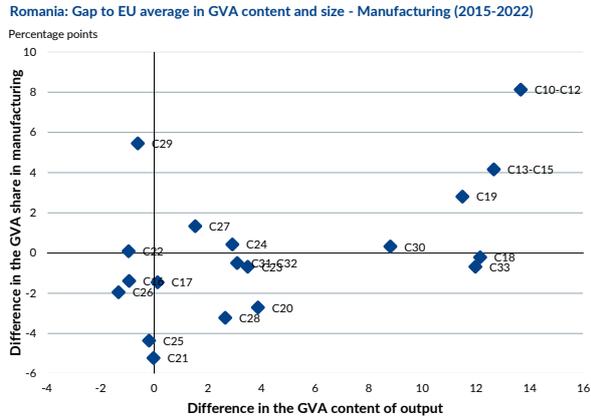


Chart RO 2b

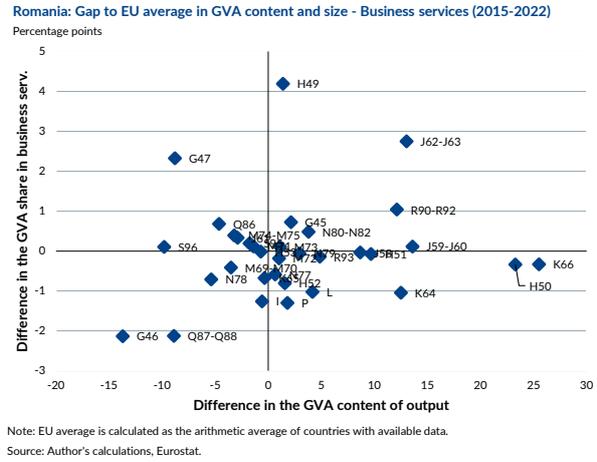


Chart RO 3a

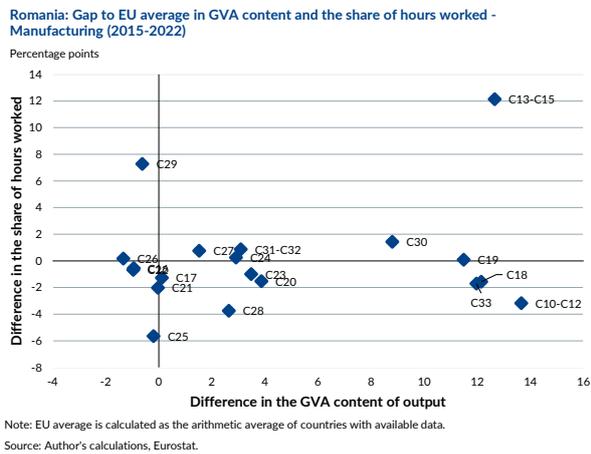


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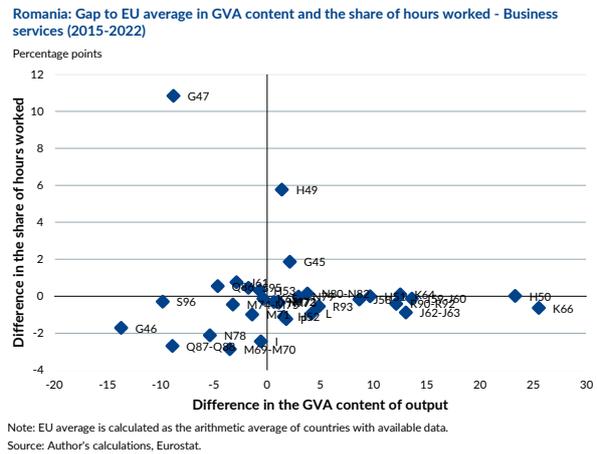


Chart RO 4a

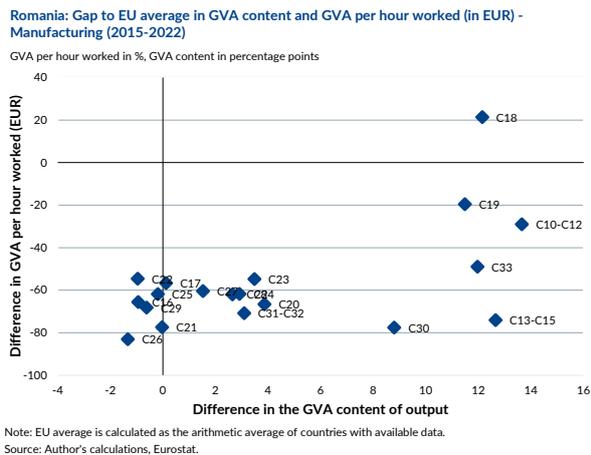
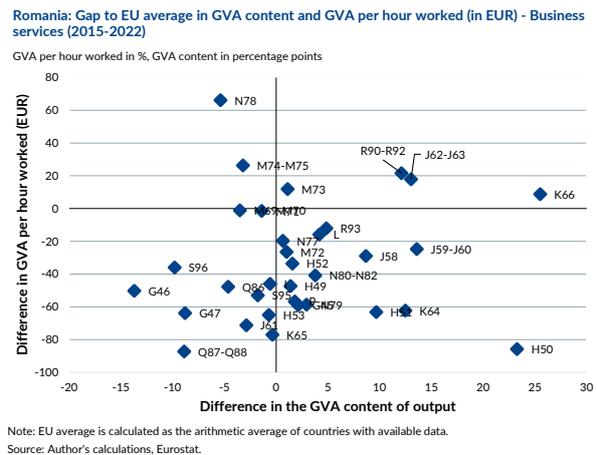


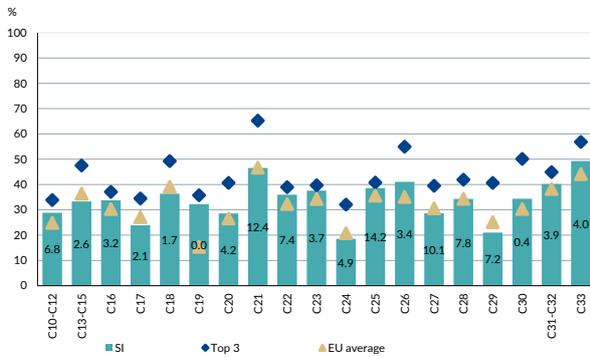
Chart RO 4b



Slovenia

Chart SI 1a

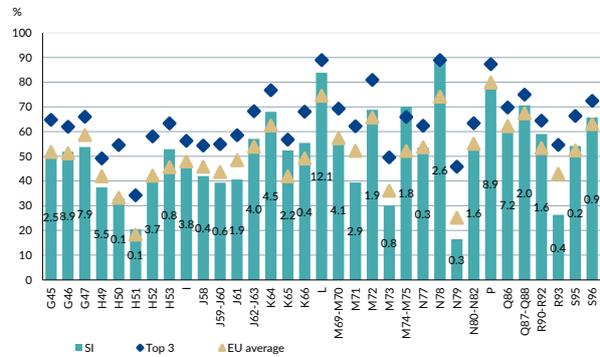
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Note: The values in the columns represent the weight of the sector as a share of total manufacturing (in the country). EU average is calculated as the arithmetic average of countries with available data.
Source: Author's calculations, Eurostat.

Chart SI 1b

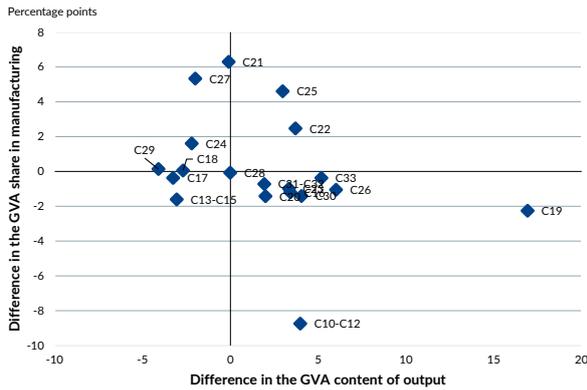
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Chart SI 2a

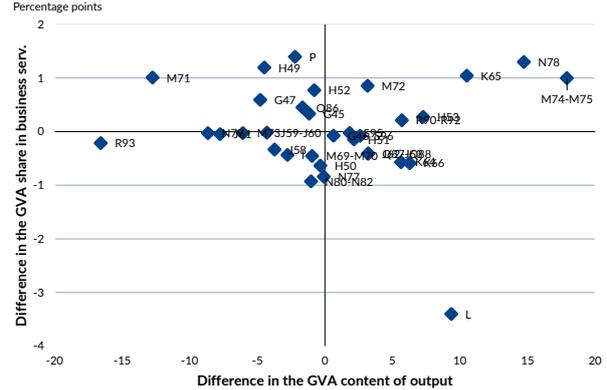
Slovenia: Gap to EU average in GVA content and size - Manufacturing (2015-2024)



Note: EU average is calculated as the arithmetic average of countries with available data.
Source: Author's calculations, Eurostat.

Chart SI 2b

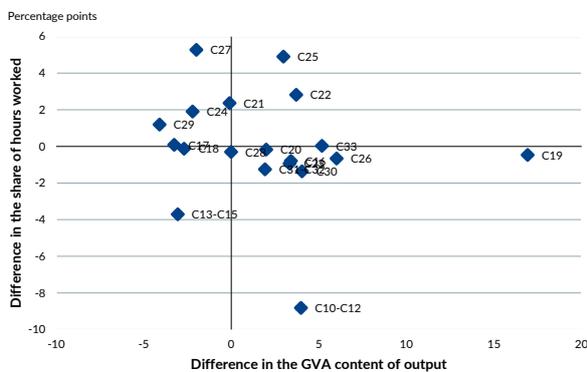
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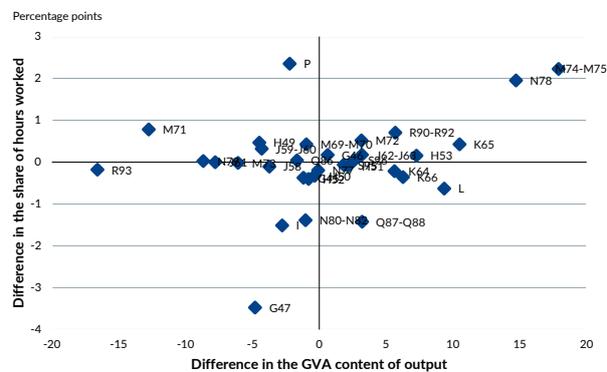
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Chart SI 3b

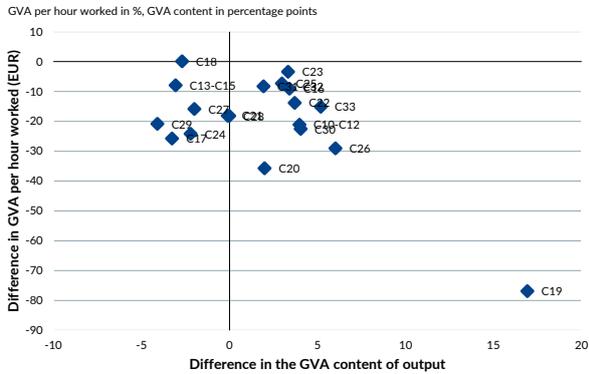
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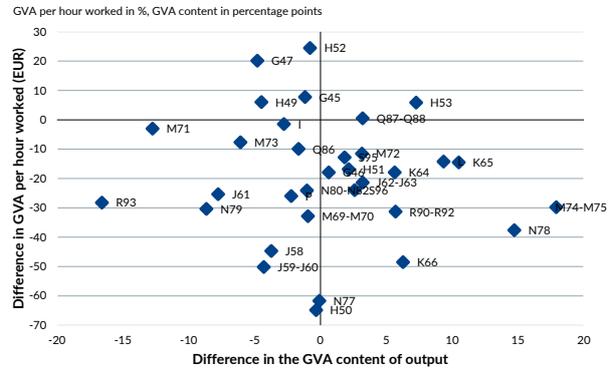
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Chart SI 4b

Slovenia: Gap to EU average in GVA content and GVA per hour worked (in EUR) - Business services (2015-2024)

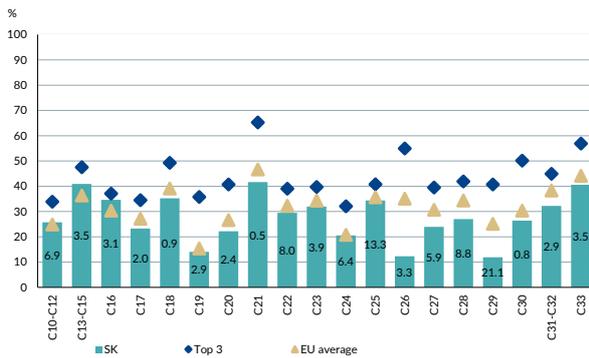


Note: EU average is calculated as the arithmetic average of countries with available data.
Source: Author's calculations, Eurostat.

Slovakia

Chart SK 1a

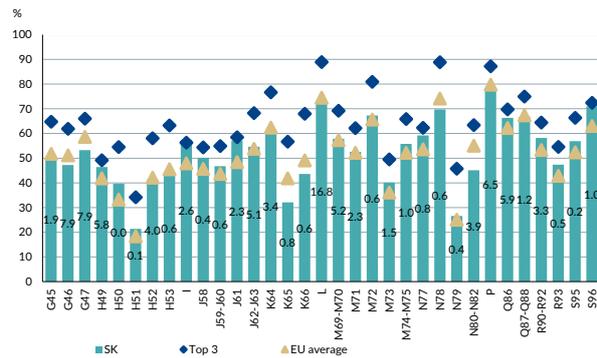
Slovakia: GVA content of gross output versus top 3 and EU average - Manufacturing (2015-2023)



Note: The values in the columns represent the weight of the sector as a share of total manufacturing (in the country). EU average is calculated as the arithmetic average of countries with available data.
Source: Author's calculations, Eurostat.

Chart SK 1b

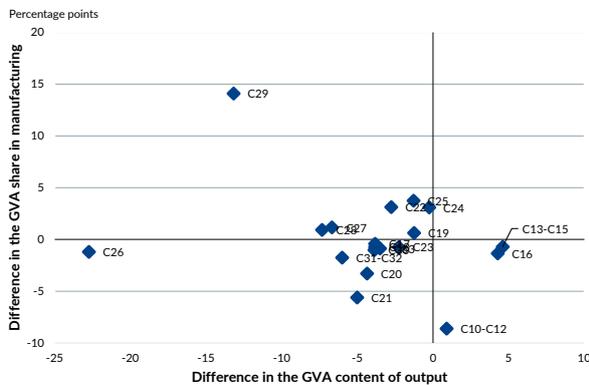
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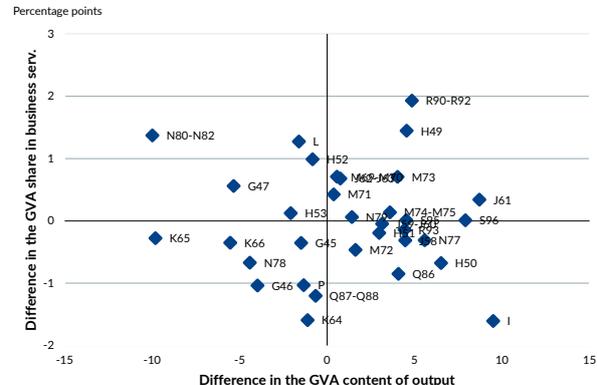
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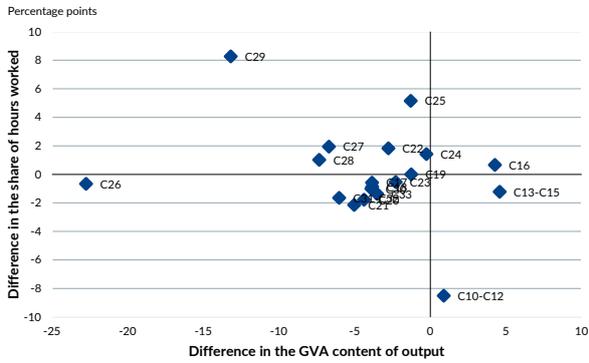
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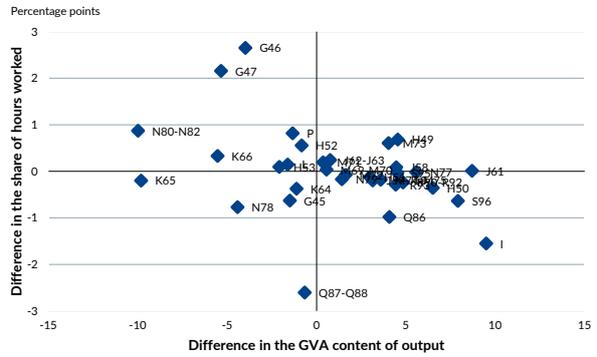
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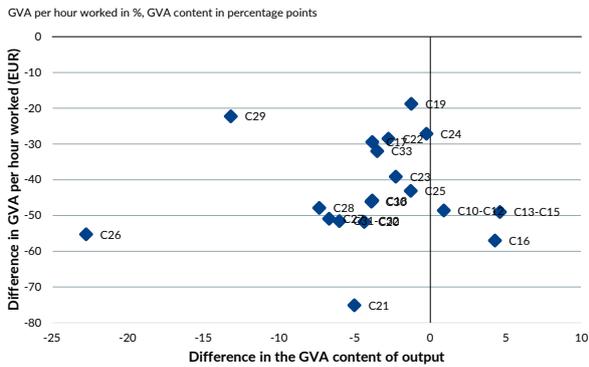
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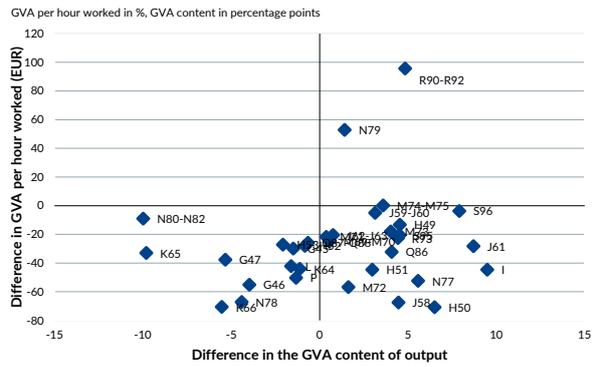
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9. Annex 2: NACE Rev. 2 classification of manufacturing and business services

Manufacturing

C10-C12	Manufacture of food products; beverages and tobacco products	Low-technology
C13-C15	Manufacture of textiles, wearing apparel, leather and related products	Low-technology
C16	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	Low-technology
C17	Manufacture of paper and paper products	Low-technology
C18	Printing and reproduction of recorded media	Low-technology
C19	Manufacture of coke and refined petroleum products	Medium-low-technology
C20	Manufacture of chemicals and chemical products	Medium-high-technology
C21	Manufacture of basic pharmaceutical products and pharmaceutical preparations	High-technology
C22	Manufacture of rubber and plastic products	Medium-low-technology
C23	Manufacture of other non-metallic mineral products	Medium-low-technology
C24	Manufacture of basic metals	Medium-low-technology
C25	Manufacture of fabricated metal products, except machinery and equipment	Medium-low-technology
C26	Manufacture of computer, electronic and optical products	High-technology
C27	Manufacture of electrical equipment	Medium-high-technology
C28	Manufacture of machinery and equipment n.e.c.	Medium-high-technology
C29	Manufacture of motor vehicles, trailers and semi-trailers	Medium-high-technology
C30	Manufacture of other transport equipment	Medium-high-technology
C31-C32	Manufacture of furniture; other manufacturing	Low-technology
C33	Repair and installation of machinery and equipment	Medium-low-technology

Business services

G45	Wholesale and retail trade and repair of motor vehicles and motorcycles	Less knowledge-intensive
G46	Wholesale trade, except of motor vehicles and motorcycles	Less knowledge-intensive
G47	Retail trade, except of motor vehicles and motorcycles	Less knowledge-intensive
H49	Land transport and transport via pipelines	Less knowledge-intensive
H50	Water transport	Knowledge-intensive
H51	Air transport	Knowledge-intensive
H52	Warehousing and support activities for transportation	Less knowledge-intensive
H53	Postal and courier activities	Less knowledge-intensive
I	Accommodation and food service activities	Less knowledge-intensive
J58	Publishing activities	Knowledge-intensive
J59-J60	Motion picture, video, television programme production; programming and broadcasting activities	Knowledge-intensive
J61	Telecommunications	Knowledge-intensive
J62-J63	Computer programming, consultancy, and information service activities	Knowledge-intensive
K64	Financial service activities, except insurance and pension funding	Knowledge-intensive
K65	Insurance, reinsurance and pension funding, except compulsory social security	Knowledge-intensive
K66	Activities auxiliary to financial services and insurance activities	Knowledge-intensive
L	Real estate activities	Less knowledge-intensive
M69-M70	Legal and accounting activities; activities of head offices; management consultancy activities	Knowledge-intensive
M71	Architectural and engineering activities; technical testing and analysis	Knowledge-intensive
M72	Scientific research and development	Knowledge-intensive
M73	Advertising and market research	Knowledge-intensive
M74-M75	Other professional, scientific and technical activities; veterinary activities	Knowledge-intensive
N77	Rental and leasing activities	Less knowledge-intensive
N78	Employment activities	Knowledge-intensive
N79	Travel agency, tour operator and other reservation service and related activities	Less knowledge-intensive
N80-N82	Security and investigation, service and landscape, office administrative and support activities	Less knowledge-intensive
P	Education	Knowledge-intensive
Q86	Human health activities	Knowledge-intensive
Q87-Q88	Residential care activities and social work activities without accommodation	Knowledge-intensive
R90-R92	Creative, arts and entertainment activities; libraries, archives, museums and other cultural activities; gambling and betting activities	Knowledge-intensive
R93	Sports activities and amusement and recreation activities	Knowledge-intensive
S95	Repair of computers and personal and household goods	Less knowledge-intensive
S96	Other personal service activities	Less knowledge-intensive

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