IMAD

productivity report 2023

" The best for the group comes when everyone in the group does what's best for himself *and* the group.
John Nash

" If you're not prepared to be wrong, you'll never come up with anything original.
Ken Robinson

" The most important spice in wine is ethics ... study philosophy, and then make wine...
Joško Gravner

*The author of the cover picture is **Nil Ferro Seliškar**, nine years old, who created the picture under the guidance of Maja Somrak and Katja Zalar Nikovič as part of the "SlikAI" workshop.*

The workshop took place on 11 and 12 September 2023 at the Rampa Laboratory in Ljubljana and aimed to combine cutting-edge technologies and raise awareness of climate change.

Participants explored the intersection of science, art and technology. The workshop encouraged group work and individual expression and created a collaborative environment with the aim of developing talent.

Like last year, each reader will interpret the image for themselves, and at UMAR, we simply add: "The possibilities are endless".

Productivity Report 2023 (Poročilo o produktivnosti 2023)

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Responsible person: Marijana Bednaš, MSc, Director

Editor: Peter Wostner, PhD

Authors of the Productivity Report 2023 (listed alphabetically):
Barbara Bratuž Ferk, MSc, Urška Čede, MSc, Tanja Čelebič, MSc, Lejla Fajić, Tina Golob Šušteršič, PhD, Marta Gregorčič, PhD, Marjan Hafner, MSc, Matevž Hribernik, MSc, Katarina Ivas, MSc, Laura Južnik Rotar, PhD, Alenka Kajzer, PhD, Tina Kocjančič, PhD, Mateja Kovač, MSc, Rotija Kmet Zupančič, MSc, Janez Kušar, MSc, Andrej Kuštrin, PhD, Urška Lušina, MSc, Mitja Perko, MSc, Denis Rogan, MSc, Urška Sodja, Ana Vidrih, MSc, and Peter Wostner, PhD.

Technical editing and layout: Mojca Bizjak, Bibijana Cirman Naglič, Maja Založnik
Translated by: Špela Potočnik

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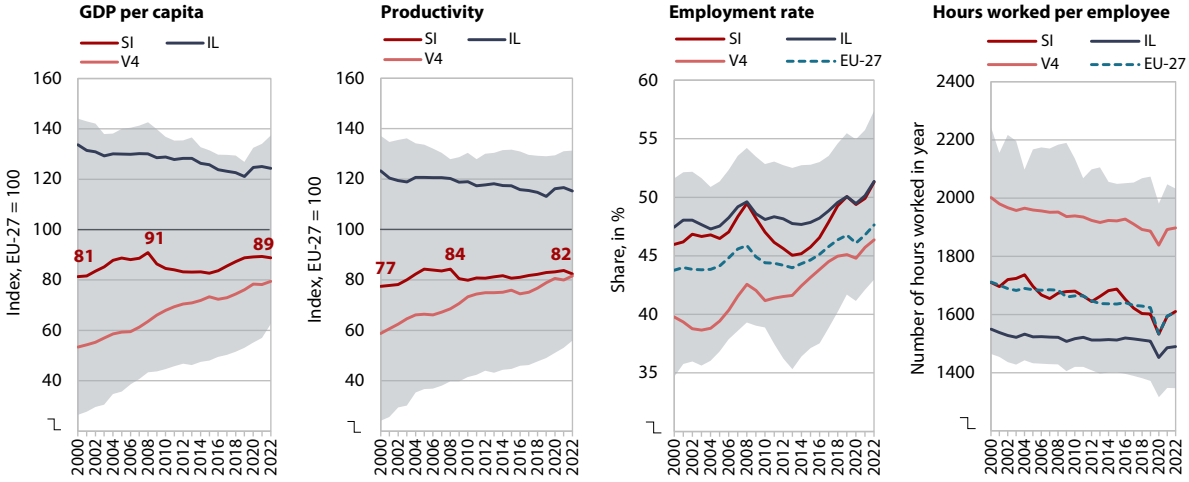
Key messages and guidelines

Slovenia's long-standing development gap with the EU average did not narrow in 2022. GDP growth was mainly driven by increased labour quantity, while real productivity growth remained modest. The latter averaged 1% over the last five-year period and was therefore significantly lower than before 2009, when Slovenia improved the conditions for increasing material prosperity relatively quickly, with productivity growth of around 3%, and also narrowed the gap with the more developed EU Member States. Slovenia thus reached 84% of the EU average in productivity (in purchasing power parity) per person employed in 2008, compared to just 82% in 2022. This is almost 30% below the level of the innovation leaders, which stand out even more in terms of productivity if the GDP generated per hour worked is taken into account. The demographic trend of a shrinking population in the most active age group (20–64 years) is also driving the need to accelerate productivity growth, particularly growth in productivity per hour worked.



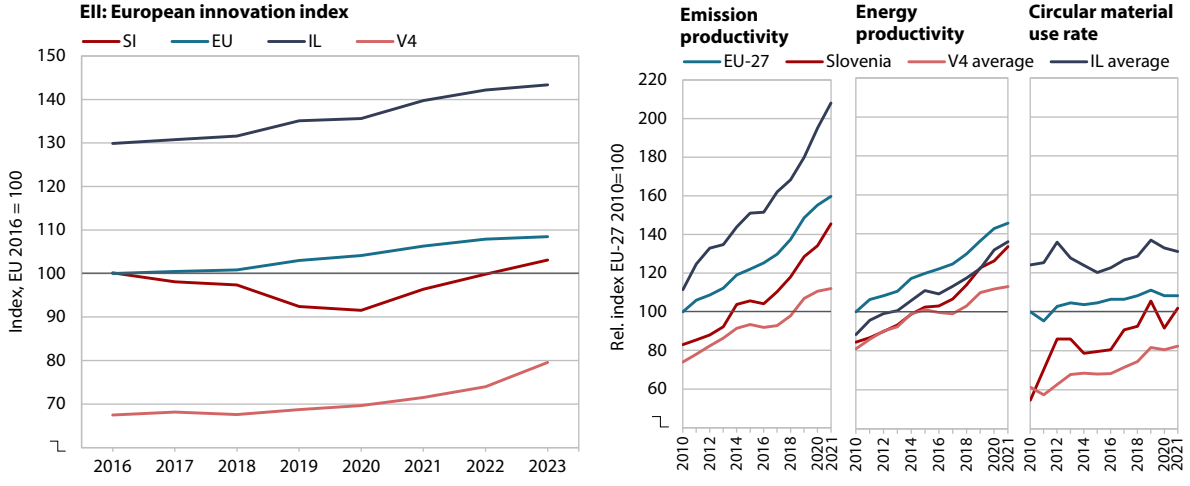
Source: Eurostat (2023); calculations by IMAD. For notes see Figure 1.

Despite modest shifts in productivity at the macro level, Slovenia continues to have a strong position for accelerated development in a number of areas:

1. **The financial situation in the corporate sector remains favourable.** Although the financial situation in some parts of the economy deteriorated in the period 2020–2022, it is still favourable in the corporate sector as a whole. Slovenia also ranks relatively high on the Economic Resilience Index at 9th place in the EU. This is due to Slovenia's high degree of social cohesion, economic independence and financial resilience.
2. **The economy is successfully integrating into global value chains, among other things by improving its functional and technological specialisation.** Slovenia is moving up the production chain and, compared to other competing countries, is more successful in upgrading production with other functions, of which research and development are particularly important. It is positive that it is utilising expertise from more and more domains to develop new products. This is reflected in the increasing economic complexity, where Slovenia has risen from 12th to 5th place. It also ranks 5th in the EU in terms of the share of exports of medium- and high-technology intensive products.

3. **The educational structure of the labour force is improving, as is the share of the knowledge-based economy.** The share of tertiary-educated people (especially experts) in the working-age population rose sharply in 2010–2020 and was well above the EU average (and even more above the V4 average). Slovenia thus no longer lags far behind the innovation leaders and has the eighth-highest proportion of employees in knowledge-based activities.[1]
4. **There have also been some positive developments in the acceleration of innovation and investment activity.** In both areas, Slovenia has made more progress than the EU average in recent years. In 2018–2020, the share of innovation-active companies (55%) was above the EU average for the first time in a decade, and investment accelerated in machinery and equipment in particular. At the same time, positive trends can also be observed in some other areas, such as investment in branding, with companies also significantly increasing their climate-related investments.
5. **Slovenians have a positive attitude towards entrepreneurship and digital transformation.** Although Slovenia has not yet succeeded in improving its attitudes towards new ideas, change and risk-taking, which are important for a smart and green transition, attitudes towards entrepreneurship have improved significantly and the impact of digital transformation on the economy and society is also viewed positively.

The main challenge is thus not the direction but the pace and intensity of smart and green transformation, especially compared to the innovation leaders. Slovenia's progress in innovation performance (according to the European Innovation Scoreboard) is too slow, despite some advancement, as it would take more than 30 years for Slovenia to catch up with the innovation leaders. The same is true for emissions and energy productivity and for the share of recycled materials in total consumption, i.e. circular use of resources, where, in addition to the sluggish pace of progress, companies still have an overly defensive attitude, in the sense that they are primarily reacting to the challenges of sustainable transformation rather than seeing the opportunities.



Sources: Eurostat (2023), European Commission (2023d); calculations by IMAD. For notes see Figure 26.

[1] Activities in which at least one-third of employees has completed tertiary education.

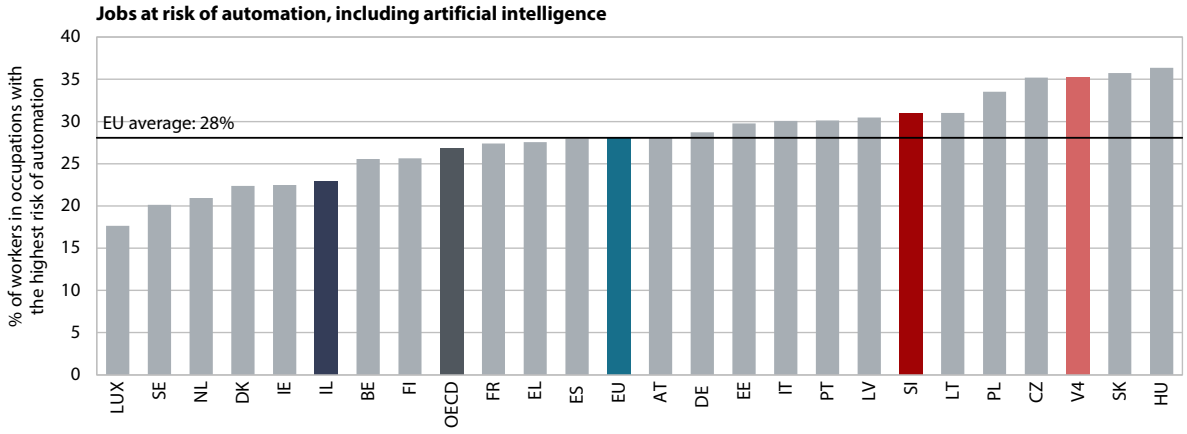
Skilled labour is of key importance for a successful smart and green transition... Like other developed countries, Slovenia lacks skilled labour for both cyclical and structural reasons. Among the structural reasons, the most important are demographic changes and the slow adaptation of the content and organisation of education and training to changes in the demand for labour and skills. There is already a shortage of personnel for the green and smart transformation as well as in education, health and social services, where demand is expected to increase in the future. The technological developments that are accelerating change in the economy and society are also changing the nature and organisation of work and require a shift in the understanding of the working life cycle, as individuals will move through several careers over the course of their lives, need to participate in lifelong education and training, and may remain active after retirement.

... upgraded by an accelerated transformation of the business sector, which relies too much on traditional comparative advantages. Slovenia must go beyond its production focus, where it is highly competitive and even a leader when it comes to large companies (e.g. in the use of industrial robots, the Internet of Things or the integration of internal processes). At the same time, it is not yet unleashing its full potential when it comes to strengthening other high value-added functions (R&D, sales, logistics, management) and is also struggling to move from traditional to data-driven companies with strengthened focus on value-creation for the customer. This type of transformation, which should comprehensively address technological, digital, sustainability and organisational/marketing aspects, must be promoted across all activities. At the same time, development in activities where opportunities have so far been underutilised, particularly in the context of the rapidly growing global shift towards knowledge-based services, should also be enhanced in the future.

The speed and intensity of smart and green transformation will become even more important in the future due to external factors or megatrends, with the following standing out:

1. **Demographic trends:** over the last decade, the population aged 20–64 has declined by 67,000, an average of 7,000 per year, and projections based on moderate net migration show that it will decrease by a further 43,000 by 2030 and by 119,000 by 2050, compared to 2022. Demographic trends are therefore **one of the main reasons for the severe labour shortages, which will become even more pronounced in the future and therefore represent our new reality.** The ability to ensure and strategically manage human resources will therefore be one of the most important structural factors for Slovenia's competitiveness in the future.
2. **Digital transition:** The potential risk of job automation has increased further in Slovenia, as in other countries, taking into account the impact of artificial intelligence. With 31% of jobs potentially at high risk of automation, Slovenia ranks sixth among EU Member States in this regard. On the other hand, **new enabling technologies**, including generative artificial intelligence, **represent an opportunity**, as not only estimates for the future but also empirical studies of past trends increasingly confirm that they have a **positive impact on productivity when introduced:** (i) **in a comprehensive manner**, using more complementary technologies and supported by appropriate training, and (ii) **at an accelerated pace**, as the estimated benefits are higher in more ambitious and developed countries. At the same time, under the right conditions, when performing the same tasks, new technologies can be of greater benefit to the less experienced, skilled or successful employees (OECD, 2023f; Dell'Acqua et al., 2023), which, in

addition to the risks that such technologies can entail, also points to the potential qualitative benefits of their accelerated implementation in practice.



Source: OECD (2023f), based on Lassébie and Quintini (2022); presentation by IMAD.

3. **Green transition:** The consequences of climate change, such as floods, droughts and fires, are becoming more pronounced, frequent and intense. This not only has a catastrophic impact on people's lives and well-being, but also has a direct effect on the performance of many economic sectors, with the loss for the EU already estimated at around one-tenth of GDP. The ecological footprint, which measures the impact on the environment, is still high in Slovenia (similar to the European average), which indicates a continuation of unsustainable development in the last decade. The green transition must therefore be **accelerated in the coming years.** This will change the inter- and intra-sectoral structure of the economy, phasing out brown technologies and activities, moving to a low-carbon circular economy, and strengthening activities that contribute to improving the environment. The latter will thus become an **opportunity for innovation and development and, consequently, a source of new competitive advantages**, where mainly those who are more ambitious in their green transformation will benefit most.

Policy recommendations

To join the ranks of the most advanced countries, Slovenia needs a strategic shift, focusing on measures that accelerate the transition to a smart and green economy and primarily have a long-term impact, which requires ensuring the right conditions, i.e. a predictable, efficient and responsive business environment and a strategic approach to human resource development.

A. A predictable, efficient and responsive business environment:

1. In order to achieve a high level of productivity in the business sector, the **productivity of the public sector must be improved also**, in particular with regard to:
   a. improving the quality of public services (health, education, resilience and emergency response, etc.);
   b. enabling predictable yet agile and responsive public services, both in terms of de-bureaucratisation, flexibilisation and digitalisation and in terms of strategic policy coordination.

2. Creating a more **favourable environment for highly productive** activities and workers, in particular by:
   a. accelerating the reallocation of economic activities and workers from less productive to more productive enterprises (improving allocative efficiency);
   b. restructuring taxes in order to reduce taxation on labour on the one hand and increase revenue from other sources and restructure expenditure on the other;
   c. focusing economic policy measures on supporting the healthy core of the economy, especially the development-oriented niche parts of the economy with high growth potential.

B. A strategic approach to human resources development where every individual counts:

1. Measures to ensure a **sufficient labour force**, with the following priorities:
   a. creating the conditions for a longer working life, including earlier entry into the labour market for young people and a longer working life for older people. In addition to pension reform, this also includes adapting workplaces to older workers and promoting new approaches to human resources management in companies (e.g. age management, i.e. taking full advantage of the strengths and talents of different age groups to achieve optimal results);
   b. an active migration policy to attract labour, especially skilled labour, from abroad and to encourage the return of Slovenian professionals, i.e. establishing a circular migration system. Without high net migration, it will not be possible to ensure further employment growth, which could hinder economic growth. At the same time, if we were able to attract more educated immigrants, the positive impact on GDP per capita would more than double over a 30-year period, i.e. it would be 3.4% higher than in the baseline scenario;

c. appropriate policy for the social integration of labour migrants and their families by creating conditions for interaction between nationals and foreigners.

2. **Further strengthening of education and training for all workers and developing a culture of lifelong learning** are crucial to ensure the right skills, with the following priorities:
   a. increased investment by companies and the state in the education and training of all employees and the improvement of working conditions, especially for highly qualified people (e.g. researchers), as the demand for new skills is high and without them it is not possible to utilise new technologies and increase productivity;
   b. human resource development in companies by promoting a culture based on a positive attitude towards learning, including by identifying skill and competence needs among workers and planning their training and development accordingly;
   c. creating a flexible adult education and (re)training system that responds quickly to the needs of the economy (e.g. setting up a system of micro-certificates for short-term training), including by raising individuals' awareness of the need for lifelong learning;
   d. improving access to training for the green and digital transitions, including for the unemployed and inactive, which requires the design and strengthening of active employment policy programmes.

3. **Improving the responsiveness of the education and training systems to the changing needs of the economy in the medium term**, linked to the green and digital transformation, demographic change, and other development trends. The development of a comprehensive system for recognising and forecasting personnel and skills needs remains a challenge. A strategic approach to human resources development planning will also need to take into account the rapidly changing skills needs, which will require even greater involvement of social partners, including companies and other institutions.

C. Measures to accelerate the transition to a smart and green economy

These represent the top of the hierarchy of the necessary package of measures to increase productivity growth, where sustainability aspects need to be promoted horizontally, especially when it comes to technological development and sustainable entrepreneurship.

1. Improvement of the **framework conditions**:
   a. the quality of the ecosystems for research, innovation and entrepreneurship, including for the promotion of start-ups, must be raised from mediocrity to the level of the innovation leaders;
   b. infrastructural conditions must be further improved, especially for digital connectivity, to eliminate grey areas on the one hand and to improve access to and use of high-capacity fixed and mobile networks on the other.

2. Further **acceleration of investments**: Slovenia has had one of the lowest contributions of investment to productivity growth in the last decade, in terms of both tangible (buildings, machinery, equipment) and intangible (R&D, knowledge, ICT, organisation) capital. It is particularly important to narrow the

gap with the innovation leaders in R&D investment, especially (i) in the so-called valley of death,[2] (ii) in the corporate sector, where the state must also play its role, and (iii) in relation to technologies that are considered priorities and are also related to the environment, with additional attention also being paid to investment in software and data and in other forms of soft capital (e.g. design and organisational capital).

3. **Promoting business transformation**

While Slovenia has recently made significant progress in the educational structure of the labour force, there is still considerable room for improvement in resource efficiency (i.e. total factor productivity), which is directly linked to the slow pace of business transformation towards a smart and green economy.

On the one hand, this should be promoted through the **broadening of the transformation processes**, not just by enabling a more efficient functioning of markets (see recommendation A.2.a) but also:

a. in medium-sized and small companies, which lag far behind the same group of companies in innovation leaders in terms of both innovation activity and digital intensity, which is not the case for large companies;
b. by further promoting co-operation and business integration that help to better exploit synergies between (i) large and other enterprises, including start-ups, (ii) different business functions (e.g. between production and other functions and consequently between high- and medium-educated workers), (iii) manufacturing and service enterprises, and (iv) enterprises on the one hand and knowledge institutions and the state on the other.

On the other hand, **smart and green transformation processes must be deepened** in all parts of the economy through:

a. even more intensive automation;
b. further strengthening of high value-added functions (research and development, sales, management);
c. greater emphasis on breakthrough innovation, including green innovation, and even greater product differentiation that creates value for the customer;
d. upgrading business practices in terms of:
   (i) introducing data-driven management;
   (ii) innovation of sustainable business models;
   (iii) organisational upgrade by introducing more flexible forms of work and management;
   (iv) accelerating the introduction of an open, innovation-friendly culture.

[2] Investment in the high-risk R&D development phases (development from proof of concept to prototype), where the availability of funding sources is often limited due to the need for complementary government and corporate funding.

1 Introductory remarks

In accordance with the Council Recommendation (2016), each Member State appoints a National Productivity Board, whose functions in Slovenia have been carried out by the Institute of Macroeconomic Analysis and Development (IMAD) since 2018. Based on objective, neutral and fully independent analyses of productivity and competitiveness, the National Productivity Boards produce annual reports with the aim of improving economic policies.

In the Productivity Report, unless otherwise stated, the term productivity refers to labour productivity, which measures how much value added is created on average per unit of work (per employee or per hour worked). There are also other measures of productivity,[3] but this is the most commonly used productivity indicator internationally as a key indicator of economic performance (OECD, 2023e). In the face of negative demographic trends leading to a shrinking working-age population, productivity is becoming an increasingly important source of strengthening economic development, which is the prerequisite for a better quality of life and prosperity of the population.

Average productivity growth in Slovenia has recently been much lower than before the global financial crisis. Similar trends can also be observed in the EU and OECD countries (OECD, 2023e), although here the decline between the two periods was somewhat smaller on average. While productivity growth accelerated significantly in the first three decades after the Second World War, growth rates have slowed since then, which is something of a paradox (Solow, 1987) given the major technological breakthroughs (especially in ICT) during this period.

Possible reasons cited in the literature for the slowdown in productivity growth include the declining transformative nature of discoveries compared to previous technological breakthroughs, the slowdown in technology diffusion in companies, sectors and regions, and the time lag in the impact of new discoveries due to gradual adjustments to organisational structures and business models, sectoral changes with regard to the growing importance of services and the significance of increasing inequality, an ageing population and weak aggregate demand, insufficient investment, particularly in increasingly important intangible capital, and declining allocative efficiency and structural barriers in the market (see for example Gordon, 2016; Summers, 2020; Goldin et al., 2022; OECD, 2023e).

On the other side of the debate, there are more or much more optimistic views, ranging from the view that the slowdown in productivity growth is mainly related to measurement difficulties (due to the increasing importance of the digital economy or intangible capital, but also the importance of the voluntary, informal or shadow economy) to the optimistic expectation that breakthrough technologies require complementary investments (Calvino and Fontanelli, 2023) and that it is therefore realistic to expect that productivity gains, e.g. from ICT, will only become apparent in the coming period (the so-called J-curve hypothesis – see Brynjolfsson et al. (2020)) and to very optimistic predictions about the potential of the fourth industrial revolution and, in particular, generative artificial intelligence, which is estimated to increase productivity by up to an additional 3.3 p.p. (Chui et al., 2023).

[3] For example, total factor productivity is a measure of the speed of technological progress and new business models, while controlling for human and tangible capital deepening, which in principle can be more informative. There are currently no sufficiently reliable estimates of total factor productivity at company level, so the analyses based on this data in our report focus on labour productivity.

Recent empirical studies on the impact of new enabling technologies, based on increasingly high-quality and complete data and methods, especially for Europe (see for example Lamperti et al. (2023)), paint an increasingly optimistic picture (Peters and Trunschke, 2022). On the other hand, a number of factors, for example in connection with increasing uncertainty, but also geostrategic shocks, suggest that we should be cautious in our expectations for the future (The Economist, 2023). Caution, however, should not be confused with hesitation and indecision, since:

1. empirical studies of past trends consistently show that more developed countries that are more automated (and where education levels are higher) benefit from both higher investment potential and better absorptive capacity (Lamperti et al., 2023);
2. the same is true for studies on the potential impact of automation, including the impact of generative artificial intelligence, in the coming period (see Chapter 4).

The Productivity Report 2023 therefore emphasises that an accelerated smart and green transition that paves the way for faster productivity growth is the key to Slovenia's future prosperity. Accelerated productivity growth is not only important in macroeconomic terms, but also has tangible positive impact at the individual level. This is supported not only by the data on faster wage growth in Slovenian companies with high productivity growth (IMAD, 2022a), but also by international empirical studies that find a positive correlation between productivity growth and employment growth as well as wages (Calligaris et al., 2023). Faster productivity growth is not only important from an economic point of view, but also from a social point of view, as it enables the social subsystems to function sustainably for the benefit of the population, provided other appropriate measures are taken.

The introductory chapter is followed by an analysis of the current state and long-term trends in the productivity and competitiveness of the Slovenian economy at macro and micro levels, including a description of participation in global value chains and an analysis of the impact of energy costs on the performance of energy-intensive companies. The third chapter analyses the key factors behind the above-mentioned trends. It presents Slovenia's performance in the transition to a smart and green economy, the development of human resources, and the improvement of the business environment. Chapter 4 concludes the report with this year's main topic, a detailed analysis of the labour market, which includes a presentation of the trends and challenges that Slovenia has faced or will face, also taking into account global trends.

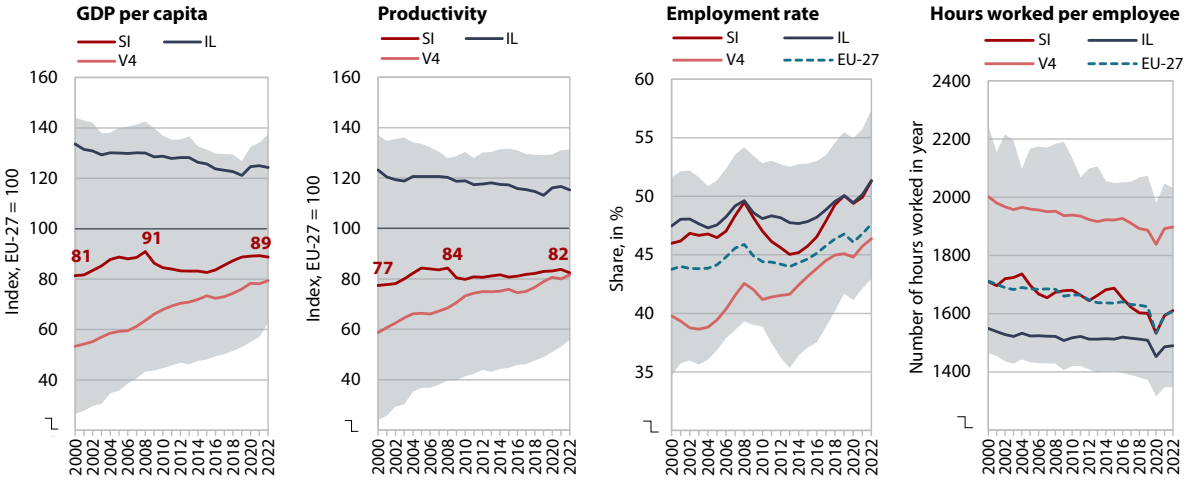
In addition to the EU and OECD averages, the Productivity Report often refers to innovation leaders and the Visegrad Group for international comparisons. The innovation leaders identified on the basis of the methodology used to calculate the European Innovation Index (EC, 2023e) are Sweden, Finland, Denmark, the Netherlands and Belgium. They serve as an example of the countries that are most successful in the transition to a smart and generally also green economy. On the other hand, the Visegrad Group, i.e. Poland, the Czech Republic, Slovakia and Hungary, are listed as the countries that are structurally most similar to Slovenia and that generally represent Slovenia's direct competition. When presenting the data for both groups of countries, a simple average is usually used, as the main purpose is to show the average trends at the level of the five or four countries, respectively, rather than the average for the whole group. The use of these country groups is intended to provide a clearer but also more reader-friendly picture of the situation and trends. However, a more detailed analysis was carried out for all countries and is presented where relevant. The Productivity Report 2023 was prepared using data available until 31 October 2023.

2 Situation and trends in the Slovenian economy

2.1 Slovenia's productivity and competitiveness

Slovenia's long-standing development gap with the EU average hasn't narrowed in 2022. According to the revised data,[4] Slovenia reached 82% of the EU average in terms of labour productivity in 2022, measured by GDP per employee in purchasing power standards (PPS). Slovenia's productivity gap was slightly higher than in 2021 (84%) and also higher than in 2008, when the trend of noticeable catching up with the EU average was interrupted. Slovenia's lag in GDP per capita (89% of the EU average in 2022, in PPS) is less pronounced than its lag in productivity, which is related to a higher share of population employed. In 2022, Slovenia ranked 16th in the EU-27 in GDP per capita adjusted for purchasing power (15th in 2008) and 18th in productivity per employee (16th in 2008). In terms of productivity per hour worked, which is lower in Slovenia, especially compared to the new EU Member States, Slovenia ranked higher, i.e. 13th (14th in 2008), but its productivity per employee was comparable to the EU average (82%, in PPS). In terms of productivity per hour worked, the innovation leaders (Sweden, Finland, Denmark, the Netherlands and Belgium) are far ahead and exceed the EU average by one-quarter.

Figure 1: Slovenia's GDP per capita adjusted for purchasing power parity was 89% of the EU average in 2022; the productivity gap was even larger (82% of the EU average)



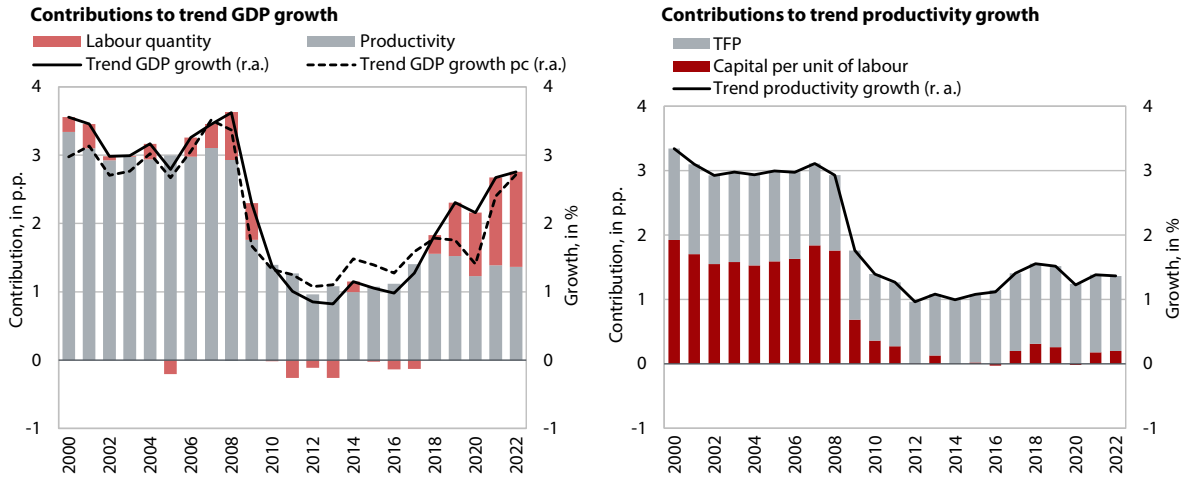
Source: Eurostat (2023); calculations by IMAD. Notes: The GDP per capita and productivity (GDP per employee) indicators are expressed in purchasing power standards (PPS). The employment rate is the ratio of employment to population; hours worked show the annual average number of hours worked per employee. The shaded field shows the range between the EU Member States with the lowest and the highest indicator values. Luxembourg and Ireland are excluded for better transparency but are included in the EU average. IL – innovation leaders; V4 – Visegrad countries.

GDP growth over the past five years has been mainly driven by increased labour quantity, while the key to addressing the constraints of an ageing population will lie in a renewed acceleration in productivity growth. At over 50%, the share of the population in employment in Slovenia's total population in 2022 was higher than ever before (see Figure 1). In recent years, with almost full employment,

[4] The statistical revision of the annual data significantly lowered the nominal values of GDP and labour productivity for Slovenia in 2022, which also affects the international comparison. In terms of productivity, Slovenia fell from 86% of the EU average to 82% and in terms of GDP per capita from 92% to 89% (both in PPS).

the majority of new jobs have been filled by immigrant workers. The high labour force participation of the working-age population is accompanied by a decline in working hours per employee,[5] which is on a downward trend both in Slovenia and in EU Member States. Due to the population ageing and the resulting decline in the number of working-age population in the most active age group (20–64 years), the scope for further growth in GDP per capita so dependent on the labour quantity (number of employees and hours worked) is quite limited (see Chapter 4). GDP growth, which is the basis for improving the material well-being of the population, will therefore depend even more on the ability to re-accelerate labour productivity growth per hour worked in the future. The average annual productivity growth, as measured by GDP per hour worked, declined from 3.4% in 2000–2008 to an average of 0.9% in 2009–2022 and remained relatively low even during the economic upswing (2014–2019), with growth of 2.1%. A key factor behind the slowdown in trend productivity growth during and after the global financial crisis was a more modest capital deepening with a more pronounced slowdown in investment in the corporate sector (for more see Section 3.1.2).

Figure 2: Low capital deepening is the main factor behind the slowdown in trend productivity and GDP growth



Source: SURS (2023c); calculations by IMAD. Notes: Trend growth is growth adjusted for the business cycle and is calculated using the production function method. Contributions to growth are also adjusted for the business cycle. GDP pc – GDP per capita.

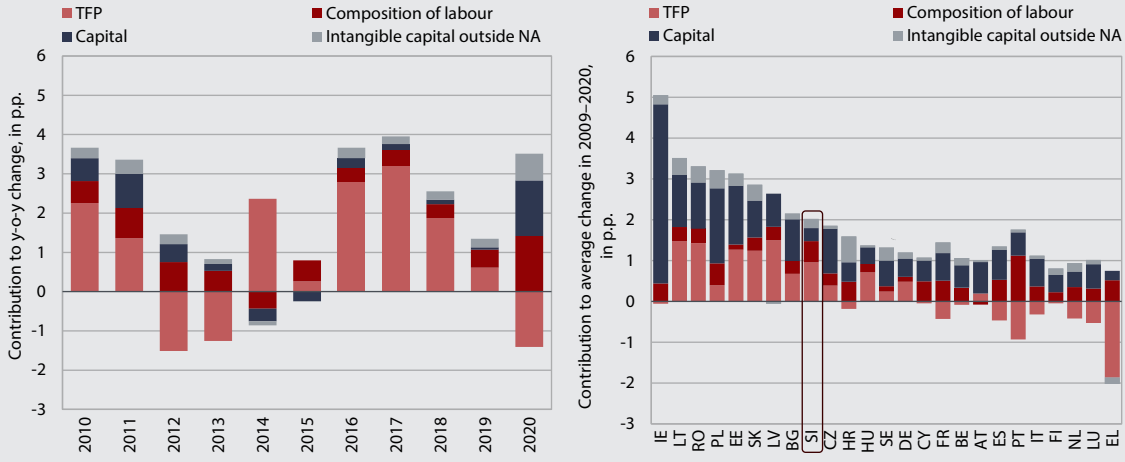
[5] Slovenia has a comparatively high participation rate especially among women, while its participation rate among older people is one of the lowest in the EU. For more on the relation between employment rates and hours worked, see e.g. ECB (2021).

Box 1 Contributions to productivity growth in Slovenia and EU Member States (EU KLEMS)

The updated EU KLEMS database provides an in-depth and internationally comparable overview of contributions to productivity growth. In the method used, capital, labour quality/composition and total factor productivity (TFP) contribute to labour productivity. An important novelty in this last edition is an analytical module that extends the intangible capital beyond that covered by national accounts.[1] This leads to somewhat different (higher) growth in value added and productivity than could be derived from the national accounts,[2] with which the statistical module is harmonised.

In Slovenia, the contribution of efficiency gains (TFP) was a key driver of labour productivity growth in the period following the global financial crisis; Slovenia also ranked high compared to other EU Member States in terms of the contribution of a change in labour composition in favour of more productive groups of workers. TFP, i.e. total factor productivity, is the part of output that cannot be explained by changes in inputs of capital and labour and is therefore considered an estimate of efficiency gains or technical progress. Although TFP is strongly dependent on the business cycle, it was an important driver of growth in Slovenia in the long term[3] – it contributed on average around half of labour productivity growth in the period 2010–2020. The changed labour composition, i.e. the increase in the share of workers with an assumed higher productivity (e.g. the higher-educated), has also contributed significantly to productivity growth, especially compared to other EU Member States. However, the contribution of capital was modest in the period 2010–2020, even if intangible capital beyond that captured in the national accounts is included.

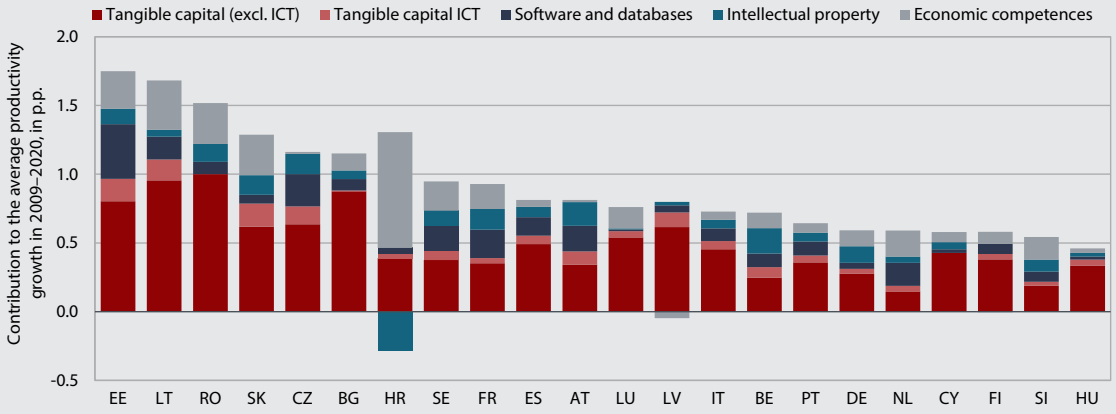
Figure 3: TFP and the contribution of the changed labour composition were the main drivers of productivity growth in Slovenia in the period 2010–2020



Source: EUKLEMS-INTANProd; calculations by IMAD. Notes: Labour is cross-classified by education level (high, medium, low), age (15–29, 30–49, 50 and over) and gender (male, female), making a total of 18 groups of workers. According to the national accounts (NA), capital is divided into tangible capital (ICT and non-ICT) and part of intangible capital. TFP means total factor productivity.

In 2010–2020, Slovenia stood out for its modest contribution of capital deepening, mainly due to a sharp slowdown in the growth of tangible capital; the contribution of intangible capital was also below average. The period after the global financial crisis coincided with the end of a major investment cycle in Slovenia, which could explain part of the slowdown. At the same time, the contribution of capital in Slovenia in the previous period (2001–2008) did not exceed that of some faster-growing EU Member States (e.g. new Member States and Ireland), which maintained relatively high investment activity after 2009. The contribution of intangible capital, in particular computer software and databases, was also relatively low. In terms of the contribution of intellectual property and economic competences, i.e. the part of intangible capital that is mostly not captured in national accounts, Slovenia ranked around the EU average.

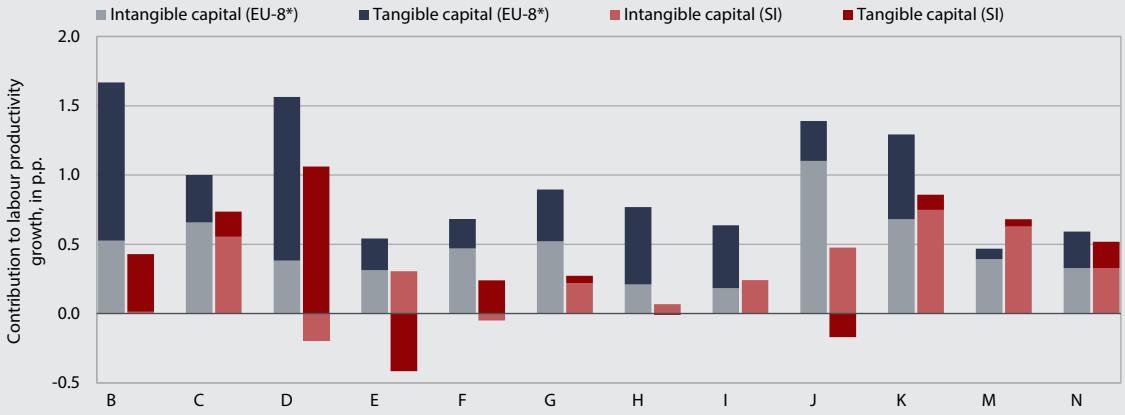
Figure 4: The period after the global financial crisis in Slovenia was characterised by a low contribution of tangible capital to labour productivity (in hours worked)



Source: EUKLEMS-INTANProd; calculations by IMAD. Note: According to national accounts, capital is divided into tangible ICT capital (hardware and telecommunications equipment), tangible non-ICT capital (buildings and structures, transport equipment, other machinery and equipment, breeding stocks and orchard development) and part of intangible capital (software and databases and intellectual property, more precisely research and development and entertainment and artistic originals). Intangible capital outside the national accounts extends the capture of intellectual property (through new financial products and industrial design) and adds economic competences (branding, organisational capital, employee training).

By international standards modest contribution of tangible capital in the period 2010–2020 was typical of most business sector activities. In the traditional capital-intensive industries, for which more detailed sectoral contributions of all types of capital are also available, it deviated more significantly from the EU average. In the case of public utilities (E), transportation (H) and ICT activities (J), the contribution of tangible capital in Slovenia was even negative on average during the period analysed. The contribution of intangible capital, including that beyond the national accounts, was relatively high and comparable or higher than in the analysed EU Member States in professional, scientific and technical activities (M), financial services (K), and also manufacturing (C).[4] Similar to tangible capital, in the case of intangible capital, knowledge-based ICT activities (J) in particular stand out in a negative sense.

Figure 5: More modest capital deepening in business sector activities, despite a relatively high contribution of intangible capital in some service and manufacturing activities in the period 2010–2020



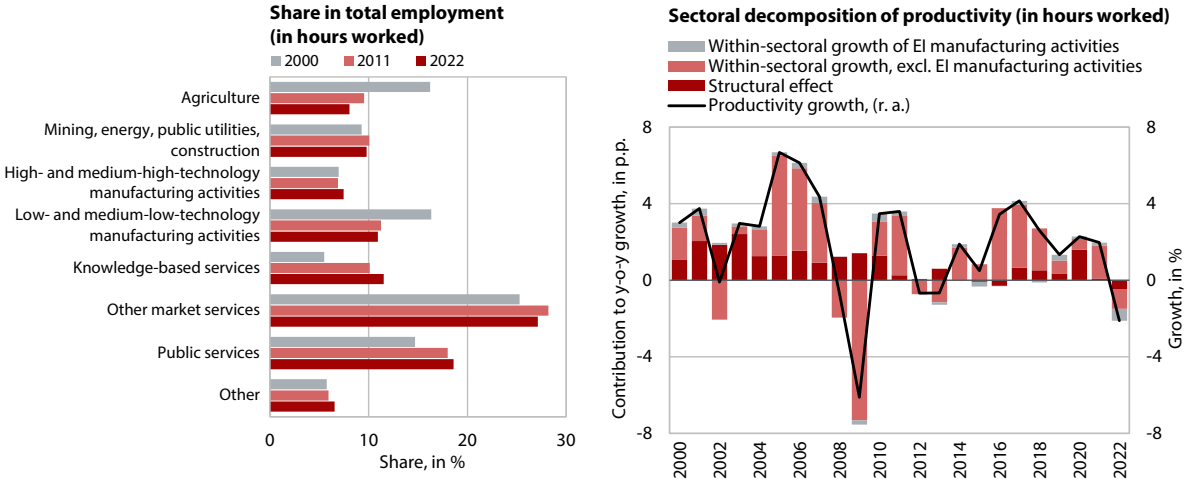
Source: EUKLEMS-INTANProd; calculations by IMAD. Note: EU-8 shows the simple (unweighted) average of the 8 EU Member States for which detailed sectoral data are available, namely Austria, Belgium, the Czech Republic, Germany, France, Italy, the Netherlands and Sweden.

[1] See also note to Figure 2 and for further details Corrado et al. (2022).
[2] See Bontadini et al. (2023), Corrado et al. (2005) and Corrado et al. (2009).
[3] With the inclusion of a change in the employee structure, as a proxy for the contribution of labour quality, the unexplained part of output (TFP) was reduced and was on average lower in the EUKLEMS-INTANProd calculations than in the production function estimate we used for illustration in Figure 2.
[4] In particular, the contribution of economic competences, including branding, organisational capital and employee training, was above average in all these activities.

To increase aggregate productivity, it is important to increase efficient allocation of production factors (labour and capital) between sectors... At the turn of the millennium, Slovenia was still in the process of intense sectoral restructuring. The reallocation of workers to sectors with faster growth and higher productivity levels, which are also significantly influenced by a different level of capital intensity, further boosted aggregate productivity growth.[6] With the exception of a short-term effect in the first year of the epidemic,[7] this contribution has been limited over the past decade, as was also the case in the EU. This structural contribution has weakened in part due to the increasing share of services, which are generally more labour-intensive (and less capital-intensive). This partly explains also the slowdown in capital deepening (see Box 1).[8]

[6] The share of hours worked in agriculture and in low-technology-intensive activities has declined sharply, while it has risen in knowledge-based services, which on average generate higher value added per hour worked.
[7] Containment measures related to the COVID-19 epidemic have mainly affected some labour-intensive services which generate lower value added per worker or per hour worked, while demand and the share of hours worked have increased in certain high-technology-intensive manufacturing sectors (e.g. pharmaceuticals) and knowledge-based services (e.g. ICT). This has led to an increase in the cross-sectoral structural contribution to aggregate productivity growth, which was more pronounced in 2020.
[8] For a more detailed analysis of investment activity, see Section 3.1.3.

Figure 6: The contribution of rising employment shares in activities with a higher productivity level has long been modest; within-sector growth, excluding structural effects, was negative in 2022 for the first time in almost a decade

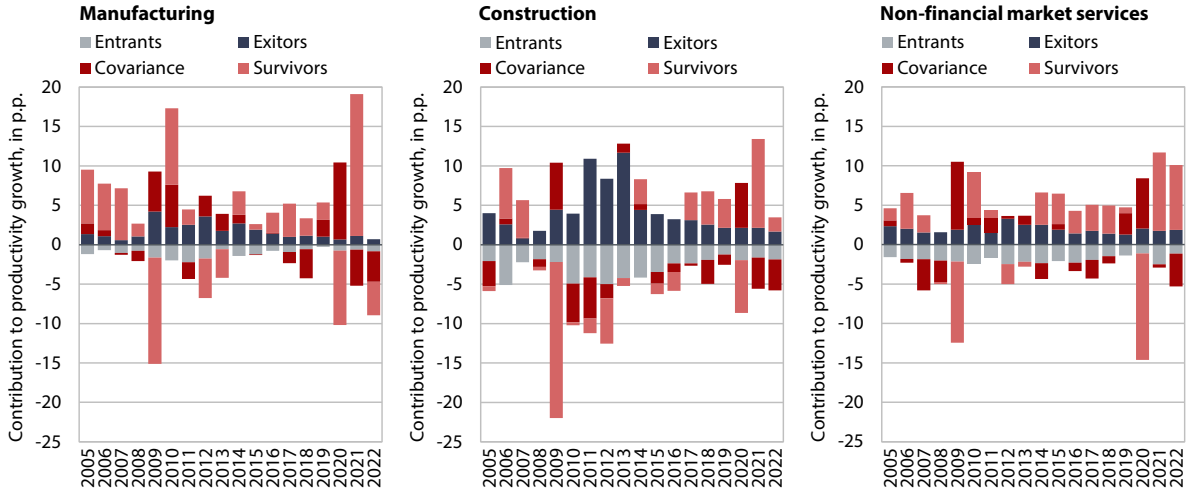


Source: SURS (2023c); calculations by IMAD. Notes: *Agriculture*: NACE A; *mining and quarrying, energy, utility services, construction*: NACE B, D, E, F; *low- and medium-low-technology-intensive manufacturing activities*: NACE C10–C19, C22–C25, C31–C32; *high- and medium-high-technology-intensive manufacturing activities*: NACE C20–C21, C26–C30; *knowledge-based services*: NACE J, M; *other market services*: NACE G, H, I, K, N; *public services*: NACE O, P, Q; *other*: NACE L, R, S, T, U. Sectoral decomposition of productivity growth (value added per hour worked) is based on annual data of the 64-level Standard Classification of Activities (NACE Rev. 2). Energy-intensive activities (EI) include the paper and chemical industries (NACE C17, NACE C20), manufacture of other non-metallic mineral products (NACE C23) and manufacture of basic metals (NACE C24). For more on the sector decomposition methodology, see IMAD (2019b).

… and between companies in the same sector. To accelerate productivity growth and strengthen the role of the state in promoting it, the focus should be the creation of *conditions* that enable the efficient allocation of capital and labour from less productive to more productive or successful enterprises, regardless of their sector of activity. This includes, among other things, an efficient business environment and efficient use of limited public resources (see Section 3.3). In the epidemic year 2020, the effect of an increase in the share of employees in more efficient and more productive firms within the same sectors (the covariance effect) mitigated the overall decline in productivity of the surviving companies. On the other hand, the impact of the exit of unsuccessful companies, the so-called "cleansing effect", was very modest in 2020 and 2021. It tends to increase in times of crises and is a natural process that enables a reallocation of production factors in favour of more successful companies.[9] A small number of insolvency proceedings (exits) were related to the interruption to the normal operation of the courts, moratoria on bankruptcies and debt repayments, and generous subsidies for companies. Although these have helped to preserve the healthy cores and thus the economic potential, their eligibility (also in terms of efficient allocation of public resources) is questionable in the case of companies that have long ceased to be viable (e.g. zombie companies). With the outbreak of the energy crisis in 2022, the total value of subsidies was again high, though lower than during the health crisis. The modest exit of companies continued in 2022, and the share of zombie companies was 5.4%, the highest since 2008 (for more details, see Section 2.3). The decline in the share of employees in more productive companies (the covariance effect) also contributed negatively to overall allocative efficiency in 2022. Manufacturing companies in particular have significantly reduced their (real) productivity on average.

[9] For a more detailed analysis, see Development report 2023, Box 1 (IMAD, 2023).

Figure 7: Negative contribution of allocative efficiency to (sectoral) productivity growth in the year of the energy crisis

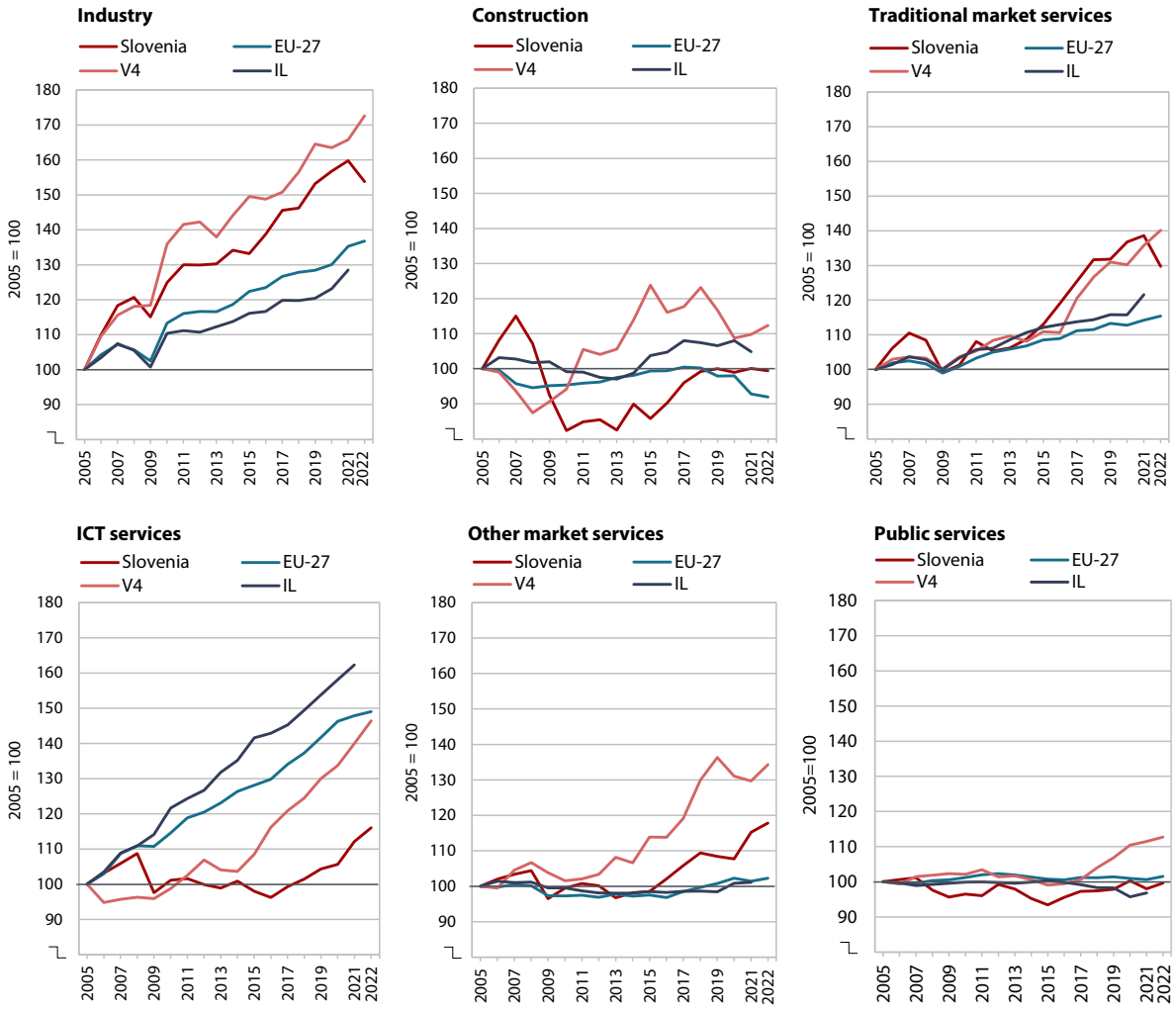


Source: AJPES (n.d.); calculations by IMAD. Notes: Calculation based on dynamic Olley–Pakes decomposition of productivity growth (Melitz and Polanec, 2015). Companies with at least one employee and positive value added are included. Productivity is defined as real value added (excluding subsidies) per employee (in full-time equivalents).

Real productivity in the export sector, which was the main driver of growth and the catching-up process with the more developed EU Member States even in the years of the epidemic, fell sharply in 2022 with the energy crisis. Total labour productivity, measured by real value added per hour worked, decreased by 1.5% in 2022 in Slovenia, with large differences across activities. Some knowledge-based (e.g. ICT) and predominantly domestic market-oriented (professional, scientific and technical) services, which were not among the fastest growing activities in Slovenia in the past, have made a positive contribution to growth. Manufacturing and traditional market services, which have been the main drivers of productivity growth and convergence with the EU over the past decade or two and have also weathered the health crisis relatively successfully, showed a sharp decline in real productivity in 2022 (-4.5% and -6.4% respectively). Among them, wholesale trade and energy-intensive manufacturing, with the exception of the manufacture of other non-metallic mineral products, stand out in terms of the extent of the decline. Although energy-intensive activities also experienced a decline in output per hour worked, currently available data suggest that the decline in output was much more moderate than the sharp decline in real value added.[10] However, the still high nominal growth rates (of value added and productivity) point to stronger pass-through of costs to prices, which allowed the favourable business performance in 2022 to be maintained even against a backdrop of high cost pressures (see Section 2.2.1).

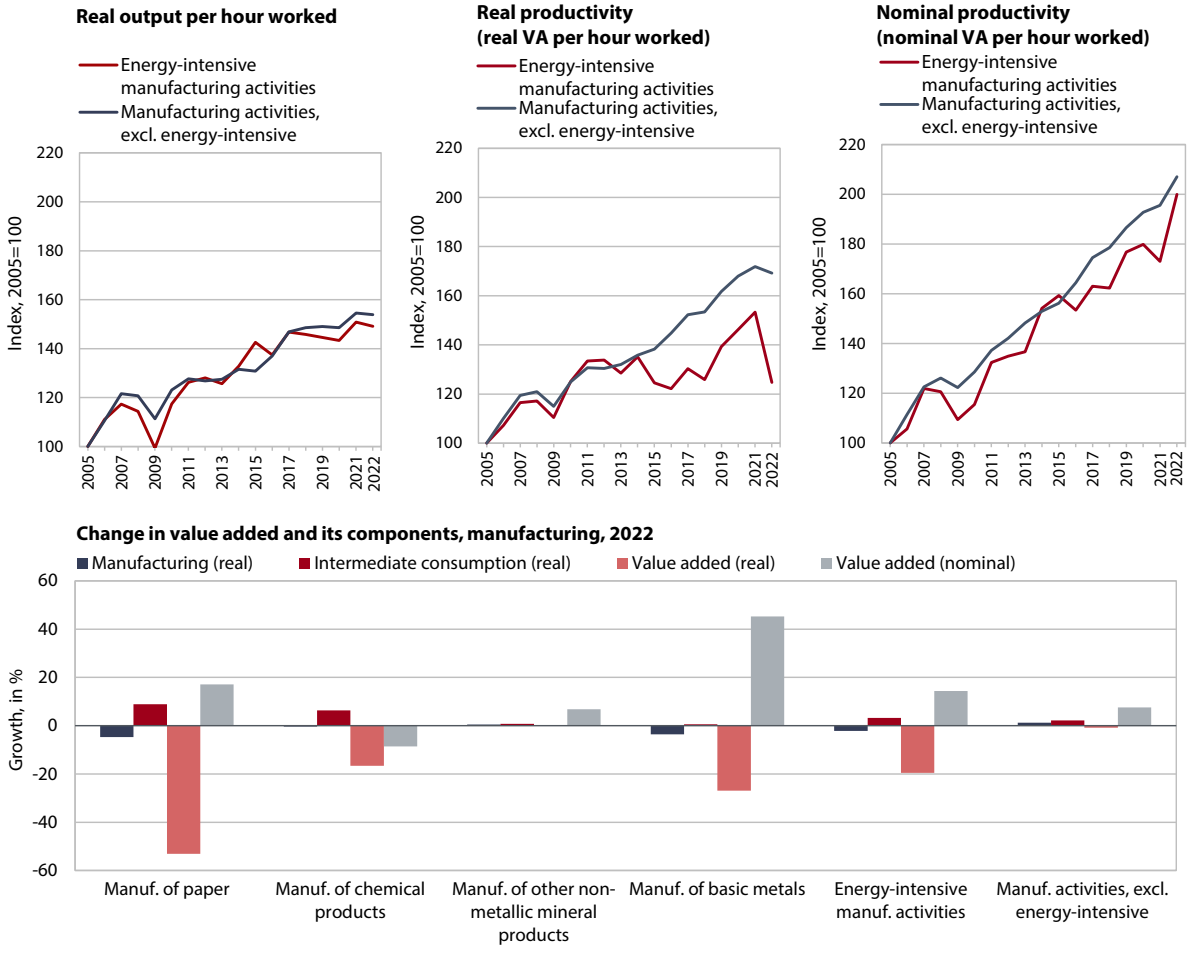
[10] The decline in value added was much deeper than the decline in output, due to a significant (quantitative) increase in intermediate consumption, i.e. a deterioration in efficiency, which is surprising against the background of high growth of prices (especially of energy).

Figure 8: During the energy crisis, the biggest productivity losses were recorded in activities that used to be the key drivers of growth and convergence with the more productive EU economies



Source: Eurostat (2023); calculations by IMAD. Notes: The indicator of real labour productivity is calculated at the sector level as the ratio of value added (in constant prices) to hours worked. *Industry*: mining and quarrying (NACE B), manufacturing (NACE C), energy supply (NACE D), utility services (NACE E); *construction* (NACE F); *traditional market services*: trade (NACE G), transportation (NACE H), accommodation and food service activities (NACE I); *ICT* (NACE J); *other market services:* financial services (K), professional, scientific and technical activities (NACE M), administrative and support service activities (NACE N); *public services:* public administration (NACE O), education (NACE P), health and social work activities (NACE Q). Innovation leaders: SE, FI, DK, BE, NL; V4: CZ, HU, PL, SK.

Figure 9: Sharp decline in real productivity in energy-intensive industries, while nominal growth remained high even during the energy crisis



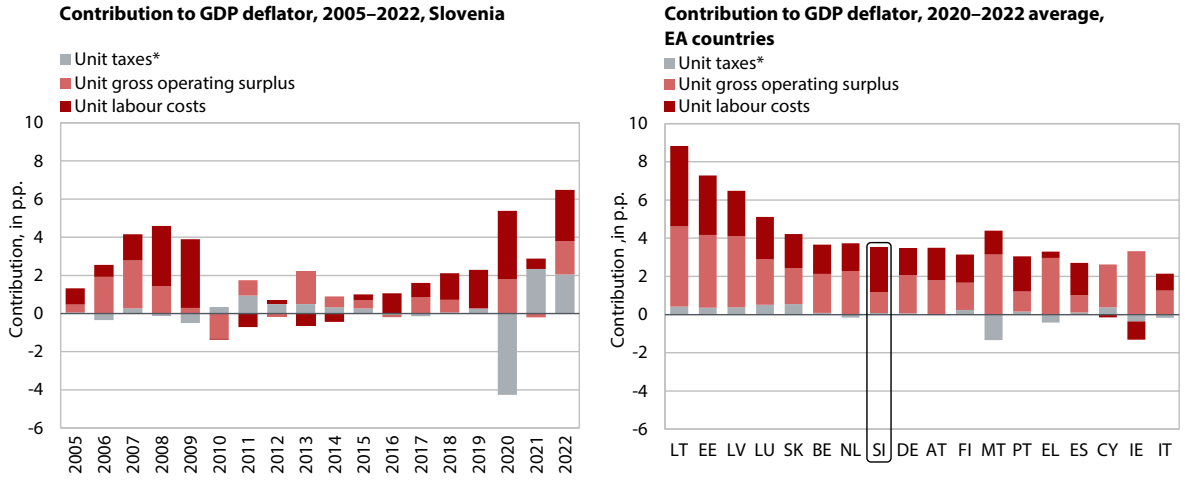
Source: SURS (2023c); calculations by IMAD. Note: VA – Value added.

In the first half of 2023, real productivity remained close to the low level of 2022; domestic cost pressures are intensifying as the relatively high nominal wage growth continues. According to seasonally adjusted data, real productivity in the economy as a whole and in manufacturing remained close to the low level of 2022 in the first half of 2023 (see Figure 11). At the same time, given the labour shortages and inflation, which was mainly due to rising energy prices already high last year, nominal wage growth, or more precisely compensation of employees per employee, remains high in the context of the current economic situation. This has led to a further significant increase in nominal unit labour costs (NULC), which have already been the main contributor to the rise in domestic prices, as measured by the GDP deflator, in 2022 and in the period since the beginning of the epidemic (see Figure 10). While the contribution of unit profits to price growth was higher in 2020–2022 than in the period after the global financial crisis and before the health crisis, it was lower than in most euro area countries according to currently available data. However, the direct influence of the state, which, according to this method, affects prices through production taxes and subsidies, was negligible on average in the period 2020–2022. Other euro area countries[11] also face increasing

[11] See also ECB (2023b).

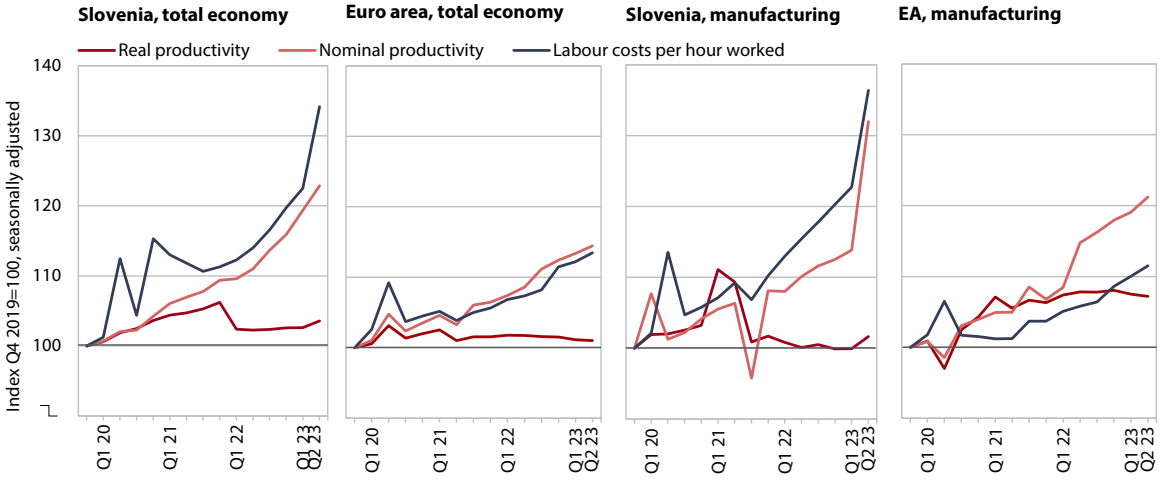
domestic price pressures, but these were higher in Slovenia in 2022 and even more pronounced in early 2023 according to preliminary data. The sectoral analysis shows that domestic price pressures, as measured by the deflator, were more pronounced in most business sector activities, which corresponds to the gap in price growth with the euro area average (see Figure 12).

Figure 10: The gap caused by high nominal wage growth and the decline in real productivity contributed most to the rise in domestic prices as measured by the GDP deflator



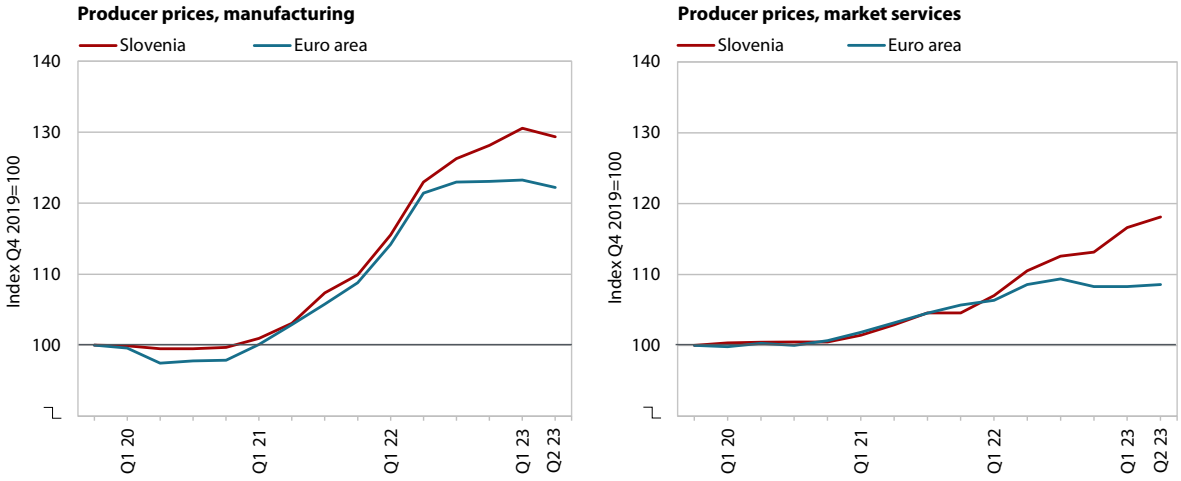
Source: Eurostat (2023); calculations by IMAD. Note: Taxes on production less government subsidies.

Figure 11: Real productivity remained subdued in the first half of 2023, while nominal labour cost and productivity growth further accelerated in Slovenia



Sources: Eurostat (2023), SURS (2023c); calculations by IMAD.

Figure 12: As global commodity prices moderate, the impact of imported price pressures is gradually easing, particularly with regard to price growth in manufacturing; prices for services continue to rise in Slovenia



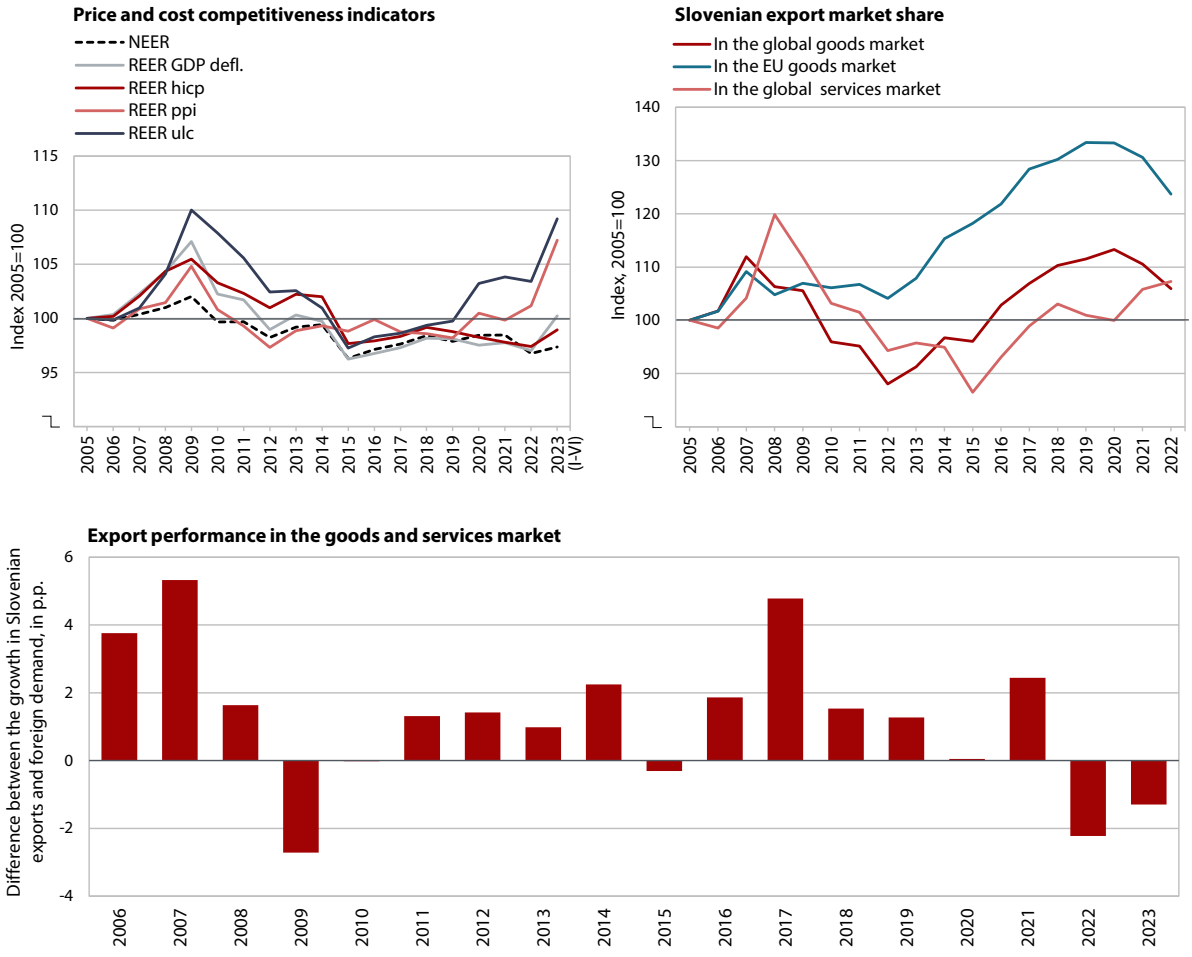
Sources: Eurostat (2023), SURS (2023c); calculations by IMAD. Market services include transportation (NACE H), accommodation and food service activities (NACE I), information and communication activities (NACE J), real estate activities (NACE L), professional, scientific and technical activities (NACE M), and administrative and support service activities (NACE N).

As the cost and price competitiveness of Slovenian exporters deteriorated, the goods export market share declined in 2022, while the services export market share continued to grow, albeit at a slower pace. As growth in labour costs and prices was higher than in Slovenia's trading partners (as measured by ULC, PPI, HICP and GDP deflator), price-cost competitiveness indicators have deteriorated significantly since the second half of 2022. Slovenia's export market share on the *world goods market* also declined in 2021 and 2022. The 2% decline in 2021 was mainly related to the export specialisation effect,[12] while the 4% decline in 2022 was mainly due to the actual decline in the performance, i.e. loss of competitiveness of Slovenian exporters. Slovenia's total goods export market share has thus fallen to its lowest level in six years and also below the level it had reached before the onset of the global financial crisis,[13] when, in the face of a significant deterioration in cost competitiveness, it took more than a decade to return to the previous levels. The *market share in services*, whose dynamics since the outbreak of the COVID-19 pandemic have been characterised by highly asymmetrical fluctuations between service groups, increased by 1.4% in 2022. Despite the growth, Slovenian services' market share in the global market is still lower than before the global financial crisis.

[12] Higher growth in the value of import demand for product groups with a below-average share in the composition of Slovenia's exports (e.g. commodities, where nominal import demand was further boosted by prices) and lower growth for some, where the share of Slovenian exports is relatively high (e.g. road vehicles).

[13] During the global financial crisis, Slovenia's cost-competitiveness deteriorated significantly under the impact of declining productivity (2009) and, given the economic circumstances at the time, relatively high wage growth (caused by the minimum wage increase, past high inflation and the elimination of wage disparities), coupled with the appreciation of the euro. Cost pressures were partly passed on to prices and companies' profits and profitability also fell considerably in 2009–2013.

Figure 13: Deterioration of competitiveness indicators and goods export market share in 2022; despite modest growth in services market share, overall export performance in goods and services declined sharply

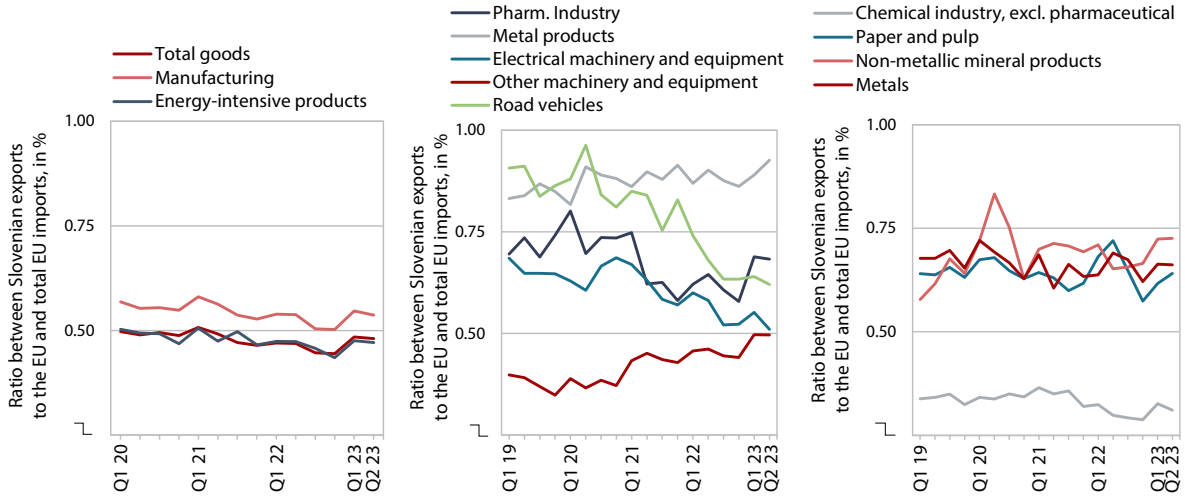


Sources: ECB (2023a), UN Comtrade (2023), UNCTAD (2023b), WTO (2023), SURS (2023c), IMF (2023); calculations by IMAD. Notes: REER hicp (PPI, ULC, GDP deflator): Real effective exchange rate in relation to 37 partners within and outside the euro area (weighted according to the relevance to Slovenia's foreign trade), deflated by the harmonised index of consumer prices (HICP), producer price index in manufacturing (PPI), nominal unit labour costs (ULC) or GDP deflator (GDP deflator). NEER: Nominal effective exchange rate. The Slovenian export market share is calculated as the ratio of Slovenian exports to world exports or imports in nominal terms. Slovenian exports of goods do not include exports of pharmaceuticals to Switzerland - a proxy for strongly increased re-exports of pharmaceuticals, which do not reflect a change in competitiveness, have an insignificant impact on economic activity and are excluded from the national accounts data on exports. Export performance is the difference between the growth of real exports of goods and services and the growth of foreign demand, measured against the real imports of goods and services of trading partners (weighted according to their importance for Slovenian exports).

The significant decline in Slovenia's market share in the EU market in the second half of 2022 was partly temporary, but despite its growth in the first half of 2023, it remained lower than before the energy crisis. Slovenia's export market share in goods in the EU market, where Slovenia exports about three-quarters of goods, decreased by 2.0% and 5.3% in 2021 and 2022 respectively. The decline in market share was particularly pronounced in the second half of last year. In addition to a decline in most product groups, stagnation in energy-intensive products – paper, chemicals, metals and non-metallic minerals – also contributed significantly to this decline. Preliminary estimates suggest that the decline in market share was to some extent temporary and related to the rationalisation of production at a time of great uncertainty about energy supply and prices. In fact, the market share increased again in the first half of 2023 (by 3.1% year-on-year) but did not exceed the levels before the energy (2021) and health (2019) crises. The largest contribution

to the decline in the market share since the start of the epidemic has come from unfavourable developments in road vehicles, where Slovenia has lost a third of its market share, against a backdrop of already considerably weakened EU and global trade and manufacturing affected by supply chain disruptions.

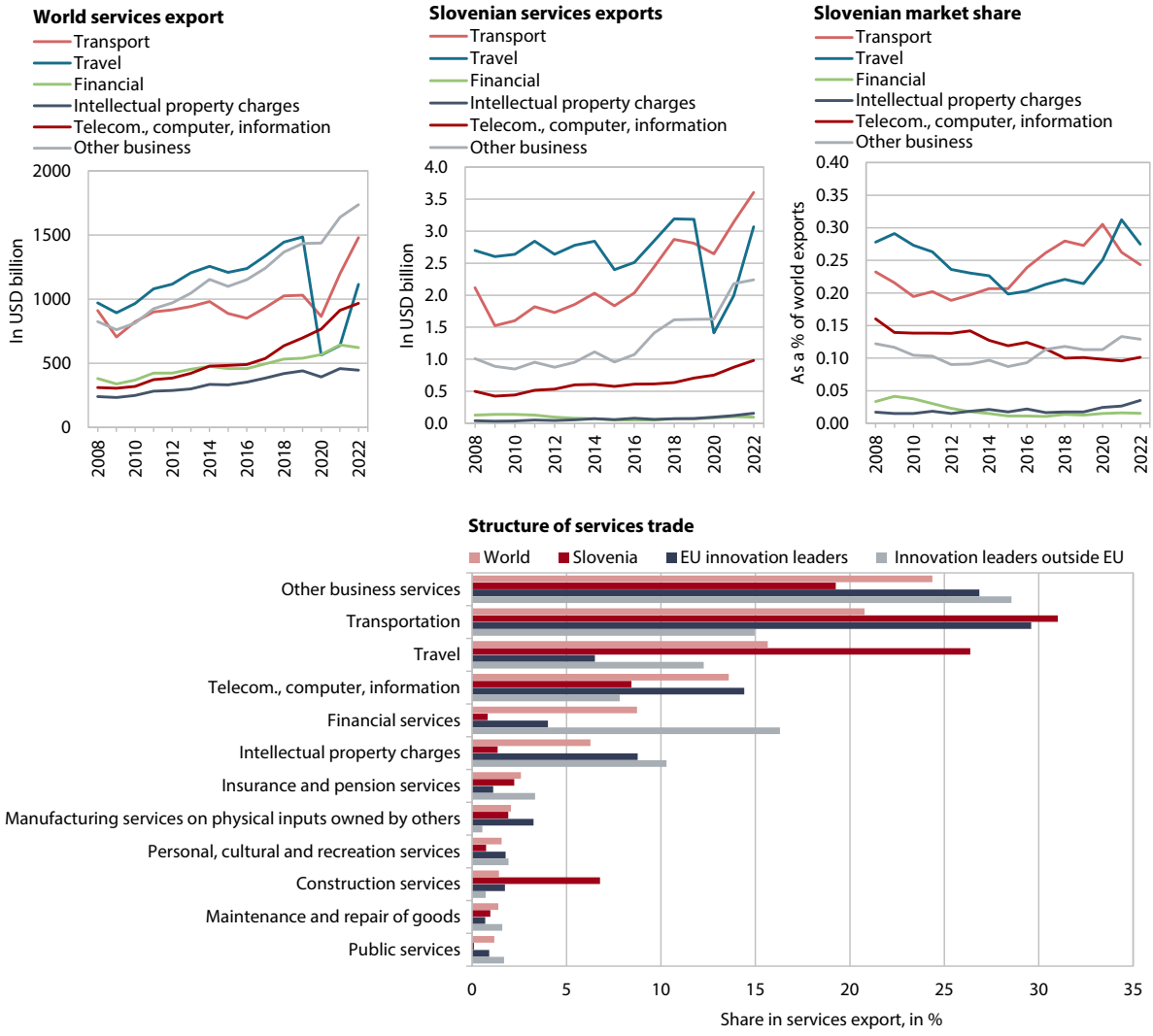
Figure 14: Strong recovery after a sharp decline in Slovenia's export share in the EU market at a time of great uncertainty in the energy markets; market share still lower than before the crisis



Sources: Eurostat (2023), SURS (2023c); calculations by IMAD.

In the services sector, despite some positive developments in recent years, Slovenia has only exploited the potential of the fast growing global trade in knowledge-based services to a relatively limited extent. Slovenia's services exports are heavily dependent on travel and transport, also due to the country's favourable geographical location. Together, these two groups accounted for 57% of Slovenia's services exports in 2022 (36% on a global level). During the health and energy crises, global exports of travel and transport services were subject to strong fluctuations, which also had a strong impact on Slovenia's market share. The total market share of services increased by 6% compared to 2019 (on average by 2% per year), while excluding the above-mentioned two service groups, which were very volatile in 2020–2022, it increased by 12% (or 4% per year). It is encouraging that Slovenia's market share has increased in recent years in some high-growth knowledge-based services, for example administrative and support service activities (including R&D, professional and management consultancy activities, and technical, trade-related services) and intellectual property royalties. However, the market share of telecommunications, computer and information services stagnated or declined significantly over a longer period of time. The market share of financial services also declined. These four services groups accounted for two-thirds of the increase in global services trade over the period 2008–2022 and accounted for more than half of global services exports in 2022 (30% in Slovenia).

Figure 15: Slovenian services trade is still mainly based on transport and travel, while globally, knowledge-based services are increasingly coming to the fore



Source: WTO (2023); calculations by IMAD. Note: EU innovation leaders: Sweden, Finland, Denmark, the Netherlands and Belgium; non-EU innovation leaders: Switzerland, USA, UK, South Korea and Singapore.

2.2 Participation in global value chains

With increasing participation in global value chains (GVCs), countries seek to maximise their participation in the value added generated along these chains. One of the hypotheses in the literature on GVCs is that the relationship between the production stages and value added exhibits a "smiley" shape, suggesting that most value added accrues to firms at the two ends of the value chain (IMF, 2015). Similarly, a 2015 IMF study found that participation in the generated value added is higher in economies that are positioned more upstream in GVCs and that the upstreamness effect is greater in high-technology intensive industries. To measure upstreamness, Koopman et al. (2010) propose a position index,[14] which measures the relative

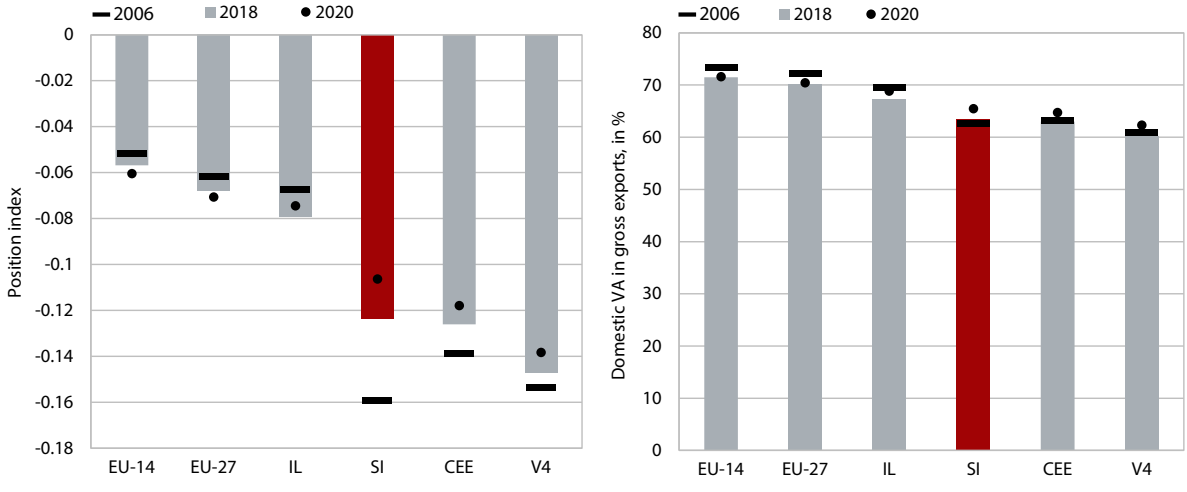
[14] The position index is calculated as follows: PI=ln(1+FP/100)-ln(1+BP/100), where FP indicates forward GVC participation and BP indicates backward GVC participation.

importance of a country's or sector's forward or backward GVC participation[15] and is also used in the analysis below. A higher value of the position index indicates a position further up the production chain, while a lower value indicates a position further down the chain.

Slovenia's position in GVCs is higher than the average of Visegrad countries but lower than the EU average. As expected, the old EU Member States are positioned higher than the EU average, while the innovation leaders as a whole are positioned slightly lower. The Visegrad countries are positioned lowest in the value chains. The dynamics of the position index between 2006 and 2018 shows a narrowing gap between the average of EU Member States, old EU Member States and innovation leaders on the one hand and Eastern and Central European countries, Visegrad countries and Slovenia on the other. Slovenia's shift over this period was much larger than on average in CEE and the Visegrad group (see Figure 16). The preliminary data for 2020 show that the EU and the old EU Member States moved slightly downstream with the 2020 epidemic year, while the other country groups and Slovenia moved slightly upstream.

In terms of the share of domestic value added in gross exports, Slovenia is ranked similar to the CEE countries, but behind the EU average, the old Member States and the innovation leaders. Between 2006 and 2018, Slovenia made only minimal progress in this indicator, while the share of domestic value added in gross domestic exports actually fell slightly in the other country groups. According to preliminary data, the mentioned indicator increased in 2020 compared to 2018, especially in the groups of countries including new Member States, innovation leaders and Slovenia.

Figure 16: The dynamics of the position index in the period 2006–2018 shows a convergence between the EU average, the old EU Member States and the innovation leaders on the one hand and the CEE countries and Slovenia on the other, but there is still a significant gap between the two groups for both indicators



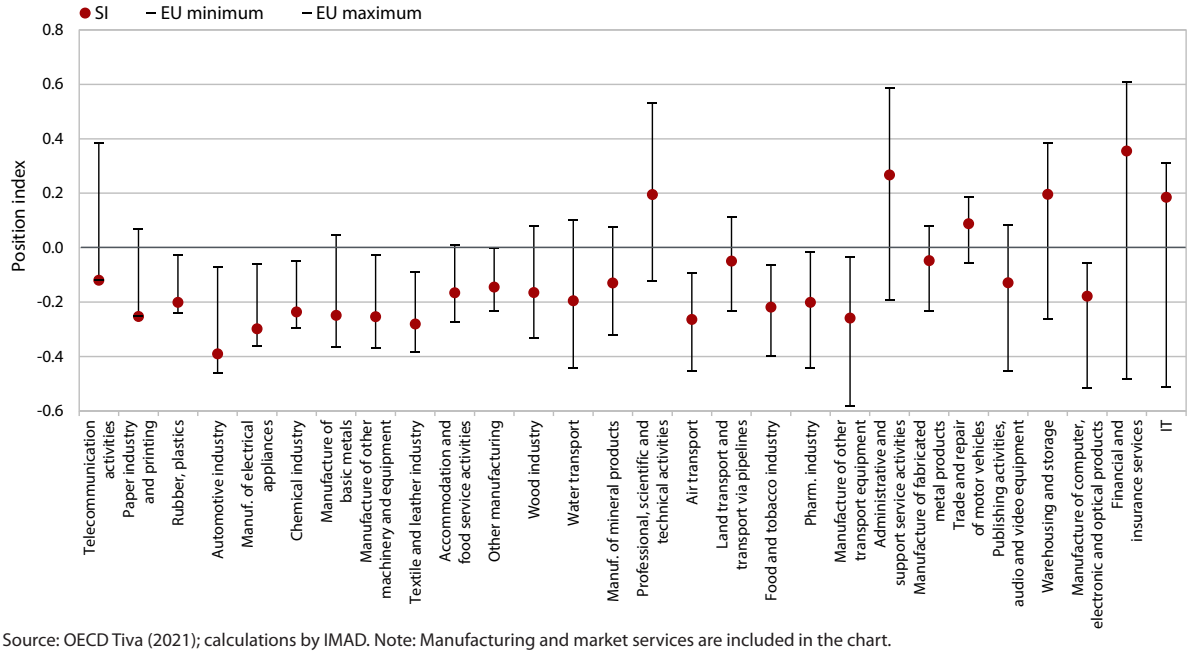
Source: OECD Tiva (2022); calculations by IMAD. Note: According to EII,[16] innovation leaders include Denmark, Finland, the Netherlands, Belgium and Sweden, Central and Eastern European Countries include the Czech Republic, Hungary, Poland, Slovakia, Slovenia, Bulgaria, Croatia, Estonia, Latvia, Lithuania and Romania, and the Visegrad group includes the Czech Republic, Hungary, Poland and Slovakia.

[15] Forward GVC participation is defined as the domestic value added embodied in other countries' exports in gross domestic exports, while backward participation is defined as the foreign value added embodied in domestic exports.

[16] EC (2021).

Among Slovenian industries, telecommunications rank lowest and information and communication activities highest, according to the position index within the range of EU values. Paper and printing, rubber and plastics, manufacture of vehicles and manufacture of electrical equipment also rank relatively low in the production chain. In contrast, financial and insurance services, manufacturing of computer, electronic and optical products, warehousing and storage, publishing, and audiovisual and radio and television activities are relatively high up the production chain.

Figure 17: In Slovenia, telecommunications, paper and printing, rubber and plastics, manufacture of vehicles, and manufacture of electrical equipment are the furthest from the European maximum in relative terms



Source: OECD Tiva (2021); calculations by IMAD. Note: Manufacturing and market services are included in the chart.

2.3 Financial performance of companies

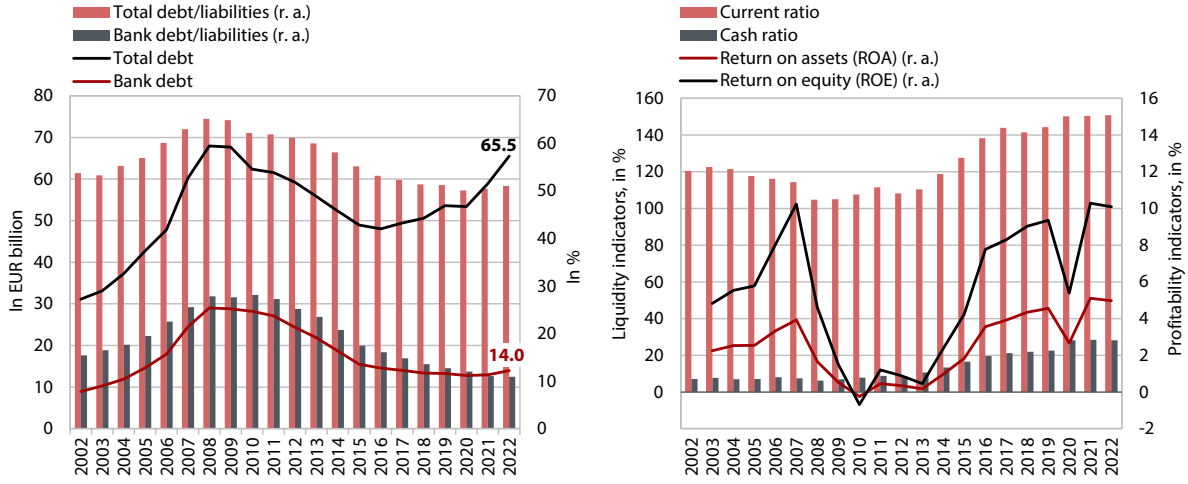
In 2022, the overall financial situation of the corporate sector remained relatively favourable despite the lifting of most measures to mitigate the consequences of the COVID-19 crisis, continued investment momentum and rising energy prices. Corporate sector *indebtedness* and *over-indebtedness* were higher in 2022 than before the epidemic but lower than at the beginning of the global financial crisis (see Figures 18, 19 and 20). Indebtedness first declined during the COVID-19 and energy crises (2020–2022) under the influence of large-scale government measures to mitigate the consequences of the epidemic (in 2020) and then increased again in 2021 and 2022 as the measures were gradually withdrawn, investment increased and energy prices surged. *Over-indebtedness*[17] only slightly increased with the outbreak of the epidemic (2020) and the energy crisis (2022). The *concentration of net financial debt of the over-indebted companies* remains at the same level as in 2019.[18] In 2022, the *debt-servicing capacity of companies* remained

[17] Over-indebtedness is calculated as the sum of net financial debt (i.e. financial debt excluding cash), exceeding EBITDA by a factor of five (if FL ≥ 5) or as the sum of the overall net financial debt (if EBITDA < 0). EBITDA is free cash-flow from operating activities (earnings before interest, taxes, depreciation and amortisation). FL – financial leverage (i.e. net financial debt/EBITDA).

[18] In 2022, ten of the most indebted companies had roughly 23% and 50 had around 41% of the net financial debt of all over-indebted companies.

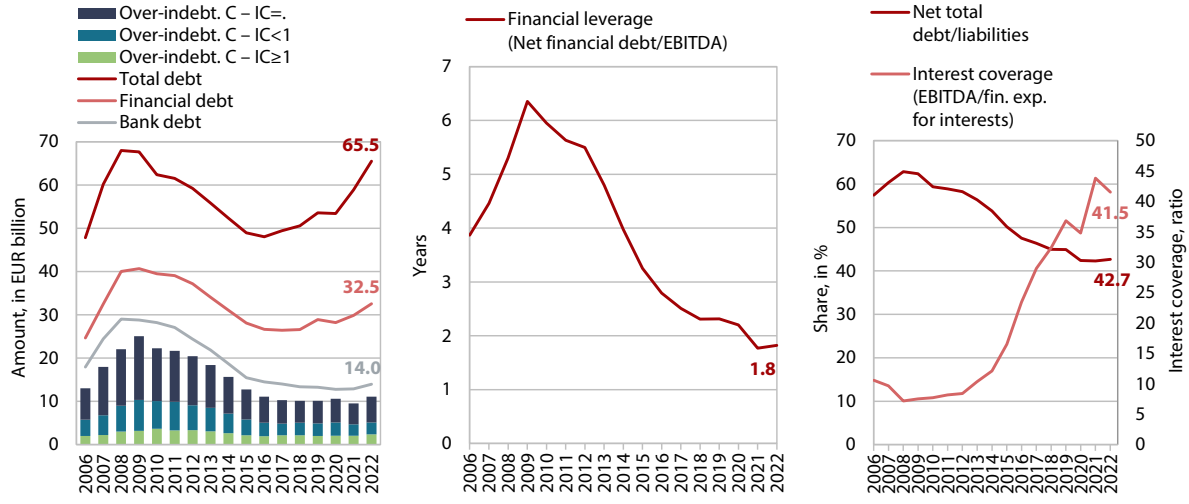
close to the best levels since 2006, despite a further significant increase in overall indebtedness and interest rates (see Figures 19 and 20).[19] Similarly, profitability and liquidity were still around their best levels since 2006 according to most indicators (see Figure 18).[20]

Figure 18: Indicators of indebtedness, liquidity and profitability are still relatively favourable



Source: AJPES (n.d.); calculations by IMAD. Note: r. a. – right axis; Total debt comprises financial (including bank), operational and other liabilities of companies. Financial debt comparisons can be made as of 2006 (when 2006 Slovenian Accounting Standards were introduced).

Figure 19: Over-indebtedness and the debt-servicing capacity are still close to the most favourable levels since 2006

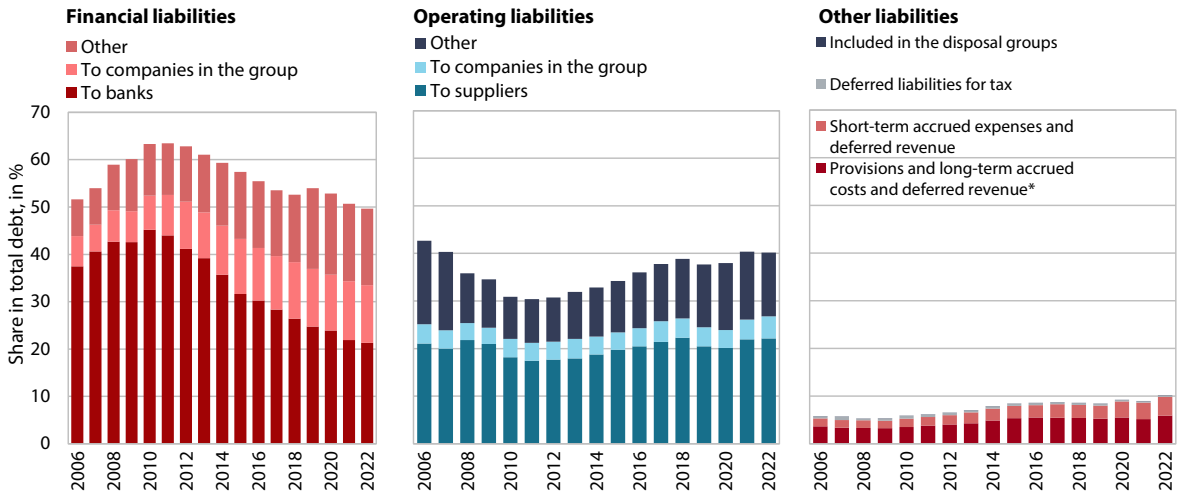


Source: AJPES (n.d.); calculations by IMAD. Note: Over-indebt. – over-indebtedness; C – IC – companies with interest coverage; FL – financial leverage; IC = . – companies with zero financial expenditure on interest; r. a. – right axis.

[19] Before the epidemic, the debt-servicing capacity had initially improved mainly due to deleveraging and later mostly due to the improved business results and low interest rates. However, in 2022, despite good business results, corporate borrowing increased and also became increasingly costly due to interest rate increases.

[20] Profitability (in 2022): Net profit, EBIT, EBITDA and value added continued to increase. ROA, ROE, ROS, operational efficiency, net profit margin and EBIT margin, with the exception of EBITDA margin, were still close to their best values. Liquidity: The current ratio, net working capital to total liabilities, current and liquid assets under both definitions, and net working capital continued to increase. However, the quick ratio and the two cash ratios remained close to their peak values.

Figure 20: The share of financial debt and thus also bank debt in total debt is at its lowest level since 2006; the shares of all other components have risen[21,22]



Source: AJPES (n.d.); calculations by IMAD. Note: ST – short-term; LT – long-term; * Provisions: accrued expenses that generate liabilities which are going to be paid in the future (e.g. reorganisation, expected losses from onerous contracts, pensions, jubilee benefits and retirement benefits); Long-term accrued costs and deferred revenues*: accrued income that will cover planned expenses over a period of more than one year (also includes government grants and donations received for the acquisition of fixed assets on a non-repayable basis).

Although the financial situation of the corporate sector remains relatively favourable, the financial situation in some activities deteriorated significantly during the epidemic and the energy crisis (2020–2022)... In 2020 and 2021 mainly in some of the most affected market services (accommodation and food service activities, arts and recreation, and administrative and support service activities) and in 2022 in some of the more material- and energy-cost-intensive activities (construction, manufacturing and energy) and in holding and leasing companies. *Bank debt* is more than one-tenth higher than in 2019 in construction, administrative and support service activities, information and communication, accommodation and food service activities, electricity and gas supply, other activities, and real estate activities. *Over-indebtedness* in these activities[23] and in holding and leasing companies has also risen by more than one-tenth. However, the debt-servicing capacity, measured as financial leverage, has deteriorated compared to the year before the outbreak of the epidemic, especially in holding and leasing companies[24] (where it is at its worst) and electricity and gas supply (for all these indicators, see Figure 19; by activities, see Appendix 6.1, Figure 1).

[21] The share of financial debt in total debt has been falling since 2012 and, at 49.7% in 2022, reached its lowest level since 2006 (9.3 p.p. lower than in 2008, when total debt peaked). The share of bank debt has also been declining since 2011 and, at 21.3%, has reached its lowest level since 2006 (half as high as in 2008, mainly at the expense of short-term bank debt). However, borrowing by companies belonging to the group increased significantly (12.1% in 2022, the highest level since 2006; the share almost doubled compared to 2008) – particularly in the case of long-term borrowing, which has been higher than short-term borrowing since 2015, and in the share of other financial liabilities (16.4%; 6.6 p.p. higher than in 2008). The share of total operating liabilities has also increased since 2012 (with the exception of 2019) and was 40.2% in 2022 (to suppliers: 22.1%, other: 13.4%; to companies in the group: 4.6%; the overall share was 4.4 p.p. higher than in 2008). The share of other liabilities has also increased and, at 10.2% in 2022, was the highest it has been since 2006 (almost double compared to 2008).

[22] For flows of non-financial corporations' financial liabilities by instrument and financing of non-financial corporations via trade credits and loans and factors in the demand for loans and flows of loans at non-financial corporations by creditor sector, see also BoS (2023c), Figures 5.5 and 5.8 with comments.

[23] Except in electricity, gas supply and manufacturing.

[24] The situation here deteriorated significantly in 2022. Their net financial debt increased by about one-fifth, while EBITDA fell by a good three-quarters.

...which has led to a temporary increase in the share of companies with a relatively high exposure to insolvency risk, although according to most indicators, this share was already lower in 2022 than during the period of economic growth. The *most problematic over-indebted companies* are those that have net financial debt and negative EBITDA. They include *zombie companies*, which are at the highest risk of insolvency, as, in addition to net financial debt, they have negative EBITDA for at least three consecutive years. In 2022, 13.4% of all companies were the *most problematic over-indebted companies* (13.7% in the period of economic growth (2014–2019)). They employed 4.1% (4.5%) of all employees,[25] had 5.8% (2.9%) of total capital in their annual accounts and generated almost zero (1%) value added generated by all companies.[26] All shares were lower than during the global financial crisis (2008–2013; see Figure 21). The productivity of these companies is low (see Appendix 6.1, Figure 2). In 2022, 49.6% of over-indebtedness (EUR 5.5 billion; 40.1% in 2014–2019)[27] was concentrated in the most problematic over-indebted companies, the majority (almost 96.5%) in SMEs.[28] By activity, 40% of the total over-indebtedness of these companies was concentrated in holding and leasing companies and more than 5% in companies engaged in real estate activities, professional and technical activities[29], manufacturing,[30] construction, and trade. In 2020–2022, over-indebtedness markedly increased in holding and leasing companies, electricity and gas supply, construction, real estate, and accommodation and food service activities[31] (see Appendix 6.1, Figure 3). The bank debt of the most problematic over-indebted companies increased over the period 2020–2022 and accounted for 9.1% of total bank debt in 2022 (10% in 2014–2019).[32]

[25] In 2022, the share of companies and employees in these companies was highest in SMEs, by activities in holding and leasing activities and accommodation and food service activities, with regional differences in distribution (see Appendix 6.1, Figures 4 and 5).

[26] In 2022, the number of companies with the highest risk of insolvency (so-called zombie companies) was the greatest since 2008 (5.4%; in 2008–2013 there were 3.8% such companies). They employed 0.8% (1.3%) of all employees and held 1.6% (2.8%) of all capital. Their value added was even slightly negative (0.04% of all companies).

[27] In 2022, the over-indebtedness of zombie companies amounted to 29.4% of total over-indebtedness (EUR 3.3 billion; 2008–2013: 16.3%; 2014–2019: 21.9%).

[28] Within which its share in 2020–2022 increased in small and medium-sized enterprises while it fell in micro and large enterprises (see Appendix 6.1, Figure 3).

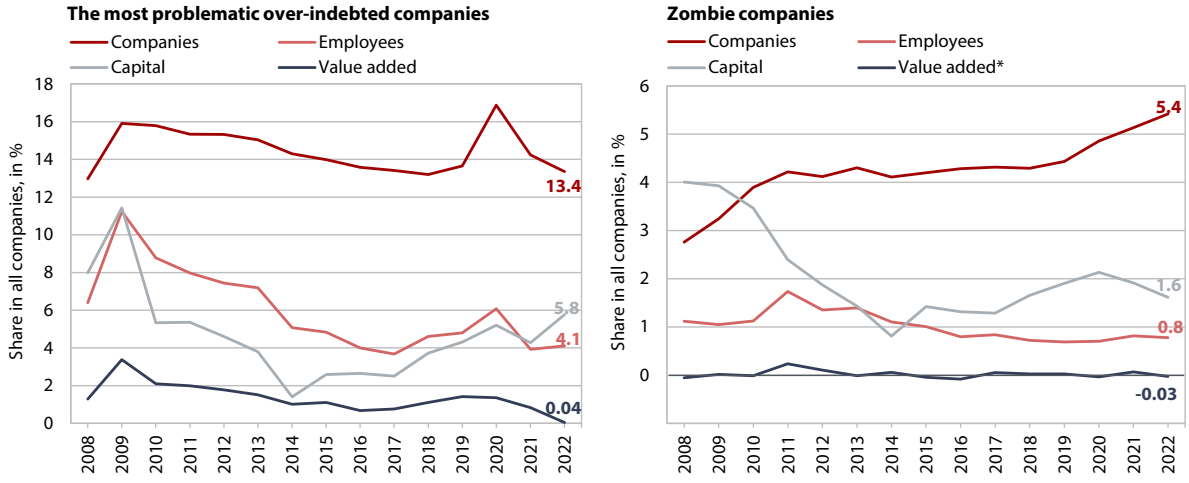
[29] The shares of indebtedness and over-indebtedness in technical and professional activities were highest in activities of head offices (NACE Rev. 2: 70; see also Appendix 6.1, notes to Figure 3).

[30] During the energy crisis (2022), over-indebtedness and indebtedness increased in the manufacturing sector (see also Appendix, notes to Figure 3). Companies in these activities face high cost pressures due to the energy price surge (see also Section 2.4) and received the largest share of grants in 2022, especially energy-intensive companies (about one-quarter of all grants; see Appendix 6.1, Figures 7 and 8).

[31] The assets quality of bank loans to companies in accommodation and food service activities also deteriorated the most during the crisis period (2020–2022) (see Appendix 6.1, Figure 6 with notes). Indebtedness and over-indebtedness are higher in accommodation companies (NACE Rev. 2: 55), which also face above-average cost pressures from energy prices and received 5.6% of all grants in 2022 (see Appendix 6.1, Figure 8).

[32] Their total debt accounted for 13.7% (12.6% in 2014–2019) of the total, while the financial debt accounted for 19% (17.2%) of total financial debt. In zombie companies it amounted to 1.5% of total bank debt or EUR 215.8 million, which was close to the lowest level since 2008 (2008–2013: 7.2%). Their total debt accounted for 6.3% (6.9%) of the total, while their financial debt accounted for 10.5% (9.4%) of total financial debt.

Figure 21: The share of companies with relatively high exposure to insolvency risk has declined after a temporary increase in the first year of the epidemic and is lower than during the global financial crisis



Source: AJPES (n.d.); calculations by IMAD. Notes: Employees – the average number of employees based on hours worked (AOP 188); Value added*: gross operating yield (AOP 126) – subsidies, grants, annual leave payments, compensations and other revenue related to business effects (AOP 124) – costs of goods, materials and services (AOP 128) – other operating expenses (AOP 148), was slightly negative in 2008, 2015, 2016, 2020 and 2022.

With the help of a number of intervention measures, the Slovenian corporate sector has weathered the COVID-19 and energy crises relatively well, but it faces new challenges in 2023 with the uncertainties associated with the continuation of the war in Ukraine, further cost pressures,[33] rising interest rates[34] and extreme weather events,[35] which require a carefully thought-out economic policy response, as the state cannot insure against all shocks.[36] If these uncertainties resulted in a significant reduction in the volume of business and no measures were taken to mitigate the consequences of the energy crisis[37,38] and help companies after the extreme weather events, this would have a negative impact on debt, liquidity and profitability indicators and thus on solvency and lead

[33] Despite the expected easing of cost pressures related to energy prices, wage growth and other remunerations.

[34] Three-quarters of corporate bank debt is tied to variable interest rates, which have risen significantly since the second half of 2022 (June 2023: 5%). This was followed by fixed interest rates, which have seen a similar increase (June 2023: 5.7%). Both deviate significantly from the average levels of the low interest rate period (2009–2021; see also BoS (2023b), Figures 2.12, 2.14 and 2.19). They are still negative in real terms, but the upward trend has been more pronounced compared to the euro area. Slovenian companies are broadly resilient to interest rate hikes, as they have considerably improved the structure of their financing over the last decade in favour of equity and their net profits were still at record levels in 2022 (BoS, 2023d). According to the Banking System Challenges Survey, however, just under half of banks expect the quality of their loan portfolios to deteriorate as a result, and this is likely to be particularly pronounced in 2024 (see also BoS (2023b), Figure 2.20).

[35] An estimated loss of EUR 380.9 million was reported by 1,173 companies (machinery and equipment: EUR 168.3 million; inventory: EUR 90.8 million and revenue loss: EUR 121.8 million; MGTŠ, 2023).

[36] The fiscal burden has increased considerably as a result of the intervention measures. The pressure to provide social support as part of the structural transformation of the economy is very high and requires a shift in focus from monetary to fiscal policy – setting growth-enhancing spending priorities together with fiscal restructuring to ensure sustainable debt levels (see also Gopinath (2023) and on the need for fiscal restructuring also Section 3.3.1).

[37] ZPGVCEP (2022) and ZPGVCEP-A (2022): (i) support to the economy for the period 6–12/2022 amounting to approximately EUR 59.7 million (available: EUR 80 million; see also Appendix 6.1, Figures 7 and 8); (ii) an increase in the earmarked assets of the Slovenian Enterprise Fund (SEF; EUR 6 million) to provide liquidity to enterprises (P7E 2023; in the amount of EUR 10 million).

[38] ZPGOPEK (2022), ZPGOPEK-A (2023) and the Decree (2022): (i) support to the economy for the period 1–12/2023 is estimated at around EUR 341.5 million (available: EUR 650 million; see also Appendix 6.1, Figures 9 and 10), (ii) job retention measures: (a) short-time work and (b) temporary lay-off (available: EUR 80 million); and (iii) liquidity measures for the economy: (a) increase of earmarked assets of ESF (2023: EUR 10 million, 2024: EUR 10 million) and the Public Fund of RS for regional development (SRRS; 2023: EUR 20 million, 2024: EUR 10 million), (b) financial engineering of the Slovenian Export and Development Bank (SID bank; ORMG1 (2023a): EUR 50 million; new measure ORMG2 (2023): EUR 100 million; PROMET2 (2023b): EUR 19.2 million).

to an increase in outstanding liabilities, which in turn could result in an increase in the number of bankruptcies.[39] However, economic policy measures need to focus on supporting the healthy cores of the economy that are not over-indebted in the long term and are able to survive in the long run, especially on the development-oriented niche segments of the economy with high growth potential.[40] Facilitating the funding and thus the preservation of zombie companies (i.e. the unhealthy cores of the economy)[41] prevents the optimal allocation of production resources to more productive companies and, as a result, hinders both productivity and economic growth.[42] The production resources of companies with relatively high exposure to insolvency risk would not necessarily be lost in the event of proper restructuring of over-indebted companies, also taking into account the general labour shortage.

2.4 The impact of rising energy costs on energy-intensive companies

The turmoil in international energy markets led to a sharp rise in energy prices in 2022, while the mitigating measures varied among countries and among consumer types. Limited energy supply as a result of the Russian-Ukrainian war had a strong impact on international energy markets in 2022. In addition, electricity generation in Slovenia and some other EU countries was affected by adverse weather conditions and the shutdown of nuclear power plants. Exchange prices for gas and electricity, two of the most important energy products for industrial production,[43] reached historic highs in 2022. However, the measures taken to mitigate the sharp rise in energy prices varied among countries and among consumer types. The actual increase in cost pressures and its impact on business performance also depended on the ability to increase energy efficiency and switch to cheaper energy sources in the short run, as well as the ability to contain other operating costs and pass them on to final prices.

The strongest increase in electricity prices was observed among large energy consumers. In 2022, the electricity price (excluding VAT[44]) for a small non-household consumer (IA) in Slovenia rose by an average of 11% compared to 2021, for a typical consumer (IC) by 85% and for a large consumer (IF) by 118%. This means that the electricity prices for the different consumer types have almost converged.

[39] In Slovenia, the number of bankruptcies in 2020–2022 remained lower than before the epidemic, showing that business entities, with the support of the state, have adapted well to the crisis, which has hit market services (accommodation and food service activities, administrative and support service activities, and art and recreation), with a large share of sole proprietors, the hardest (see also Tavčar, 2023). A similar trend continued in the first half of 2023, with no increase in the average monthly number of bankruptcy proceedings initiated against non-financial corporations compared to 2022. However, accommodation and food service activities stand out with a 16.4% increase in the number of bankruptcy proceedings compared to 2022. This was also the only activity where the number of insolvencies was higher than in 2019. Construction is also approaching pre-epidemic levels, with the number of bankruptcy proceedings increasing since 2022 (see also BoS (2023c), Figure 5.11).

[40] For detailed possibilities of economic policy in this area, see also Demmou et al. (2021) and Diez et al. (2021).

[41] In 2022, the most problematic over-indebted companies received 3.2% (EUR 28.8 million; 6.9% in 2008–2013) and zombie companies received 0.5% (EUR 4.2 million; 1% in 2008–2013) of all subsidies to the business sector (EUR 900.4 million).

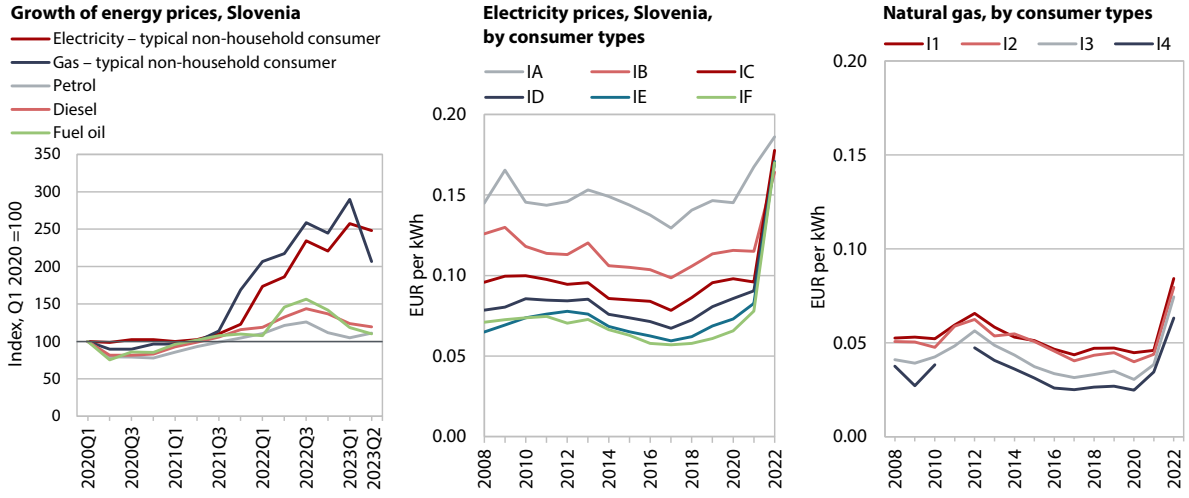
[42] The epidemic and the energy crisis, which affected both low- and high-productivity companies, and the broad measures taken to mitigate their consequences, hindered an optimal reallocation of production resources from low-productivity to high-productivity companies (the so-called "cleansing effect"). It is expected that the phasing-out of measures will enable these mechanisms to return to their optimal function (EC, 2022a). See Figure 7 and IMAD (2023), Box 1, for more on the small effect of company exits, and Bighelli et al. (2022), section 5.1, for the impact of job retention schemes on the allocation efficiency in Slovenia in 2020.

[43] In 2021, natural gas and electricity accounted for around two-thirds of final industrial energy consumption in the EU and around three-quarters in Slovenia.

[44] Price including levies, taxes and excise duties, but excluding VAT.

Higher price increases for large consumers were also observed in the EU average. The increase in electricity prices in Slovenia was slightly higher than the EU average, but the price level remained lower than the EU average for all consumer types in 2022, most significantly (by one-third) for small consumers (see Appendix 6.2). The increase in natural gas prices has been much more evenly distributed among the different types of non-household consumers in Slovenia than for electricity (between 81% and 93% for a typical consumer – I3) and is also in line with the EU trend.

Figure 22: Large differences in electricity price increases by consumer type in 2022; price increases for natural gas were more uniform in Slovenia



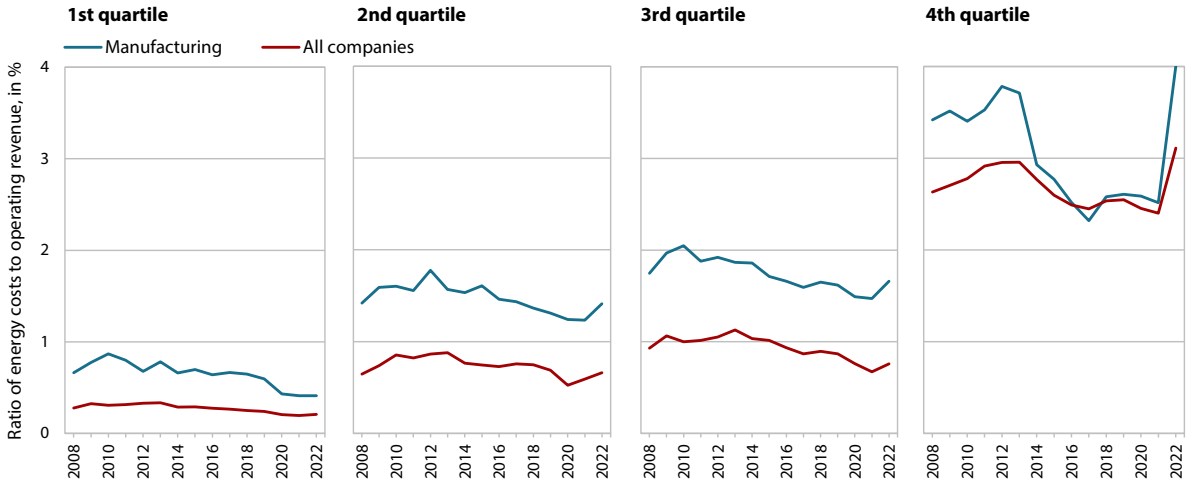
Sources: SURS (2023c), Eurostat (2023); calculations by IMAD. Notes: Bands of electricity consumption: IA: < 20 MWh, IB: 20 MWh–500 MWh, IC: 500 MWh–2000 MWh, ID: 2,000 MWh–20,000 MWh, IE: 20,000 MWh–70,000 MWh, IF: 70,000 MWh–150,000 MWh, IG: > 150,000. Bands of natural gas consumption: I1: < 1,000 GJ, I2: 1,000 GJ–10,000 GJ, I3: 10,000 GJ–100,000 GJ, I4: 100,000 GJ–1,000,000 GJ, I5: 1,000,000 GJ–4,000,000 GJ, I6: > 4,000,000 GJ.

In line with the price trend, the largest increase in the energy costs to business revenues ratio was seen among large energy consumers, including companies in energy-intensive industries.[45] The energy costs of companies in Slovenia increased by 58.8% on average in 2022 (after an increase of 22.8% in 2021), with their share in operating revenues amounting to 2.6%. For the quarter of the largest energy consumers (4th quartile interval), the average burden of energy costs on operating revenues was 3.1%, the highest in the period analysed (2008–2022). The burden of energy costs on company revenues has also risen sharply in energy-intensive activities, which – in addition to large companies – are mostly large consumers. The increase was most pronounced in the paper industry, which also stands out in terms of the share of gas consumption.[46]

[45] In 2021, around 17% of the value added and 50% of the energy costs of the manufacturing sector (C) were accounted for by companies in the energy-intensive industries (C17: manufacture of paper, C20: manufacture of chemicals, C23: manufacture of non-metallic mineral products, C24: manufacture of basic metals).

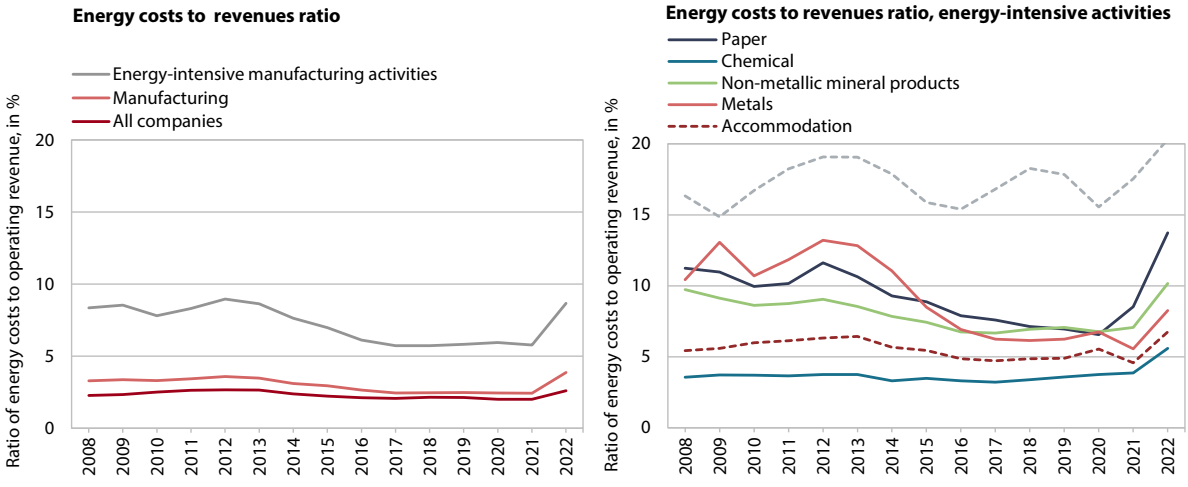
[46] The energy costs of companies in the paper industry increased by 107.7% in 2022 and reached 13.7% of operating revenues, the highest in the period analysed. Natural gas accounted for more than half of the paper industry's energy consumption in 2020 and also stands out with its high share in an international comparison (see also Productivity report 2022 (IMAD, 2022b, p. 87)). In the manufacture of basic metals, which is one of the most energy-intensive activities (see appendix) and is also characterised by high gas consumption (especially in the iron and steel segment), the increase of energy costs was less pronounced: 91.3%, to 8.3% of operating revenue. Over the last ten years, the manufacture of basic metals has significantly restructured its production and reduced its energy cost burden.

Figure 23: The increase in the energy costs to revenues ratio was more pronounced among large electricity consumers



Source: AJPES (n.d.); calculations by IMAD. Note: Companies are classified into quartiles according to absolute energy costs. The first quartile interval comprises 25% of companies (or manufacturing activities) with the lowest energy costs expressed in euros, the second (third) those with energy costs between 25% and 50% (between 50% and 75%), and the fourth 25% of companies with the highest energy costs. The analysis includes companies with at least one employee and a positive value of income and energy costs, whereby the energy costs may not exceed the income.

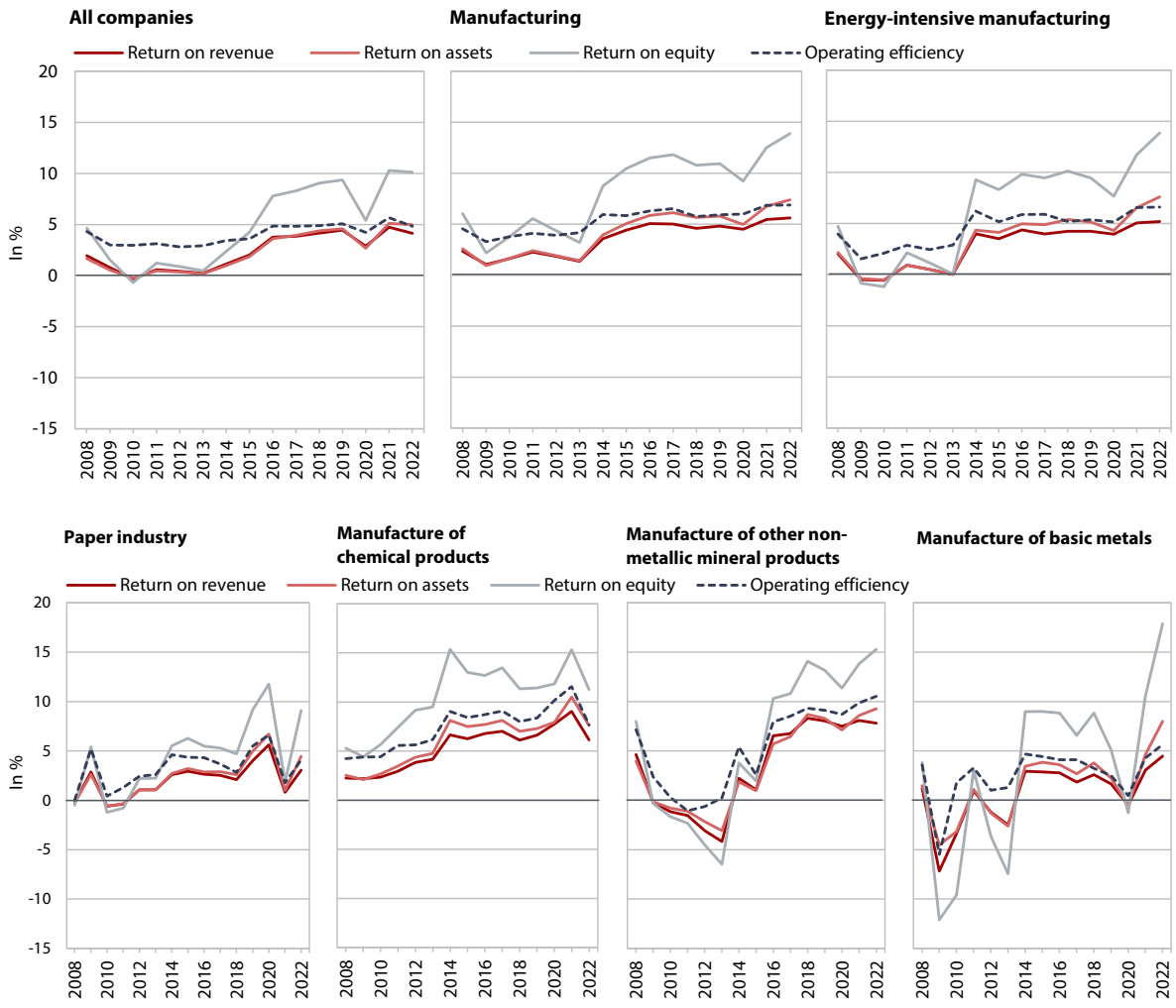
Figure 24: Among energy-intensive activities, the highest increase in cost pressures was seen in the manufacture of paper



Source: AJPES (n.d.); calculations by IMAD.

In 2022, the business results of most activities – including the energy-intensive ones – were solid... The exceptions were the energy supply (NACE D) and mining and quarrying (NACE B) companies, which on average operated at a loss. However, for manufacturing companies, which are more exposed to both energy costs and international competition, operating efficiency and profitability rates were actually the highest since 2008 and higher than the average for the economy. Against a backdrop of high nominal growth in operating revenue, the performance of energy-intensive manufacturing firms was also favourable.

Figure 25: Despite higher cost pressures, when it comes to business performance, energy-intensive manufacturing activities mostly exceeded the average in the economy as a whole in 2022



Source: AJPES (n.d.); calculations by IMAD.

...which suggests that, on average, firms have managed to pass on high cost increases to prices. The AJPES data do not allow a more detailed breakdown of nominal income growth into price and volume effects, but comparable data suggest a strong spill-over effect of higher costs on prices. For example, the industrial producer price index in Slovenia recorded a sharp increase last year, which was more pronounced than in the euro area, and this also applies to most energy-intensive activities (see Appendix 6.2). On the other hand, their production volume decreased significantly, especially in the second half of the year, which (with limited possibilities to improve energy efficiency or switch to alternative energy sources in the short run) is most likely related to a loss of competitiveness as well as to the rationalisation of (more energy-intensive) production at a time of high price increases and energy insecurity. The decline in the production of energy-intensive activities has continued in the first half of 2023, while producer prices have also gradually declined, due to a fall in the prices of energy and other raw materials.

Box 2

Empirical correlation between energy prices and company performance

Higher energy prices have a negative impact on company performance in the short term and thus create the need to increase energy and capital efficiency. According to the empirical literature, rising energy prices have a negative impact on productivity and the EBIT margin in the short term.[47] For example, a 5% increase in energy prices, ceteris paribus, is expected to reduce productivity[48] by an average of just over 0.4% one year later (André et al., 2023). The estimated decline in productivity is likely to be greater in smaller companies, in more energy-intensive sectors, in companies with a lower mark-up over marginal costs, in less capital-intensive and less capital-efficient companies, and under financially less favourable conditions (lower liquidity ratio, greater dependence on external sources of financing). At the same time, higher price increases (by one p.p.) are expected to reduce EBIT margin[49] growth next year by an average of between -0.043 p.p. (electricity) and -0.225 p.p. (gas) (CompNet, 2023), while the impact of prices on energy efficiency,[50] employment, investment and the share of renewable energy is less pronounced.

Unlike in the short term, productivity gains are intensified in the longer term, but only in the case of weak energy shocks and in less energy-intensive activities; in this regard, investments play an important role. Four years after a weak energy shock,[51] productivity growth is likely to rise by around 1 p.p. on average, while it is likely to fall by around 2 p.p. on average following a stronger shock (André et al., 2023). Weak shocks are more likely to have a favourable impact on productivity in less energy-intensive sectors and in companies with higher investment activity. The latter is positively influenced by the financial stability of companies, the restrictiveness of environmental policy, the sustainability of economic policy and a positive output gap, among other factors.

[47] In line with the results of André et al. (2023): an analysis of the performance of companies in the manufacturing and construction sectors with at least three employees, located in 21 countries in the period 1995–2020; and CompNet (2023): an analysis of companies with at least 20 employees, located in 8 EU Member States in the period 2007–2016.

[48] EBIT margin is the ratio of the company's profit (before interest and taxes) to its turnover. Productivity means multifactor productivity in the model decomposition of value added according to Wooldridge (2009).

[49] The ratio of operating profit or loss (EBIT) to net sales.

[50] Value added per TJ (tera joule) of energy consumption.

[51] A weak shock means a relative price change whose absolute value is less than 1 standard deviation measured over the entire time series. In the same sense, a strong shock means a relative price change whose absolute value is greater than 1.5 times the standard deviation.

3 Key factors of Slovenia's economic performance

The weak productivity growth over the last decade and a half, which has not allowed a more visible narrowing of the gap with the more advanced economies, is the result of a modest level of investment (see Section 2.1) and, from a structural perspective, in particular the too slow transition to a smart (including digital) and green economy (IMAD, 2022b, 2023). This chapter on key factors of productivity and competitiveness therefore starts by providing an overview of indicators of innovation, digital, sustainability, organisational and business transformation and a detailed analysis of investment, with a focus on investment in smart and green transformation. This is followed by an analysis of the available indicators on human and social capital, which, in a context of massive demographic, technological and climate change and the associated rapidly changing skills needs, has a significant impact on investment decisions and thus on restructuring and raising the productivity of the economy. The transformation of the economy to raise productivity must also be supported by a business environment that encourages investment, innovation, and knowledge and skills building. The analysis of the business environment at the end of the chapter focuses on the tax aspect, the availability of financing, the impact of bureaucracy, and agility and the values and habits that define it.

3.1 Transition to a smart, green economy[52]

Accelerating the green transition is becoming increasingly urgent in the face of more pronounced climate change and associated more intense and destructive weather events, presenting both a challenge and an opportunity for development. The consequences of climate change, such as heatwaves, droughts, fires, storms and floods, are driving up production costs and increasing the need for radical changes in production and living patterns. As climate change affects many activities, such as agriculture, energy and industry, and services, it is estimated that around one-tenth of GDP has already been lost for Europe (European Environment Agency, 2023; ECB, 2023c; Ellerbeck, 2022; COACCH, 2019). The ecological footprint, which measures the impact of production processes and lifestyles on the environment, is high in Slovenia, similar to the European average, reflecting unsustainable development that has not improved in the last decade (Global Footprint Network, 2023).[53] Due to the current delay, the transition in the coming years will have to be accelerated and will imply a change in the structure of the economy. As the challenges will be greatest in polluting activities, activity in these will decline rapidly, while activity in less polluting activities, and especially in activities that have an impact on environmental improvement, will increase (Varga et al., 2021). The transition to a low-carbon circular economy, supported by the development and deployment of innovative technological breakthroughs, is thus becoming a source of new competitive advantage and opportunities for new jobs and development, especially where green transformation is being pursued more ambitiously.

[52] For a detailed analysis of the transition to a low-carbon and circular economy, see the Productivity Report 2022 (IMAD, 2022b).

[53] In the last decade, the ecological footprint of Slovenia has twice exceeded its biological capacity, which creates a large ecological debt (Global Footprint Network, 2023).

While the share of recovered material use in total material use in 2021 is again slightly closer to the EU average... The circular material use rate, which is one of the indicators of the circular economy, has doubled in Slovenia over the last decade (to 11%), but it is still well below the average of the leading countries (18% to 34%) and also slightly below the EU average (11.7%) (Figure 26, left).[54] In 2021, the gap with the EU narrowed slightly, but at the same time the circular material use rate in Slovenia still lagged behind the 2019 value. In terms of material productivity, expressed as GDP per unit of material use, Slovenia is significantly lagging behind, in particular in the productivity of fossil energy use (OECD, 2023g), by more than a quarter compared to the EU average, and the gap has widened further in recent years. This stems from increased road transport and the resulting above-average use of energy fuels and partly also from energy-intensive manufacturing activities with (too) low value added.

... the progress in emissions and energy productivity, despite a relative improvement in 2021, is too slow, mainly due to road transport. Slovenia's emissions and energy productivity gaps with the EU average have not been reduced over time (they are around 10%), and compared to the top three countries, Slovenia's productivity gaps are by more than 50% lower.[55] In 2021, Slovenia's growth in emissions and energy productivity was more pronounced (8% and 6%[56]) than the EU average (3% and 2%), as GHG emissions and energy use increased less than the EU average, in the context of a post-COVID-19 economic recovery and slightly higher GDP growth. The overall increase in emissions in 2021 (by 0.8%) was driven by a renewed increase in transport emissions (by 14%), while most other sectors saw a decrease in emissions (ARSO, 2023; Eurostat, 2023).

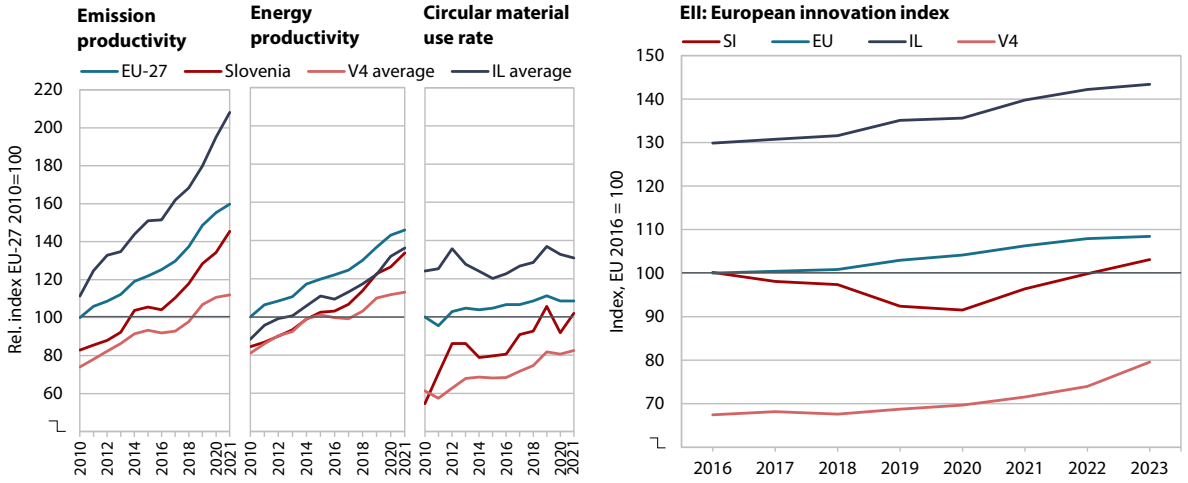
The green transition requires radical improvements in environmental productivity and circularity of resource use and the promotion of sustainable mobility. Accelerating the deployment of RES is of key importance and will require increased investment from both the public and private sectors. Emissions-intensive economies included in the emissions trading system (ETS) are being encouraged to find environmentally sound solutions by rising prices of allowances, while material- and energy-intensive economies are being encouraged to find environmentally sound solutions by high prices of raw materials and energy. In this context, maintaining the availability of critical raw materials that are limited in nature is becoming increasingly challenging, as the demand for them is rapidly increasing in the green transition (International Energy Agency, 2023). There is an urgent need to increase the efficiency of their use and reuse (EC, 2023a), while promoting sustainable consumption, maximising the use of products and thus preventing waste generation. Given the huge impact, a radical stepping up of all sustainable forms of transport is of particular importance. To achieve the necessary changes, attention must be targeted on infrastructure modernisation, technological breakthroughs and sustainable entrepreneurship. Consumers, investors and employees also expect sustainability, and this will become even more important in the future.

[54] The leading countries in terms of the circular material use rate in 2021 were the Netherlands, Belgium and France. A higher rate of processed substances (circular use) means a greater use of secondary materials. These replace primary raw materials, thereby reducing the environmental impact associated with the extraction of primary raw materials and waste management. The majority of processed substances in Slovenia are minerals and metals (around 65% in total), which are mostly used in the processing industry and construction (SURS, 2023c).

[55] The leading countries in emission productivity in 2021 were Sweden, Denmark and Luxembourg and in energy productivity Ireland, Denmark and Malta.

[56] In the manufacturing industry, energy productivity has doubled since 2005 and has exceeded the EU average since 2019 (by 5% in 2021), while its lag behind the leading countries remains at around a third.

Figure 26: Environmentally linked productivity is improving (left), as is Slovenia's innovation capacity as measured by the European Innovation Index (right), but the gap with the EU average remains and has even widened considerably compared to the innovation leaders

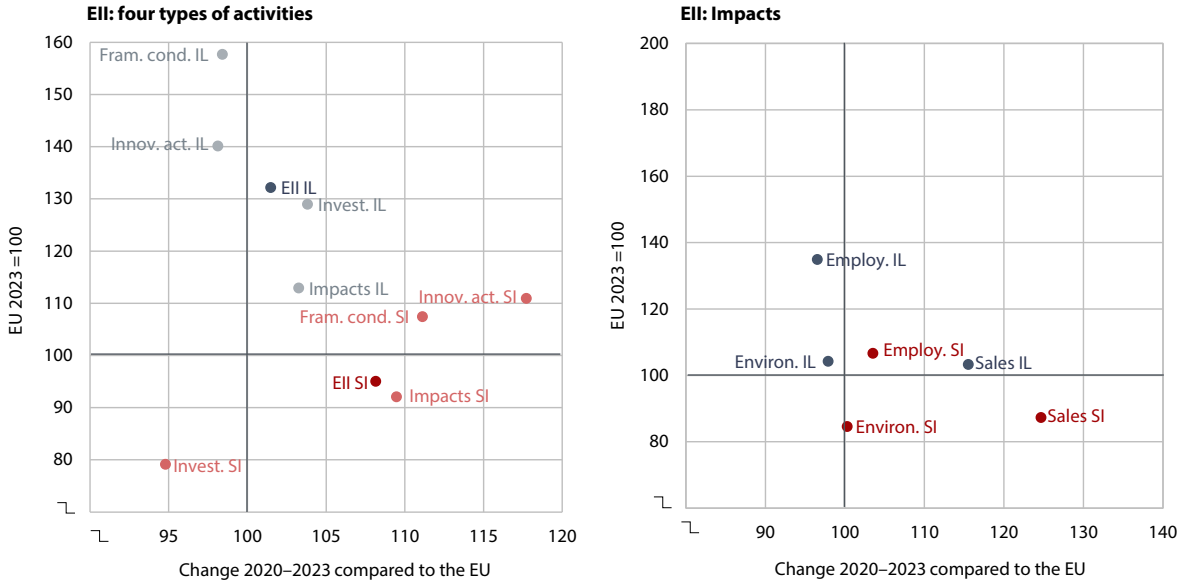


Sources: European Commission (2023d), Eurostat (2023); calculations by IMAD. Notes: Emission productivity is expressed as GDP per unit of GHG emissions, energy productivity as GDP per unit of energy use, and the use of processed matter as its share in the total use of matter (Figure left). »EII« stands for European Innovation Index.

In the area of smart transition, Slovenia has not yet managed to return to the ranks of strong innovators according to the European Innovation Index (EII), despite its progress since 2020.[57] The gap with the EU average has more than halved since 2020 according to the EII, and in recent years, Slovenia has again outperformed Italy, Spain and Portugal, reaching 13th place in the EU (Figure 26, right). On the other hand, the too slow progress is reflected in the fact that Slovenia only reached the EII of the 2016 EU average in 2023 and also that the gap with the innovation leaders, although this has also been decreasing since 2020, remains much larger than before 2018. Slovenia's too slow progress in innovation is also indicated by the Global Innovation Index, according to which it ranks 33rd in 2022 and 2023, which is lower than in the previous six years (WIPO, 2023).

[57] The EII classifies countries into four groups: the innovation leaders are those above 125% of the EU average in EII, followed by strong innovators (EII between 100 and 125%), then moderate innovators (EII between 70 and 100%), which include Slovenia, and finally emerging innovators with an EII below 70% of the EU average.

Figure 27: Structural factors influencing innovation, including innovation performance, are improving, but the gap with the innovation leaders, especially in terms of investment, remains significant



Source: European Commission (2023d); calculations by IMAD. Notes: The figure on the left shows the four types of activities that make up the EII, namely Framework Conditions ("Fram. cond.«), Investments (»Invest.«), Innovation Activities ("Innov. act.«) and Impacts (»Impacts«)[58]. The figure on the right shows the three innovation dimensions that make up the activity type »Impacts«, namely impacts on employment structure ("Employ.«), impact on sales structure ("Sales«) and impact on environmental sustainability (»Environ.«). The data on the y-axis shows the situation according to the index in 2023, while the x-axis shows the relative change with respect to the change in the EU average over the period 2020–2023, where the abbreviation SI refers to Slovenia and IL to the innovation leaders.

In the period 2021–2023, Slovenia has been progressing faster than the EU average and the innovation leaders in improving framework conditions and innovation transformation, but it continues to lag far behind both groups of countries in terms of investment. Slovenia is more innovation-active than the EU average (see "Innov. act. SI«, Figure 27, left), as it has a higher share of innovation-active companies, and also outperforms the EU average in providing the framework conditions for innovation, i.e. human resources, the science and research system and digital accessibility (see »Fram. cond. SI«). At the same time, however, it is lagging far behind the innovation leaders in both areas. While Slovenia has been improving faster than both groups of countries in both aspects since 2020, at current dynamics it would take more than 30 years to reach the EII of the innovation leaders. To leapfrog among the leaders, Slovenia will therefore need to address its biggest weakness, i.e. underinvestment in innovation, where not only does it lag far behind the EU average and even further behind the innovation leaders, but the gap is getting even wider.

As a result, the performance and effectiveness of the transition to a smart economy can be assessed as merely average, with significant untapped potential. In terms of employment impact, Slovenia has, on the one hand, an above-average share of employees in knowledge-intensive activities, with an eighth-place ranking, and is also making progress in the area of sales structure, where, for example, it is already among the leading EU countries in terms of the share of

[58] The EII consists of the presented four types of activities, which are further divided into innovation dimensions, which are composed of individual indicators. See the methodology report (EC, 2023e) for detailed explanations; for an overview we summarise the composition of the activity types. "Framework conditions" refers to human resources, attractiveness of the scientific research system and digitisation, "Investments" refers to funding and support, firm investments, and the use of information technologies, "Innovation activities" refers to innovators, linkages and intellectual assets, and "Impacts" refers to impacts on employment, sales and environmental sustainability.

exports of medium- and high-tech-intensive products, with a fifth-place ranking (Figure 27, right). On the other hand, it continues to have one of the lowest shares of knowledge-intensive services exports in the EU and only an average share of new product revenues. The average innovation performance, as well as its average improvement, is also confirmed by the corresponding index calculated by the EC's Joint Research Centre (Bello et al, 2022)[59], according to which Slovenia's innovation performance, while considerably above the V4 average, lags significantly behind the innovation leaders. The economic complexity and resilience indicators also show that Slovenia's transition towards a smart green economy is on the right track. In the former, according to the methodology of the Observatory of Economic Complexity, Slovenia has risen from 12th to 5th place in the EU over the last 20 years (OEC, 2023), which is also confirmed by the study by Crescenzi et al. (2020), according to which Slovenia is becoming increasingly diversified technologically, which means that it »uses knowledge from an increasing number of domains in the development of new products over time« (ibid., p. 32). At the same time, Slovenia, with a ranking of 9th, also demonstrates a relatively high level of resilience, especially when it comes to social progress and cohesion, financial resilience, and economic independence (Hafele et al., 2023).

3.1.1 Framework conditions

3.1.1.1 Human resources for innovation

Human resources are Slovenia's comparative advantage according to the EII methodology, but more attention will be needed to develop top-quality human resources, such as researchers and people with PhDs, especially in technical fields, to move to the top. In terms of the share of the population with a higher education qualification or participation in lifelong learning,[60] Slovenia is above the EU average and does not lag far behind the innovation leaders (see Section 3.2). The differences are more marked in the availability of top-quality human resources. For example, Slovenia is at the level of the EU average in the number of new PhDs in technical fields (science, technology, engineering and mathematics) per 1,000 population aged 25–34, but it is well behind the innovation leaders. When it comes to researchers, their numbers have mostly increased over the period 2010–2021, but not enough to reduce the gap to the innovation leaders (Figure 28, right). Trends have been positive over the longer term, especially in the business sector, and as of 2018 have also turned positive in the public sector,[61] although still quite marginally. However, fewer researchers from abroad migrated to Slovenia than emigrated from Slovenia in the period 2001–2020[62] (EC, 2022b, 2023f), which has a negative impact on the capacity of R&D activity in Slovenia. As regards the development of future human resources, while the number of young researchers supported by the state has been increasing since 2018 (ARRS, 2023), higher education institutions and institutes are facing difficulties in attracting candidates for young researchers due to the lack of attractive conditions in relation to the labour market situation (ARRS, 2023).

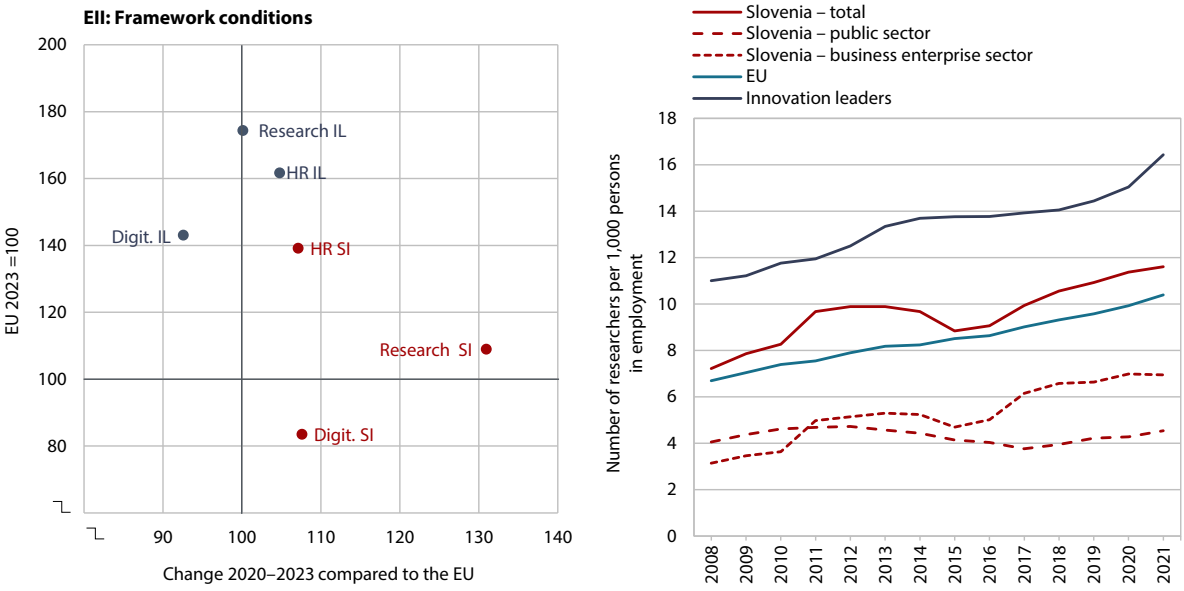
[59] For a methodological explanation, see IMAD (2023, p. 43).

[60] This raises concerns about the intensity of the training. According to the data available for 2020, an employee who has been involved in education or training has been in education or training for 21.3 hours on average in Slovenia, 22.6 hours on average in the EU and 25.5 hours on average in the innovation leaders (Eurostat, 2023).

[61] The public sector includes both the higher education sector and the state sector. In the business sector, which accounts for around 60% of researchers (in 2021, EU: 56.3%; IL: 68.3%), their number has mostly increased in the last ten years, which has had a positive effect on the sector's innovation capacities. At the same time, the proportion of younger researchers (under 35) is much higher in the business sector than in the public sector.

[62] According to data, the ratio of researchers who immigrated to Slovenia and those who emigrated from it was 0.94 in the period 2001–2020 (IL: 1.01; V4: 0.77) (EC, 2022b).

Figure 28: Slovenia does not have comparatively poor conditions for innovation, especially in the area of human resources, but to move to the innovation leaders, it will be necessary to create top-class conditions here as well



Sources: European Commission (2023d), Eurostat (2023); calculations by IMAD. Notes: The figure on the left shows the three innovation dimensions that make up the EII activity type »framework conditions«, namely human resources (»HR«), an attractive research system ("Research«) and digitalisation (»Digit.«), where SI refers to Slovenia and IL to the innovation leaders. The data on the y-axis show the state of the dimension according to the index in 2023, while the x-axis shows the relative change of the dimension with respect to the change in the EU average over the period 2020–2023.

3.1.1.2 The scientific research, innovation and entrepreneurship ecosystem

The scientific research system is increasingly open and developing faster than the EU average, but the gap to the innovation leaders, especially in terms of its excellence, remains very large. Slovenia's scientific research system is well integrated internationally, both in terms of scientific publications co-authored with foreign scientists and in terms of the share of foreign students in PhD studies. In the former, while Slovenia has regressed slightly in the last year, it is making faster progress than the EU average in this area over the longer term. In the latter, the share of foreign students in PhD studies has increased significantly over the last three years, but Slovenia is still lagging behind the EU average.[63] At the same time, the gap with the innovation leaders in both areas remains significant, which may also be a consequence of the system's weakness in terms of scientific research excellence. Slovenia ranks only 18th in the EU in terms of the share of scientific publications among the 10% most cited publications in the world and is even behind the EU average in this regard. It is worrying that Slovenia has not been able to improve its relative performance in this area over a longer period, which could also be linked to underinvestment to date.[64]

Although there is above-average cooperation between science and innovation stakeholders, this is mostly short-term, which is also a consequence of a too weak innovation system. The ability of science and business to work together

[63] The share of foreign students in PhD studies in 2021 (latest international data) was 20.8% (EU: 23.0%; IL: 34.6%) (Eurostat, 2023).

[64] However, where it is expected to improve markedly in the future, in line with the adopted Scientific Research and Innovation Activity Act in 2021, it could, of course with a significant delay, be reflected in improved excellence at a later stage.

(in scientific collaboration, human resource mobility and innovation development) is a comparative advantage for Slovenia according to the EIIs (Figure 35, left), but progress could be much more significant if the weaknesses in the innovation system that foster such collaboration were addressed. This is confirmed by a survey conducted among stakeholders of the innovation system in Slovenia (VVA et al., 2021), which showed a lack of (mainly long-term) cooperation between knowledge institutions and the business sector, as well as, for example, a lack of knowledge on product commercialisation. This is due, among other things, to a lack of recognition of the opportunities that SRIPs (Strategic Research and Innovation Partnerships) can bring, especially by the government, but also, for example, to a lack of tailoring of government actions to the specific needs or potentials of stakeholders in the individual phases of product or service development (VVA et al., 2021).

The business support environment is not sufficiently encouraging, and too many Slovenian start-ups go abroad. Innovative start-ups with breakthrough high-tech solutions with global growth potential have a significant impact on the creation of high value added and new jobs.[65] According to the identified good practice[66] standards that should contribute to improving the business conditions of start-ups or the quality of the so-called »start-up community« in the EU (EC, 2021a), Slovenia achieves 61% of these standards (ESNA, 2022).[67] This is below the EU average (62%) and places Slovenia only 18th out of the 23 EU Member States for which results are available, while all innovation leaders exceed the EU average. The above is reflected in the number of start-ups per million inhabitants, where Estonia and Lithuania rank at the top (1,408 and 706 respectively), while Slovenia, with 238 start-ups, lags far behind the EU average (550), though still outperforming nine EU countries (Rus et al., 2023). Worryingly, among the 14 CEE countries, Slovenia has the fourth highest share of start-ups that have relocated their headquarters outside the region, at 68% (dealroom.co et al., 2022).[68]

3.1.1.3 Digital connectivity

Closing the digital connectivity gap should be accelerated, in terms of its impact both on international attractiveness for living and working and on more balanced regional development. Very high-capacity fixed network coverage in Slovenia is 75.5%, which is slightly above the EU average (73.4%) and significantly below that of the innovation leaders (85.5%). For internet access with a speed of at least 100 Mbps per user, Slovenia is slightly behind the EU average, and it is significantly behind the EU average for gigabit access. The latter is available to 4.5% of households in Slovenia and 13.8% in the EU, while the leaders France, Hungary and Romania provide gigabit access to 39.9%, 29.8% and 23.3% of households respectively. On the one hand, this is reflected in the relatively low data transmission speeds to the user, where Slovenia ranks 55th among 182 countries in the world and 17th among EU countries (Ookla, 2023), which means that Slovenia is not a

[65] Slovenian start-ups create more than 50 jobs per EUR 1 million of capital invested, ranking Slovenia fourth among all European countries (not only in the EU) (dealroom.co et al., 2022).

[66] This refers to eight standards: (1) fast start-up creation and smooth market entry, (2) attracting and retaining talent, (3) stock options, (4) regulatory innovation with a "Think Small First" approach, (5) public procurement of innovation, including technology transfer policy, (6) access to finance, (7) social inclusion, diversity and protecting democratic values, and (8) digital-first manner (EC, 2021a).

[67] ESNA (Europe Startup Nations Alliance) baseline report (ESNA, 2022). As data availability is still significantly limited for many standards, extreme caution is needed when comparing them (ibid.). Also, there is not yet a common methodology in place for defining or capturing data from the start-up ecosystem.

[68] Bulgaria (76%), Ukraine (96%) and Belarus (99%) also have a higher share, while the Czech Republic (11%), Lithuania (8%) and Poland (7%) have the lowest.

particularly attractive place to live and work in this respect. On the other hand, lower internet coverage and access have a regional dimension, as rural areas have not only poorer access (OECD, 2022b; AKOS, n.d.), but also lower data speeds (Caldas et al., 2023).[69] In terms of mobile network coverage, Slovenia ranks 19th, with 63.9% 5G signal coverage, and is thus well behind the EU average (81.2%). According to the Digital Slovenia 2030 Strategy (Government of the RS, 2023), these gaps are expected to be closed by 2025 and 2030 respectively.

3.1.2 Investments

3.1.2.1 Investments in fixed assets

In Slovenia, investments contributed significantly to economic growth until the global financial crisis; then followed a period of deleveraging and low investment activity, while in the last five years, investment growth has been among the highest in the EU. Until 2008, investments grew rapidly, both in business and infrastructure, with intensive motorway construction making an important contribution. After the global financial crisis, investments fell sharply, mainly due to problems in the banking sector, corporate deleveraging and worsening expectations. Over the period 2007–2012, only Greece experienced a decline greater than Slovenia's. In the following five-year period, there was, on average, investment growth. Within this period, investments declined temporarily in 2016 under the impact of the completion of the EU drawdown, before recovering strongly in 2017. However, investment activity during this period was still among the weakest in the EU. On average, the 2017–2022 period saw a return to investment growth; while this was more moderate than before the global financial crisis, Slovenia was among the EU countries with higher investment growth. Nevertheless, the investment-to-GDP ratio was still slightly lower than the EU average (21.6%, EU: 22.4%),[70] and the contribution of capital deepening (capital per unit of labour) to productivity growth, given the simultaneously high employment growth, did not increase significantly over the period (Figure 29).

Figure 29: After extremely low investment activity during and in the first years after the global financial crisis, Slovenia has been among the EU countries with the highest investment growth rates over the last five years

Source: Eurostat (2023); calculations by IMAD. Note: The grey lines in the figure show the ranking of other EU Member States in terms of investment growth.

[69] The gap between rural and urban areas in Slovenia is not out of line with the average: among the 51 countries included in the OECD analysis, Slovenia has the 25th smallest data speed gap (the analysis refers to Q2 2021) (Caldas et al., 2023).

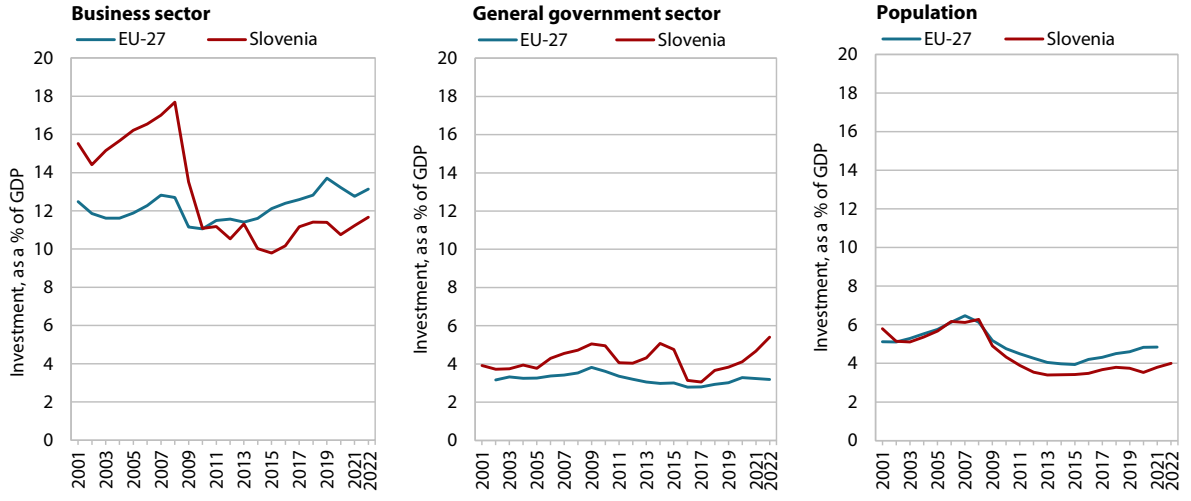
[70] In the period 2002–2007, the ratio between investments and GDP in Slovenia (26.4%) was much higher than the average in the EU (22.1%).

The relatively low share of investment in gross domestic product is significantly influenced by low levels of investment in buildings and structures. *Investment in housing* accounts for just over 2% of GDP, which puts Slovenia among the EU Member States with the lowest shares. *Investment in other buildings and structures* (engineering structures, such as roads and railways, and all non-residential construction, such as commercial, service, industrial, etc.) is at the average EU level but is much lower than in other below-average-developed EU Member States.

In terms of productivity, major investments in equipment and machinery are relatively high in Slovenia, while investments in intellectual property products are low. Slovenia ranks among the EU countries with an above-average ratio of investment in equipment and machinery to GDP. This is linked to the relatively high share of industry in the economy and the large number of successful and profitable companies in this sector. The picture is less favourable when it comes to investment in intellectual property products (computer software and databases, research and development), which are one of the key drivers of productivity growth in the modern economy. In Slovenia, investment in these products lags far behind the most advanced countries in this area, and the share of such investment is also lower than the EU average.[71]

By investor sector, Slovenia has less investment by individuals and companies compared to the EU, and more investment by the state. The general population sector invests less in Slovenia than the EU average, mainly due to lower investment in housing. The ratio of business investment to GDP is also lower in Slovenia than in the EU average; in our assessment, this is mainly due to lower investment in intellectual property products and partly also to lower investment in buildings and structures. The main contributor to the lower ratio of business investment to GDP compared to the period before the global financial crisis is lower activity in motorway construction, while the lower contribution of processing industry and trade investment is also significant. The government sector is investing more than the EU average, with particularly significant increases in 2021 and 2022.

Figure 30: All sectors have increased their investment as a share of GDP in recent years, but only the general government sector is investing more than the EU average as a share of GDP



Source: Eurostat (2023); calculations by IMAD.

[71] In 2022, the ratio of investments in intellectual property products to GDP was 3.0% in Slovenia, 4.4% in the EU, and the highest among EU Member states in Ireland (10.1%), Sweden (7.7%), France (6.4%) and Denmark (6.2%).

Companies consistently point to difficulties in finding suitable labour as a limiting factor for investment. According to an EIB survey (EIB, 2019), in 2022, 89% of companies in Slovenia identified the availability of skilled labour as a long-term limiting factor for investment. Since the outbreak of the pandemic, uncertainty about the future also ranks highly; last year, 85% of companies reported this limiting factor. Last year, companies also ranked energy costs highly (in 84% of cases), but we estimate that this has subsequently fallen with the falling prices of energy products.

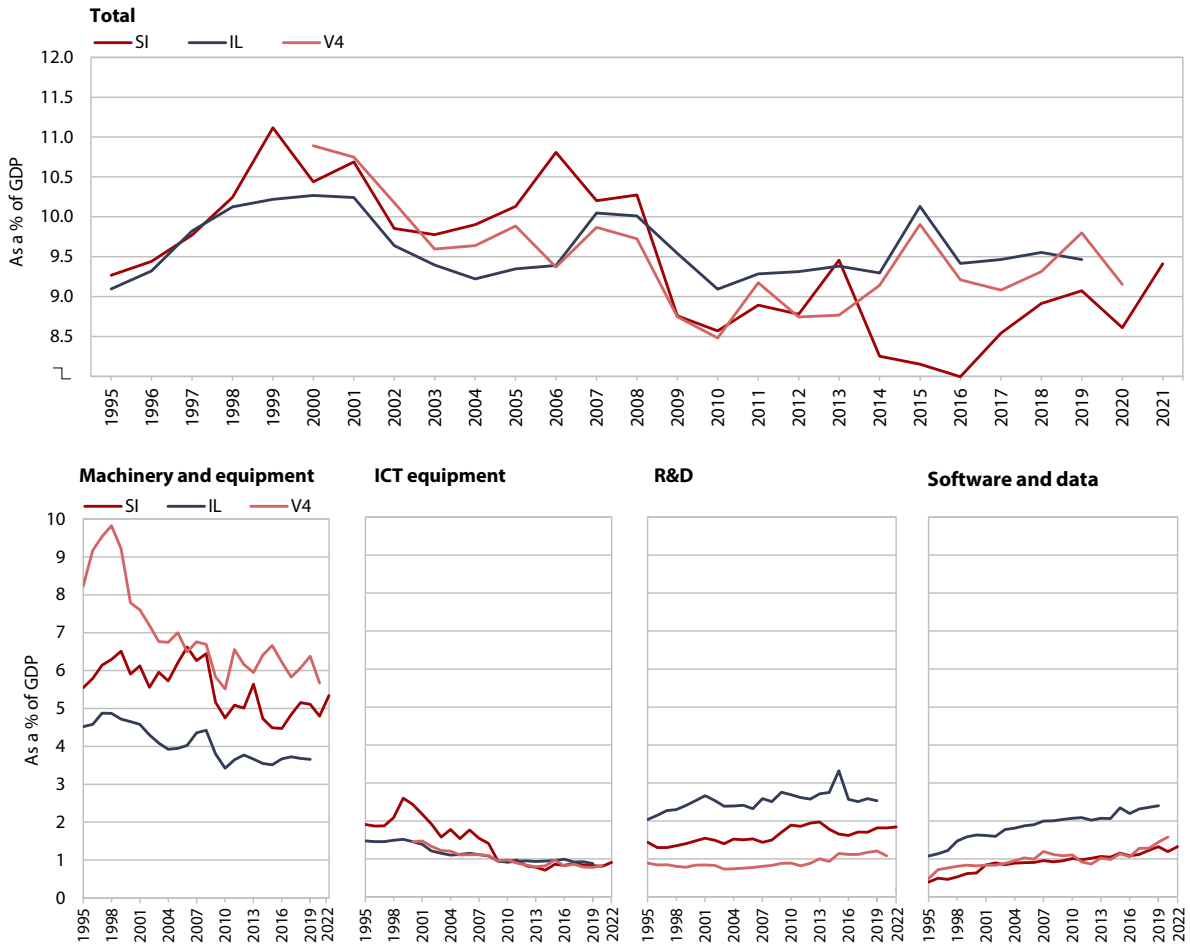
3.1.2.2 Investing in innovation-led growth[72]

In terms of investment in R&D, ICT, and machinery and equipment, Slovenia has been successful in narrowing the overall gap with other countries since 2016, but structurally softer forms of investment remain an untapped opportunity. In the period 1999–2008, Slovenia was among the leaders in this area, followed by a period of sharp decline until 2015. By 2021, Slovenia has managed to close the gap almost completely, thanks to a positive trend. At the same time, the structure of these investments has remained unchanged, with Slovenia lagging behind the innovation leaders not in tangible but in intangible investments. There is a clear trend, both in Slovenia and in other countries, of a decreasing importance of the former and an increasing importance of intangible investments, which, although growing in Slovenia, including in terms of GDP, are also growing in other countries at the same rate (R&D) or faster (ICT software and databases).[73] The latter in particular are especially sensitive in terms of digital transformation, where, in terms of investment, Slovenia has also been overtaken by the V4 countries. Empirical studies show that this is an untapped opportunity for Slovenia in particular: ICT investments positively and statistically significantly accelerate both productivity growth (Borowiecki et al., 2023) and employment, especially of workers with high education and incomes (Miho et al., 2023), while investments in intangible capital also have a positive impact on the non-financial, i.e. innovation, performance of companies (Erjavec and Redek, 2023).

[72] As investments with the major impact on the innovation transition, the literature lists, among other things, investments in research, development and innovation, ICT/digitisation, human resources, and other forms of intangible capital, e.g. organisational factors, which are analysed in detail in this section. For an overview of green transition funding, see the Productivity Report 2022 (IMAD, 2022b).

[73] The EIB data on the structure of business investment (2023) also testify to less attention to investing in intangible forms of capital, showing that Slovenian companies are investing above average in infrastructure, buildings, machinery and equipment, while investments in R&D also fluctuate significantly compared to the EU. However, the lag is more pronounced for other soft investments in ICT, employee training, and business process organisation and optimisation, where Slovenian companies invest similar shares of their revenues to those in the V4 countries (see Section 3.1.3.3 for more details).

Figure 31: The overall gap in investment in machinery and equipment, R&D and ICT is closing successfully, but the structural gap to the leaders in intangible capital investment, especially soft ICT investment, remains



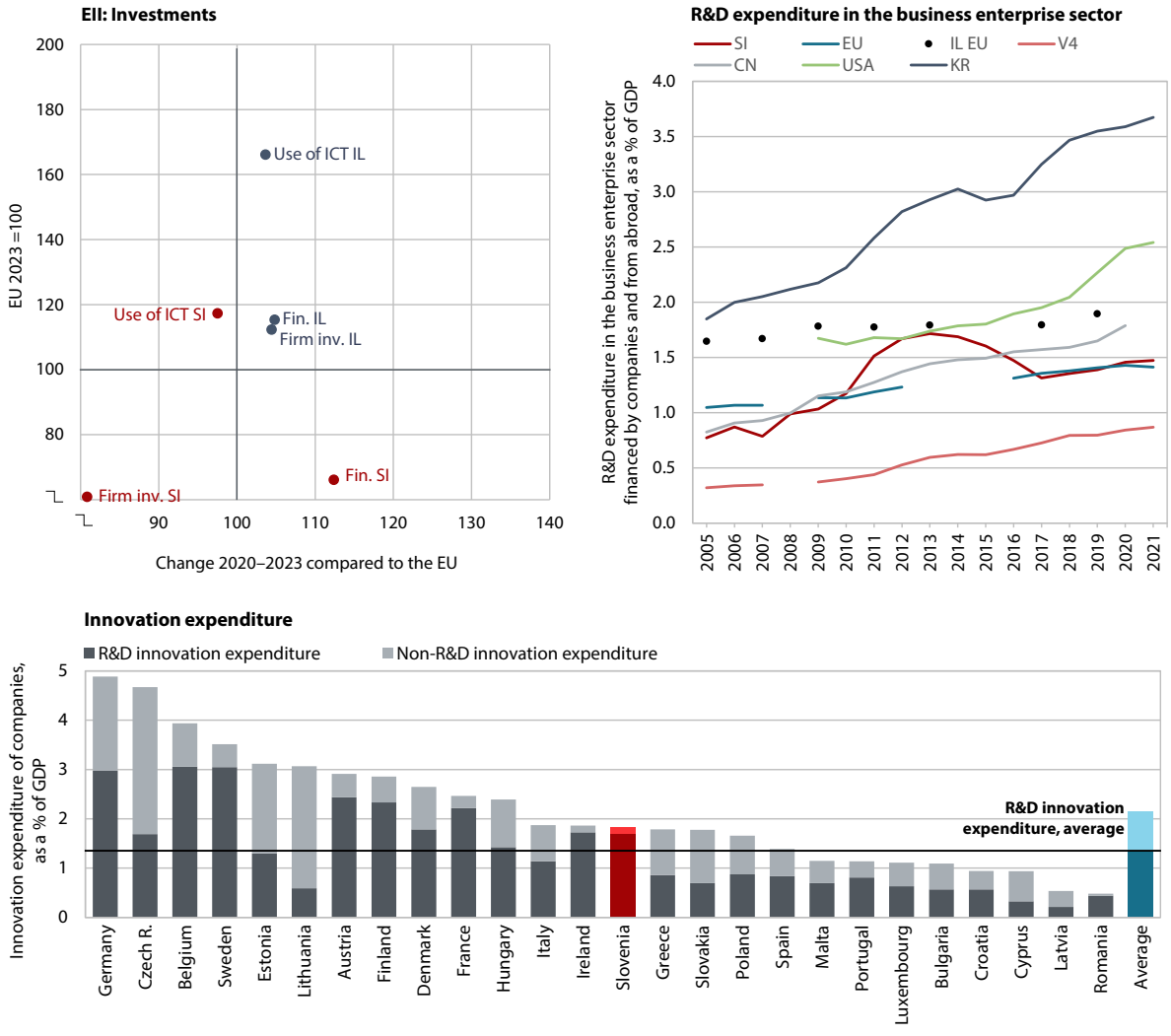
Source: EIB (2023); calculations by IMAD. Notes: The results of the EIB Investment Survey 2022 have been used, which means that the data refer to 2021. These are the shares invested by companies for the purposes defined above (R&D refers to research and development, including purchases of intellectual property, while ICT refers to the share of investments in software, data, IT networks and websites).

Although Slovenian companies are only marginally above the EU average in R&D investment, they are still among the more successful performers (but not the leaders) in the EU, ranking seventh, but at the same time Slovenia is at the tail end of the EU in other innovation investments. While business sector R&D expenditure is only slightly above the EU average, the high expenditure of the largest country, Germany, nevertheless means that Slovenia still ranks a high seventh in the EU. This is also true if we exclude the influence of the state: Figure 32, top right, shows only the part of R&D expenditure that is self-financed by companies or for which companies obtain funding from abroad.[74] According to this indicator, before the 2008 global financial crisis the Slovenian business sector lagged behind the EU average in terms of these investment and was then at the level of China, though significantly ahead of the V4 countries. In the following period, up to 2013, Slovenian companies moved up to the level of the EU's innovation leaders in terms of investment and also became on a par with US companies. This was followed by

[74] This eliminates the influence of the state, whose support varies considerably over time and which, of course, differs significantly between countries. Therefore the figure shows the intensity of investment in R&D that does not derive from state funding.

a return to average EU countries, which, however, collectively (i.e. both average and leading countries) are increasingly lagging behind companies from other parts of the world, both behind those from the US and even more behind those from South Korea, while at the same time Chinese companies are also already practically on an equal footing with the leading European innovators in terms of R&D investment. Slovenia, however, lags far behind in non-R&D innovation investment – according to the European Innovation Survey, Slovenian companies invest one of the lowest shares of GDP for this purpose (Figure 32, bottom).[75]

Figure 32: Slovenia underinvests in R&D and innovation, including businesses, especially in the non-R&D segment of innovation investment



Sources: EC (2023d), Eurostat (2023); calculations by IMAD. Notes: Figure, top left: Illustration of the three innovation dimensions that make up the EII activity type »investment«, namely finance and support (»Fin.«), firm investment (»Firm inv.«) and the use of information technologies (»Use of ICT«) in enterprises, whereby the abbreviation »SI« refers to Slovenia and »IL« to the innovation leaders. The data on the y-axis show the state of the dimension according to the index in 2023, while the x-axis shows the relative change of the dimension with respect to the change in the EU average over the period 2020–2023. Figure, top right: CN stands for China, US stands for the USA and KR stands for South Korea. Figure below: Data on innovation expenditure are from the 12th European Innovation Survey and refer to 2020.

[75] This refers to the funding of all activities that contribute to the development of new or significantly improved products and processes, from investments in machinery and equipment to marketing, branding, design and training, to which Slovenia, according to this source, presumably devotes a minimal share, while in, for example, the Czech Republic or Estonia, this share of GDP even exceeds that devoted to R&D (for detailed information, see Section 3.1.4.4).

The situation in funding and supporting the transition to innovation-led growth has been improving over the last four years, but the gap even to the EU average remains very large and will not be closed even with EU funding. Figure 33 shows the size of the government budget for R&D; while this has been increasing since 2018, the gap with the EU average is still 0.2 p.p. of GDP, though Slovenia has outperformed the V4 countries, mainly due to their reduction in such investment over the last two years. The examples of Germany and South Korea, which have increased their investment as a share of GDP by 48% and 106% respectively since 2004, show how positive attitudes towards public investment in R&D can be translated into practice. The rationale for such changes is also supported by empirical studies for Slovenia, according to which, for example, public support for R&D in the corporate sector has positive short- and especially medium-term effects on companies' productivity, profitability and internationalisation rates (Crivellaro and Granato, 2023). In this respect, Slovenia cannot be counted on to compensate for the gap from EU funds, since, as shown in Figure 33, right, Slovenia allocated a smaller share of its cohesion funding relative to GDP on smart or green transformation than most CEE countries.[76]

Finally, some positive developments have also been observed in the area of start-up and venture capital financing. According to an estimate by a private venture capital fund (Silicon Gardens, 2023), Slovenian[77] start-ups are assessed to have raised EUR 1.25 billion in investments in 2021 and 2022, which is six times more than five years before, although 54% of these were related to secondary investments, i.e. the transfer of ownership between investors. Although Slovenia is no longer the country with the lowest share of venture capital in GDP according to the EII (it has overtaken Malta and Romania), capital market development must remain high on the agenda (see Section 3.3.2), as Slovenia is still among the less successful countries in financing business growth (Giordano et al., 2023), with a significantly lower availability of venture capital.[78] To address this challenge, the VESNA[79] Venture Capital Fund was established in 2023 and the Slovenian Enterprise Fund is preparing a new proposal for equity financing in the form of a Fund of Funds for the period 2024–2029.[80]

[76] In more developed countries, cohesion funding does not play a major role. For a description of the methodology, see the note to Figure 30.

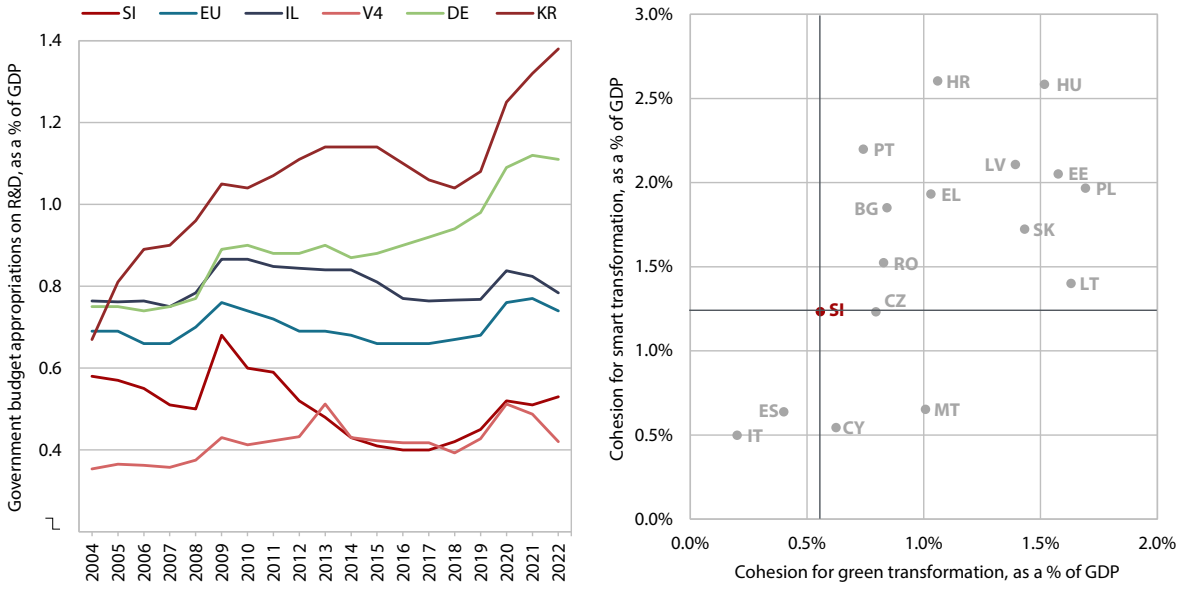
[77] These are start-ups founded in Slovenia or abroad by Slovenian citizens, three-quarters of which operate in Slovenia.

[78] For example, in 2022, according to the data of dealroom.co (2022), EUR 71 million of venture capital was invested in Slovenia, compared to EUR 865 million in Croatia, EUR 1.1 billion in the Czech Republic and as much as EUR 1.4 billion in Estonia.

[79] The fund was set up to support technology transfer of knowledge from universities and PROs (public research organisations) in Slovenia and Croatia. It will support pre-seed and seed stage start-ups developing solutions in the fields of climate and the environment, advanced materials, and AI and ICT (Dremelj, 2023).

[80] The size of the Fund of Funds is expected to be around EUR 35.7 million. In addition to the funds of the Slovenian Enterprise Fund (SPS), it will also include EU cohesion funds and funds from private investors. This will be a combination of financial support and "content" support to raise the competences of innovative SMEs (mentoring, training, networking, international conferences, etc.) (SPS, 2023).

Figure 33: State budget allocations for R&D are increasing, but Slovenia continues to lag far behind other countries, and European cohesion funding will not close the gap, not even in the area of green transformation



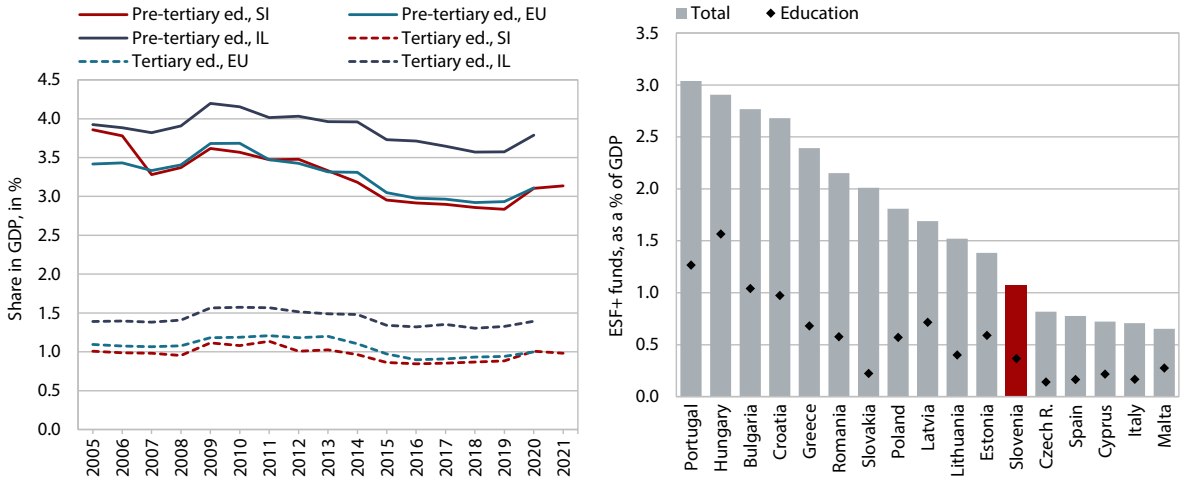
Sources: Eurostat (2023), EC (2023g); calculations by IMAD. Notes: The conversion uses EC (2023b) data on the structure of cohesion spending by country for the period 2021–2027, taking into account as smart transformation funds the funds under Policy Objective 1, Smart Europe, i.e. funds for research, development and innovation, digitisation, entrepreneurship, and training, while taking into account as green transformation funds the funds for energy efficiency, renewable energy, smart energy systems and the transition to a circular economy under Policy Objective 2, Green Europe. The conversion in terms of GDP refers to 2022.

Investment in formal education remains average. After several years of mostly negative trends, spending on pre-tertiary education[81] increased in 2020 and was comparable to the average of the 22 EU countries that are also OECD members (Figure 34, left). At the same time, the investment gap with the innovation leaders, which stood at 0.6 p.p. of GDP, did not narrow, reflecting lower public spending. The picture is similar for tertiary education expenditure, where Slovenia also lags behind the innovation leaders, is in line with the EU average and was ranked 29th among OECD countries in 2020. At the tertiary level, too, the lag behind the innovation leaders in terms of investment is mainly due to lower public expenditure, while the lag behind the OECD average is due to lower private expenditure (by individuals, companies and others).[82] In total, investment in education lags behind the innovation leaders by a significant margin, i.e. by 1.1% of GDP. Public expenditure on training and further training of the employed and unemployed under active employment policy is also low (see Section 4.2), and ESF+ funding (Figure 34, right) will not close both gaps in the coming years.

[81] Pre-tertiary education includes primary education (in Slovenia, the first two educational cycles of basic education) and secondary education (in Slovenia, the third educational cycle of basic education and upper secondary education).

[82] The share of public expenditure on tertiary education in Slovenia in 2022 was 1.1% of GDP, which was the same as the EU average, lower than in the innovation leaders (1.5% of GDP) but higher than the OECD average (1.0% of GDP). The share of private expenditure was 0.2% of GDP (the same as in the EU and IL but lower than in the OECD (0.5% of GDP)) (OECD, 2023b).

Figure 34: Public spending on formal education is lower than in the innovation leaders (left), and EU funding from ESF+ will not contribute to reducing the gap with other countries (right)



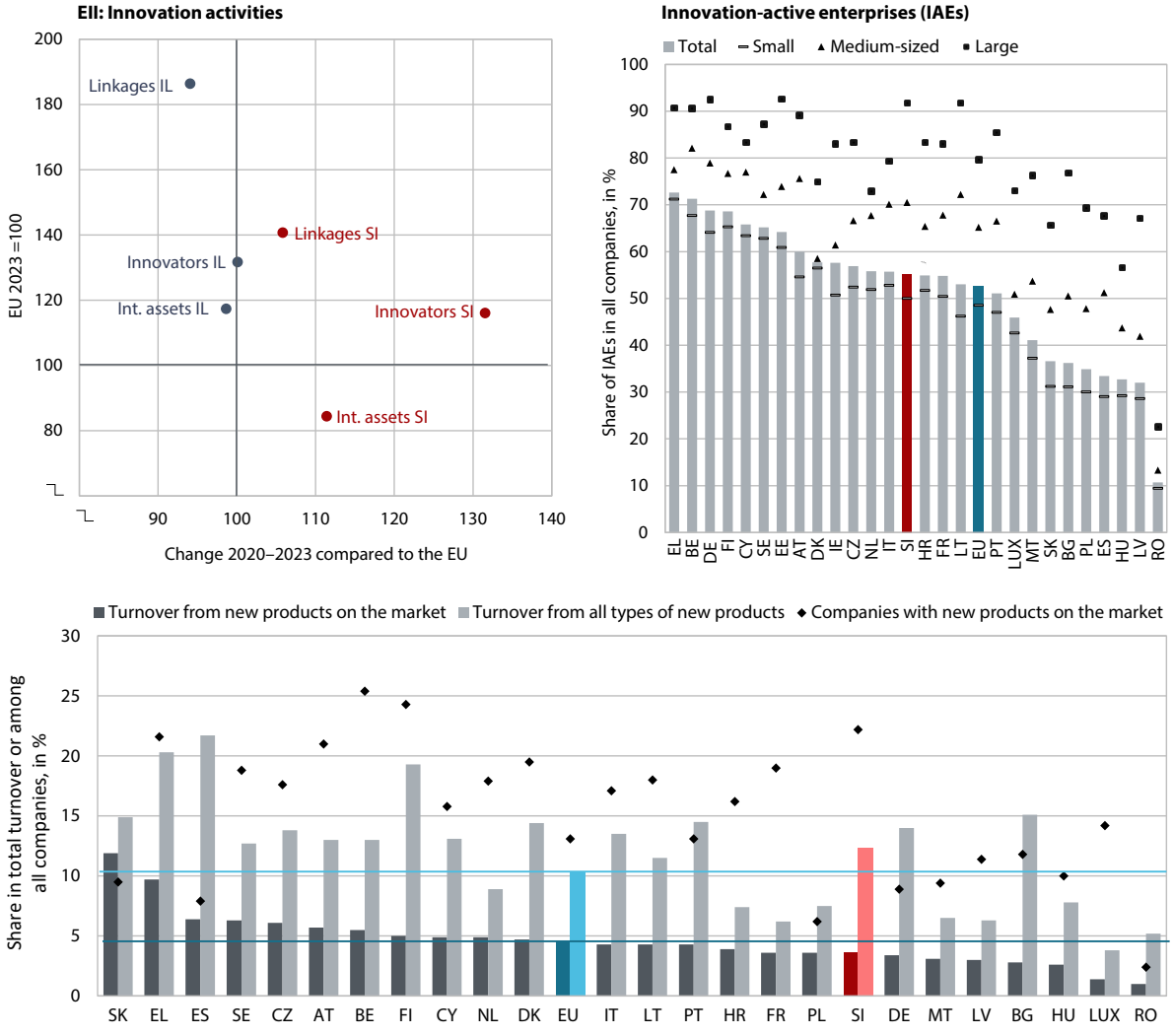
Sources: OECD (2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019a, 2020, 2021, 2022a, 2023b) and SURS (2023c); calculations by IMAD (figure left) and Eurostat (2023), EC (2023g); calculations by IMAD (figure right). Notes: In the figure on the right, the conversion uses EC data (2023b) on the structure of cohesion spending by countries for the period 2021–2027, taking into account the funds of the European Social Fund (ESF+). The conversion in terms of GDP refers to 2022. For education, expenditure on pre-school, basic, upper secondary and tertiary education, adult education, vocational education and training, and the development of digital skills is included.

3.1.3 Innovation and business transformation

At 55% in 2018–2020, the share of innovation-active enterprises exceeded the EU average for the first time in a decade, reflecting the positive dynamics of innovation transformation, but also untapped opportunities in terms of further broadening and, above all, deepening innovation processes. The share of innovation-active companies varies considerably by size: 92% of large companies are innovation-active, the third highest share in the EU, 70% of medium-sized companies (10th place) and half of small companies (16th place). All size classes of companies pay much more attention to product innovation, where Slovenia is ranked 8th (but also small companies are ranked relatively high, in 10th place), while in process innovation Slovenia ranks 16th and lags behind the EU average. On the one hand, this points to untapped opportunities for further involvement, especially of small companies, in innovation activities (i.e. innovation expansion), but on the other, innovation processes also need to be deepened in all segments. This requires a greater focus not only on process innovation, but also on breakthrough innovation. According to Eurostat, Slovenian companies rank third in the EU in terms of the share of companies that have developed products that were new to the market,[83] but at the same time they generated less revenue from this activity than the EU average (18th place; Figure 35, bottom).

[83] The broad involvement of companies in bringing new products to market is also confirmed by the EIB survey (2023), according to which in 2021 as many as one in ten companies brought a product or process to market that was new even at the global level, which was the 4th highest share among all EU countries.

Figure 35: Slovenia has recently emerged as an innovation-dynamic country with relatively favourable growth in the relevant EII dimensions, but the gap with the leading countries widens as company size decreases, and Slovenian companies also rely too heavily on well-tried and tested products



Sources: EC (2023d), Eurostat (2023); calculations by IMAD. Notes: Figure left: an illustration of the three innovation dimensions that make up the EII innovation activity type, namely innovators (»Innovators«), collaborations and/or linkages (»Linkages«) and intellectual assets (»Int. assets«), where SI refers to Slovenia and IL to the innovation leaders. The data on the y-axis show the state of the dimension according to the index in 2023, while the x-axis shows the relative change of the dimension with respect to the change in the EU average over the period 2020–2023. The figure on the right shows the share of innovation-active enterprises as from the 12th European Innovation Survey, covering the period 2018–2020. The figure below shows the shares of companies and/or shares of turnover from all types of new products (which also includes new products only for the company) and/or the share of turnover from new products only on the market (and not those that are new only for the company), whereby the line indicates the average share of turnover from all types of new products at the EU level.

3.1.3.1 The digital aspect

The state in the field of digitisation and automation in the business sector is still relatively favourable, but mainly thanks to large companies. In the IMD World Digital Competitiveness Ranking (IMD, 2022), Slovenia ranked 37th out of 63 countries (35th in 2021), while it ranked below average at 16th among EU countries.[84] The picture was slightly more favourable on the business sector side, where Slovenia, with one-third of companies with a high or very high digital intensity index in 2022, ranked 11th, which was above the EU average.[85] Large companies, however, ranked well above the EU average in terms of digital intensity, at 91%, and were even among the innovation leaders, ranking a high fifth. At the same time, the gap to the innovation leaders among both medium-sized and small enterprises was as high as 19 p.p. In Slovenia, medium-sized enterprises with a high or very high digital index account for 58%, whereas in the innovation leaders, they account for 77%, while the shares among small enterprises are 27% and 46% respectively. Companies have been more optimistic about their digital competitiveness in recent years, with the EIB Corporate Digitalisation Index ranking Slovenia just behind the innovation leaders, Spain and Austria, and Slovenian companies, according to their self-assessment, even having the highest share of advanced digital technologies among all EU countries, though this is not confirmed by official data.

Slovenia needs to move beyond the prevailing focus on traditional manufacturing and business, which might prove to be its competitive advantage under the assumption of accelerated transformation in other segments as well. In the automation of production, e.g. in the use of industrial robots, the Internet of Things or the integration of internal processes (see Figure 36 and IMAD, 2022b), Slovenia is highly competitive.[86] even leading the EU among large companies.[87] The above supports the traditional manufacturing functional specialisation, which Slovenia is complementing on more successfully than other CEE countries with research and development function (Kordalska et al., 2022). At the same time, Slovenia has not yet succeeded in making a breakthrough in the area of strengthening services or other high value-added functions, for example management,[88] and also faces difficulties in the transition from traditionally to

[84] The slightly less detailed UNCTAD Frontier Technologies Readiness Index ranked Slovenia 28th among 166 countries in 2022 (33rd in 2021), while Slovenia ranked 15th among EU countries, similar to the IMD ranking (UNCTAD, 2023a).

[85] At the same time, it lagged far behind the leaders Sweden, Denmark, Finland and Ireland, where such companies accounted for more than half of all companies. According to the DESI methodology, Slovenia ranks around average in the use of digital technologies in enterprises in terms of the use of electronic data interchange (ERP) systems, social networks and cloud data; it stands out positively in the use of artificial intelligence and e-invoicing but lags far behind in the use of big data (see IMAD, 2022b; "DESI 2023 dashboard for the Digital Decade", 2023).

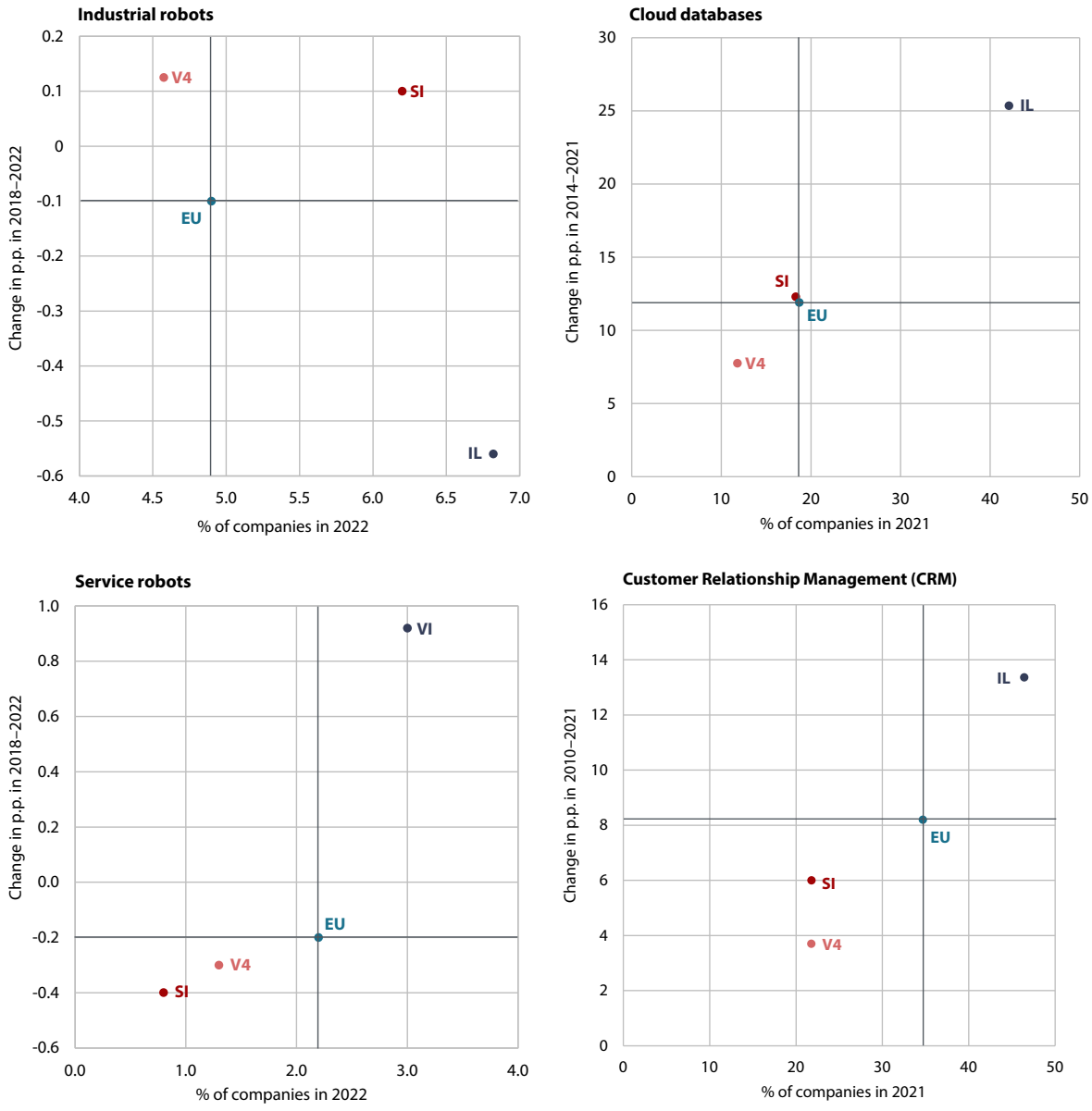
[86] The share of companies using industrial robots decreased from 7.7% to 6.2% between 2020 and 2022, according to Eurostat data (2023), but at the same time Slovenian manufacturing companies significantly increased the density of robots per 10,000 employees between 2020 and 2021, rising from 10th to 3rd place, just behind the traditional leaders Germany and Sweden and ahead of Denmark and the Netherlands, according to the International Federation of Robotics. The latter shows that, at least for industry and robots, the modernisation process is deepening, which is very positive given the reverse trend in 2018–2020.

[87] In terms of the share of industrial robots used, both large and medium-sized Slovenian companies are leading in the EU (2022) and in the use of the Internet of Things, large Slovenian companies are leading in the EU, while medium-sized Slovenian companies lag only behind Austrian ones (2021), whereas in the integration of internal processes (ERP), only large Slovenian companies are leading in the EU, while medium-sized Slovenian companies are lagging slightly behind, ranking 10th (2021).

[88] An analysis of the structure of inward foreign direct investment in the period 2003–2017 confirms its predominantly manufacturing orientation (around half of the investment was directed towards this) and also the relatively high attractiveness in terms of providing sales and logistics functions (31% and 10% respectively), while at the same time, compared to countries such as Austria, there are still considerable untapped opportunities in terms of the R&D function and, to a lesser extent, in terms of the management function (Crescenzi et al., 2020).

data-driven companies (IMAD, 2020a, 2022b). Complementarity between all these functions, including manufacturing, can be an important comparative advantage for Slovenia (Crescenzi et al., 2020), but only if it also strongly accelerates the use of technologies where it is not among the leaders or even lags far behind: for example, in data integration it is not among the leaders (it is average in the use of cloud databases), but in big data analysis, it lags far behind, and the same applies to the use of service robots and customer relationship management (CRM) systems, where progress made is also far below the EU average (Figure 36).

Figure 36: Slovenia is successfully automating industry but lacks ambition in data integration and lags far behind in service automation and structural business transformation



Source: Eurostat (2023); calculations by IMAD.

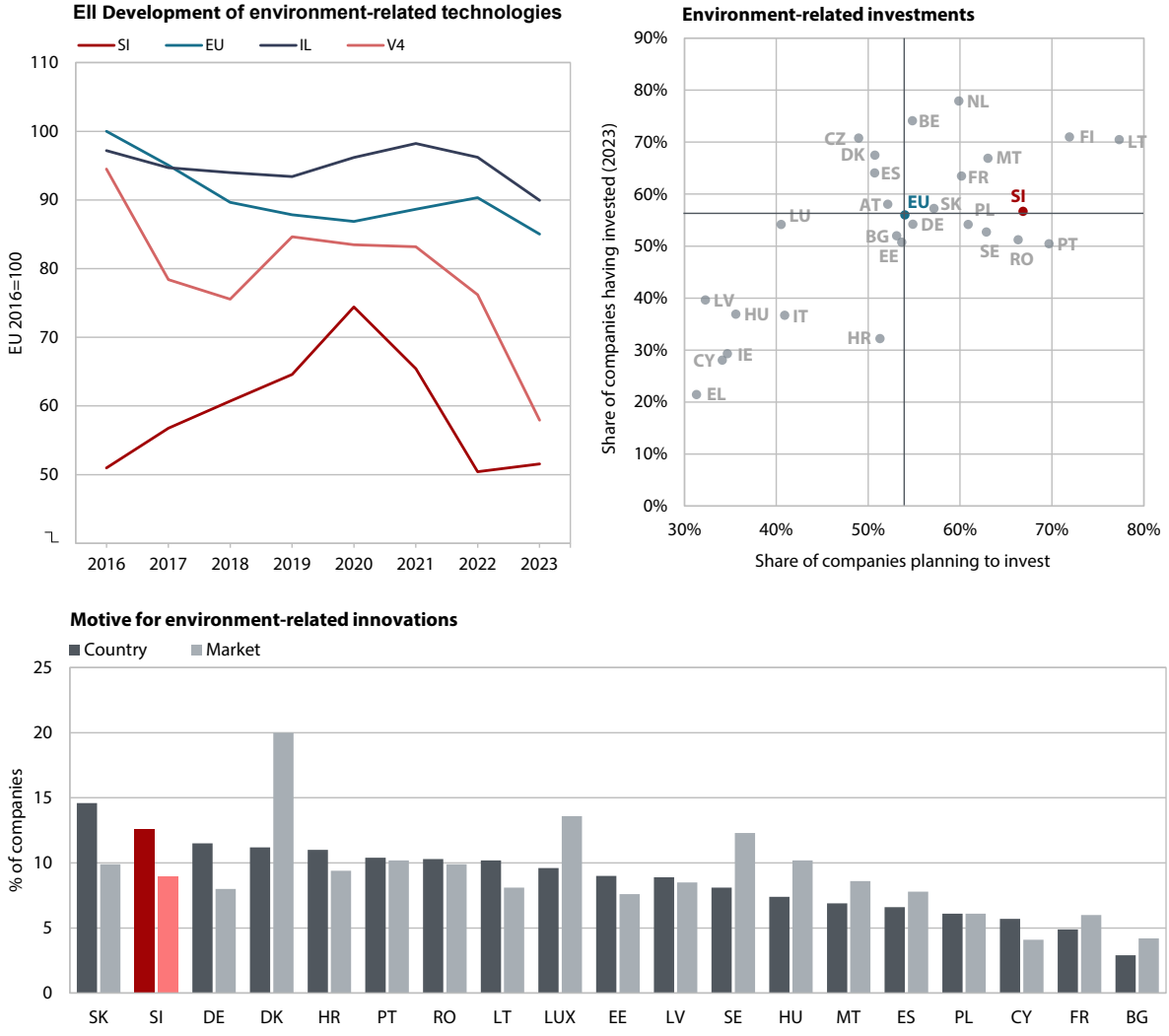
3.1.3.2 Sustainability

While the business sector is around the EU average in terms of perceiving sustainable transformation as a market opportunity, 2022 marked a turning point not only in terms of increased awareness, but also in terms of a strong acceleration of environmental investments. Slovenia made steady progress in the period 2018–2022 in accordance with the European eco-innovation index (IMAD, 2022b), but this is no longer sufficient to reduce the gap with the EU average (which is around five index points), due to the acceleration of activity in other EU countries after 2020. In this context, the data show that the business sector continues to have a relatively defensive attitude towards sustainable transformation, in the sense that it is mainly reacting to its challenges and less likely to see the opportunities.[89] This is reflected in (a) the poor exploitation of opportunities related to the development of environmental technologies (Figure 37, left), (b) the below-average share of companies with defined targets and monitoring of their GHG emissions (34% in Slovenia compared to 42% in the EU in 2023),[90] and in particular (c) the fact that companies are mainly introducing environmental innovations in response to the increased cost of raw materials and energy products or to existing or upcoming government regulation or taxation (first and second highest share in the EU), while the share of companies introducing environmental innovations due to existing or expected market demand is average (Figure 37, bottom). The share of companies that do not expect any impact of climate change on their business fell by 6 p.p. in 2022, which is likely to have contributed, among other things, to a substantial acceleration in environmental investment. In fact, according to EIB data (2023), in 2022, Slovenia achieved the highest increase in the share of companies that have already invested in weather-related or emission reduction projects. In terms of the share of companies that have already invested, it is now at the level of the EU average, but with one of the highest shares of companies with plans to invest in the next three years (Figure 37, right). In terms of the structure of these investments, companies are investing more than the EU average in (a) new less polluting technologies, (b) waste reduction and recycling, and (c) energy efficiency, but they lag far behind in investments in sustainable transport modes and renewable energy.

[89] According to EIB data (2022), in 2022, 19.4% of Slovenian companies saw an opportunity in stricter climate standards and legislation, compared to 19.9% in the EU (the gap remained unchanged compared to a year before) and 47% in the leading country Denmark.

[90] Data for 2021 showed a more positive picture (IMAD, 2022b), which is probably due to the fact that at that time the EIB's question also covered the monitoring of energy efficiency targets, whereas from 2022 on the question refers exclusively to the monitoring of GHG emissions.

Figure 37: Slovenia continues to lag behind in the development of environmental technologies and is around the average in exploiting (market) opportunities related to sustainable transformation; however, companies have strongly accelerated environmental investments



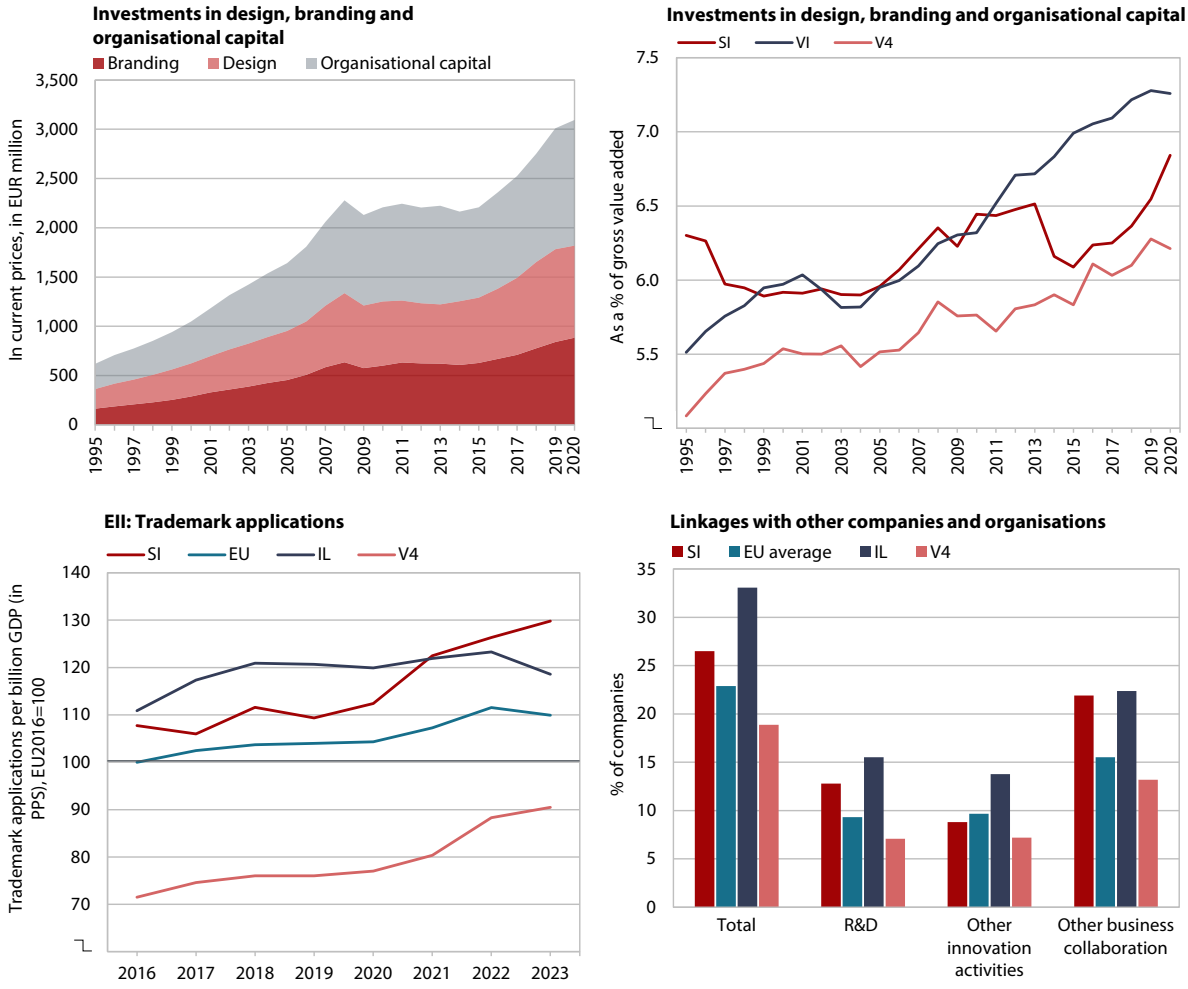
Sources: EC (2023d), Eurostat (2023), EIB (2023); calculations by IMAD. Notes: Top left figure: EII indicator showing the share of environment-related patents in total patents. The top right figure shows the share of companies that have already invested in projects with an impact on the environment and the reduction of GHG emissions, according to EIB data (data refers to 2023). Bottom figure shows the share of companies that identified »expected future legislation and taxes« (marked as »State« in the figure) or »current or expected market demand« (marked as »Market« in the figure) as a factor of high importance – the data is based on the 12th European Innovation Survey and refers to the period 2018–2020.

3.1.3.3 Organisational and marketing aspect

The business sector has been very active in the area of marketing, but there are still many untapped opportunities, especially in going beyond the traditional (mainly technological) understanding of the innovation process, i.e. in deepening innovation processes and culture, with an even greater focus on product differentiation, design and organisation, as well as opening up of companies to external stakeholders. As shown in Figure 38, top, business sector investment in the soft factors of intangible capital, design, branding and organisational capital (EUKLEMS & INTANProd, 2023) is increasing in nominal terms, or at least has not declined significantly during the global financial crisis and consolidation. But a comparison in terms of gross value added shows four distinct periods: (i) before 1999, when Slovenia was ahead of even the innovation leaders; (ii) between 1999 and 2011, when it was on a par with them; (iii) after 2012, when it fell behind and moved closer to the V4 countries, while from 2016, and especially after 2018, Slovenia accelerated these investments significantly. Thus, while Slovenia is still lagging behind in organisational capital, it is even ahead of the innovation leaders when it comes to investment in marketing and branding. Accelerated investment is also reflected in the number of EU trademark applications filed with the EUIPO per billion GDP (in PPS), where Slovenia has also outpaced the innovation leaders over the last two years (Figure 38, bottom left). These trends will need to accelerate further in the future to achieve an even more intensive complementarity of technological and non-technological investments (Černe et al., 2023). Greater emphasis should be placed on product differentiation and fostering a culture of innovation[91] both within companies and through even stronger outward opening. While Slovenian companies' cooperation with other companies and organisations is above average, especially in terms of business cooperation, but also research and development, there are significant untapped opportunities in other innovation activities (Figure 38, bottom right). It is worth noting that this type of outward opening, for example through the introduction of open innovation processes, is particularly important for less productive companies (Farčnik et al., 2022) and is therefore also linked to the process of broadening of innovation activity (see Section 3.1.3).

[91] For example, according to the CorpoHub survey (2023), most companies are in the process of moving from individual projects to a systematic innovation process, but are far from having a strong innovation culture. For example, in most companies, lean and agile business innovation processes are not yet reflected in users and even less in financial results, but more and more companies are dealing with this systematically.

Figure 38: Slovenia is gradually returning to the leading position in marketing, both branding and design, but what is missing is a more decisive deepening of innovation processes, with a stronger focus on organisational change, innovation culture and even more intensive networking



Sources: EUKLEMS & INTANProd (2023), EC (2023d), Eurostat (2023); calculations by IMAD. Notes: The figure on the top right shows the share of investment in design, branding or organisational capital as a share of gross value added according to the expanded definition of fixed capital formation. For details, see Bontadini et al. (2023), which also presents a methodology for estimating the different types of investment not covered by the national accounts. Figure on the bottom left: The data on registered trademarks are part of the European Innovation Index. Figure on the bottom right: data on business participation are derived from the 12th European Innovation Survey and refer to the period 2018–2020.

3.2 Human resources

3.2.1 Staff

The shortage of staff with appropriate knowledge and skills is a growing constraint on productivity growth. According to the European Economic Survey (CCIS, 2023), staff shortages are a major business challenge for 57% of companies surveyed, and the availability of an adequate workforce in 2022 was rated as the worst in 10 years at the EU average level (IMD, 2023b). The 3% job vacancy rate[92] in 2022 was also at an all-time high (EU: 2.9%; IL: 3.9%). In Slovenia, 55.8% of companies faced a shortage of (suitably qualified) staff in the first half of 2023. This percentage rose to 85.1% for large companies. In addition to a general shortage of labour (attributed to demographic change and robust economic activity), the availability of skilled labour is hampered by a shortage of various specialist and other occupations. These challenges impede a faster transition to a smart green economy (Section 3.1) and hamper productivity growth. The importance of the relevant skills and knowledge of employees for productivity is also highlighted by research by Cammeraat et al. (2021), which shows that in selected OECD countries, a highly skilled employees, digital literacy, and investment in the education and training of the workforce have a positive impact on labour productivity.

In Slovenia, the educational structure of the employed persons has been improving for many years, but an important challenge is to improve the skills of the workforce to meet the challenges of work. The share of persons in employment with at least upper secondary education increased significantly over the 2010–2022 period, with the long-standing high participation of young people in education and a transition from younger, better educated generations to older age groups, and is higher than in the innovation leaders.[93] However, the gap in the share of persons in employment with tertiary education compared to the average of the innovation leaders has narrowed considerably (Figure 39, left), most notably in other diversified business activities, and also in manufacturing and construction (Eurostat, 2023). While the educational structure is relatively good, the self-assessment of employees shows that about a quarter of them are in jobs with lower educational requirements. However, in 2022, 21.4% of those with tertiary education (aged 25–34) were employed in occupations requiring at most upper secondary education (EU: 23.0%; IL: 15.9%). There are also shortfalls in occupation-specific and a number of transversal skills and competencies[94] that are increasingly important to cope with the challenges of the working environments (Section 4.2).

Despite changes in the structure of education enrolments at a smaller pool of younger generations (due to demographic change), the supply of qualified staff is not keeping pace with the demands of the labour market. In Slovenia, 79% of SMEs faced (moderate) difficulties in recruiting workers with appropriate knowledge and skills in 2023 (EU: 78%; IL: 68%), which places Slovenia among the EU Member States with one of the highest shares. (Figure 39, right). Job seekers also lack appropriate skills, competencies and education (ESS, 2023a). Over the years, the corporate sector has grappled with shortages in occupations requiring primary education, in occupations requiring upper secondary vocational and

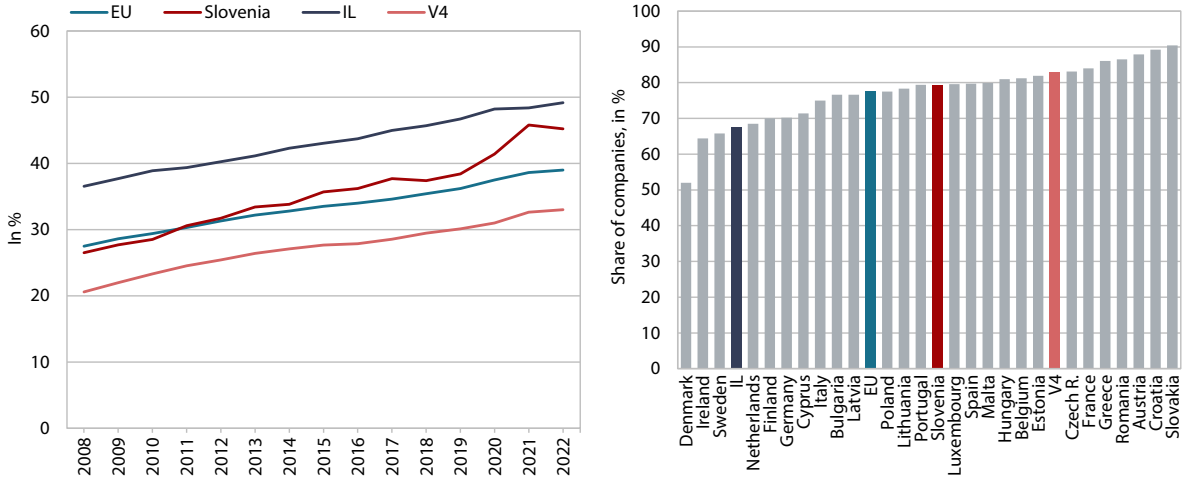
[92] The ratio of job vacancies to occupied positions (a higher ratio indicates that employers are having difficulty in finding suitable workers).

[93] The share of adults (25–64 years) with at least upper secondary education in Slovenia in 2022 stood at 91% (EU: 79.5%; IL: 84.6%) (Eurostat, 2023).

[94] Transversal skills and competencies include, for example, communication, problem-solving, leadership, teamwork, flexibility and cooperation.

technical education,[95] and in occupations requiring tertiary education.[96] Despite a long-term shift towards increased enrolment in upper secondary vocational and technical study programmes and tertiary study programmes in science and technology, health, and social services, the supply of these subjects falls short of the labour market needs, due to a decline in enrolments caused by demographic factors (younger generations). Simultaneously, the gap between enrolments and the needs of the economy, coupled with the inadequate preparation of students for the labour market,[97] underlines the need to strengthen strategic human resource development.

Figure 39: The share of persons in employment with tertiary education is slightly lower compared to innovation leaders (left); SMEs face significant challenges in recruiting suitably qualified staff (right)



Sources: Eurostat (2023) (left) and Eurobarometer (2023).

3.2.3 Social capital

In addition to the skills and abilities of employed persons, labour productivity is also influenced by the organisation and relations within the work process and wider society (social capital)... In the world of work, employees' social capital is measured by analysing employees' values and attitudes towards work, working conditions, job quality, participation, motivation, commitment, etc. While the productivity and financial performance of companies can be strengthened in the short term even in the face of weak employee social capital and poor working conditions, there are long-term consequences for employees, business performance and society: employees' health, job and life satisfaction, social and emotional well-being deteriorate, and hidden costs due to absenteeism, healthcare costs, incapacity to work, etc. increase, which has a negative impact on the quality of life of employees and on society as a whole. Social capital holds significance not only within the company, but also in its external environment, as evidence shows that companies operating in an environment with robust social capital (e.g. higher levels of trust) tend to achieve higher productivity growth (Ganau and Rodríguez-Pose, 2023).[98]

[95] Employers find it most difficult to recruit, among others, heavy truck and lorry drivers, welders and flamecutters, bricklayers, manufacturing labourers, sales workers, cooks, waiters, cleaners and helpers (ESS, 2023a).

[96] Shortages in tertiary education occupations includes a lack of ICT specialists and other engineers, various health, social protection and education professionals, and some social science graduates (ESS, 2022a).

[97] 23.5% of students in Slovenia (IL: 15.4%) consider themselves (very) poorly prepared for the Slovenian labour market (DZHW, 2021).

[98] The analysis was carried out for manufacturing companies and the impact was found to be strongest for smaller, less productive, less capital-endowed and less technologically advanced companies.

... where employees in Slovenia show a strong identification with their work, they perform it more autonomously than in the EU, but they are also (only) averagely engaged and successful, which is mainly due to the poorer quality of employment, working conditions and work organisation. For many years, analyses for Slovenia have shown a strong employee identification with the work organisation, the workplace and the job (Eurofound, 2016, 2023), but also poor employee perception of job quality and earnings, their material well-being (Hafner-Fink et al., 2019; ISSP Research Group, 2017), and, above all, poor self-perception of the quality of health and fitness for work (EU-OSHA, 2019, 2022). Slovenia is within the EU average in terms of both employee engagement[99] and the share of successful employees,[100] but employee engagement remains a challenge for Europe as a whole (Gallup, 2017, 2020, 2022). Among job and workplace quality factors, Slovenia ranks worse than the EU and innovation leaders, especially in working time flexibility, compliance with occupational health and safety standards, and emotional well-being, but better in the training and cognitive development of employees: more employees than the EU average receive on-the-job training, and more employees perceive that they have interesting work that they can do autonomously, though they are less likely to feel able to solve more complex tasks or unforeseen problems on their own (Eurofound, 2016, 2021; ISSP Research Group, 2017). Employee participation in management and decision-making in companies and other organisations is also below the EU average and that of the innovation leaders, and the risks associated with digitalisation are less frequently discussed with employees (EU-OSHA, 2022).

3.2.3 Values and habits

As a society, Slovenia is less receptive to change and new ideas, however, its population holds a positive perception of the impact of digital transformation on the economy and society... According to experts, Slovenian society is less inclined towards embracing new ideas, change and risk-taking compared to the EU average (IMD, 2023a; Širec and Crnogaj, 2023).[101] In Slovenian culture, there is a lack of emphasis on values such as creativity, innovation, autonomy and personal responsibility in managing one's own life (Širec and Crnogaj, 2023). This sentiment is also reflected in Eurobarometer data (2021a), according to which 64% of Slovenians agree that science is changing our way of life too fast, which is above the EU average (of 57%) and much higher than the innovation leaders (at 39%). The proportion of people who have a positive view of the impact of science and technology on society is similar to the EU (85%; EU: 86%), but lower than in the innovation leaders (95%). However, less than a third of respondents (27%; EU: 29%) believe that artificial intelligence and automation will create more jobs than they will eliminate. The share of respondents who rate the impact of digital transformation on the economy and society positively decreased over the 2021–2022 period, yet it remained above the EU average in 2022 (73%; EU: 67%; 2021 – Slovenia 81%; EU 68%) (Eurobarometer, 2021b, 2022).

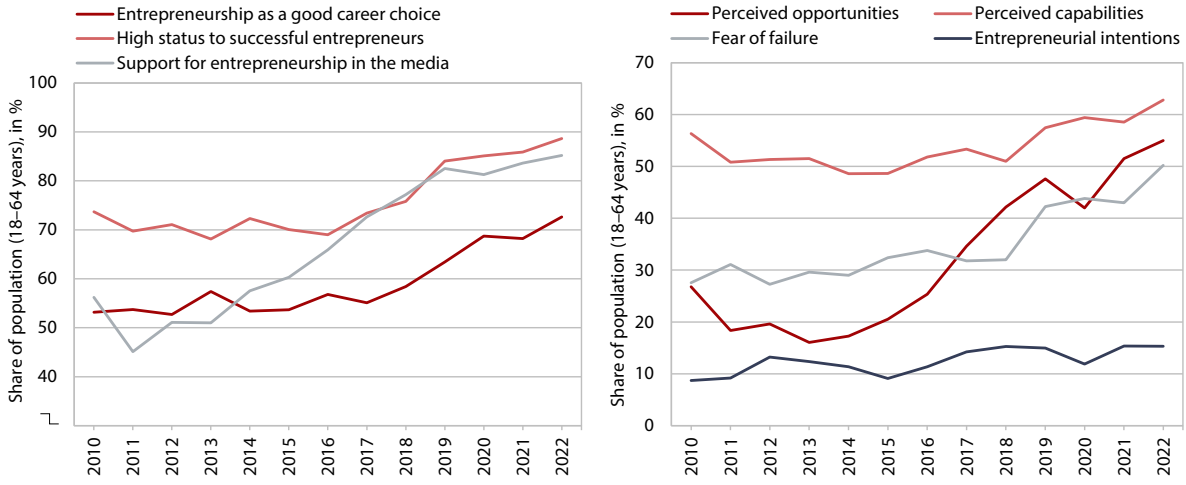
[99] Employee engagement (Gallup Q^{12} Index) includes employees' basic needs, motivation, belonging and personal growth (Gallup, 2022).

[100] Thriving employees are those who are positive about their present life situation, have a positive view on the future, have few health problems and negative daily feelings, and are happy, respected and hopeful (Gallup, 2022).

[101] In both surveys, Slovenia ranks in the bottom third of EU Member States for most of the above indicators, far behind the innovation leaders.

... and the attitude towards entrepreneurship has also improved markedly over the last decade. According to the GEM survey,[102] the respect for entrepreneurs in society and the desirability of entrepreneurship as a career path have increased, which is also linked to the perception of more positive entrepreneurial stories in the media (Širec and Crnogaj, 2023; GEM, 2023). In the 2022 survey, the values of all three indicators were again above the average for the EU Member States surveyed.[103] Slovenians also rate their entrepreneurial skills[104] better than a decade ago, with the exception of their willingness to take risks. In 2022, 50.2% of respondents expressed a fear of failure, the highest rate ever recorded and above the EU average (44.8%).[105] Encouragingly, the proportion of people who see business opportunities in their environment has increased significantly over the last decade. In 2022, it was above the EU average.

Figure 40: In Slovenia, social attitudes towards entrepreneurship (left) have become more favourable in recent years and some elements of the population's entrepreneurial capacity have improved (right)



Source: GEM (2023). Note: The GEM survey analyses society's propensity for entrepreneurship along three dimensions of individual perceptions: entrepreneurship as a desirable career path, society's respect for successful entrepreneurs and support for entrepreneurship in the media.

[102] The Global Entrepreneurship Monitor (GEM) is the world's largest survey of entrepreneurship. Slovenia has participated in it since 2002.

[103] 14 EU Member States were involved in the GEM survey on these issues.

[104] Ability to see business opportunities, perceived knowledge, experience and know-how to start a business, fear from failure among those perceiving business opportunities and entrepreneurial intentions among those not involved in entrepreneurial activity.

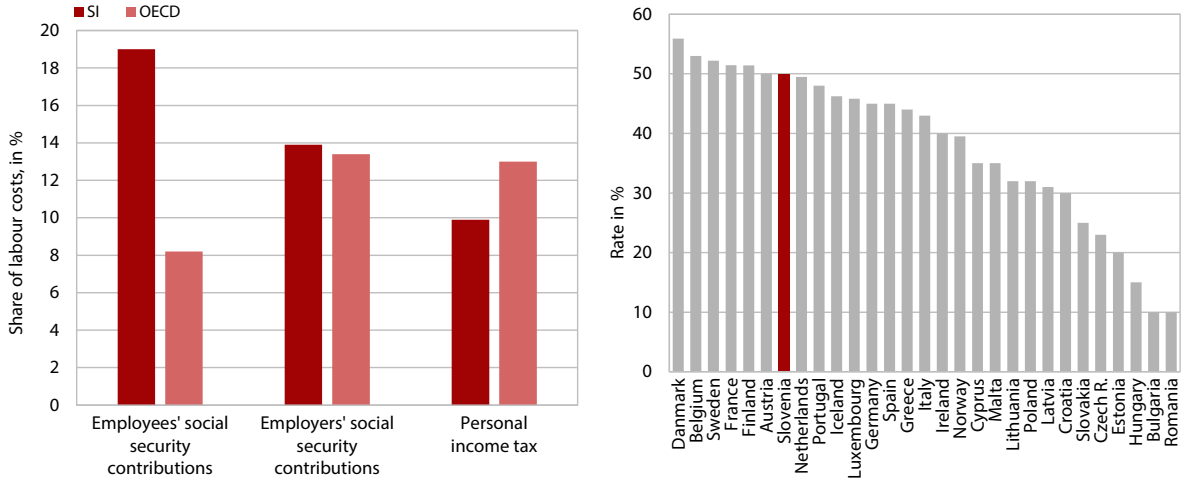
[105] For the questions on self-perceived entrepreneurial skills, 17 EU Member States were included in the GEM survey.

3.3 The business environment

3.3.1 The tax environment

The tax burden on labour, which is an important factor in the attraction of suitable workforce and thus in the competitiveness of companies in the global market, is high in Slovenia. Labour costs are relatively high from the perspective of companies, while net employee income is relatively low, which reduces incentives for companies and employees. Slovenia's high tax burden on labour income is the result of higher than average social security contributions for employees, and even with a relatively low income threshold by international standards, we also have a high personal income tax rate of 50% in the highest personal income tax bracket.[106] The size of the tax burden on labour costs borne by the employer is also measured by the tax wedge.[107] Slovenia ranks above the OECD average and similar to more developed European countries on most indicators measuring the tax wedge (Figure 42). The size of the tax burden and the structure of government revenue (the ratio of taxes to contributions) are closely linked to, and historically dependent on, the welfare state system.[108] As a result, there are considerable differences among EU Member States and even more so among OECD countries in this area.

Figure 41: Social security contributions in Slovenia account for a high share of labour costs (left), and the tax rate in the highest personal income tax bracket is among the highest in the EU (right)



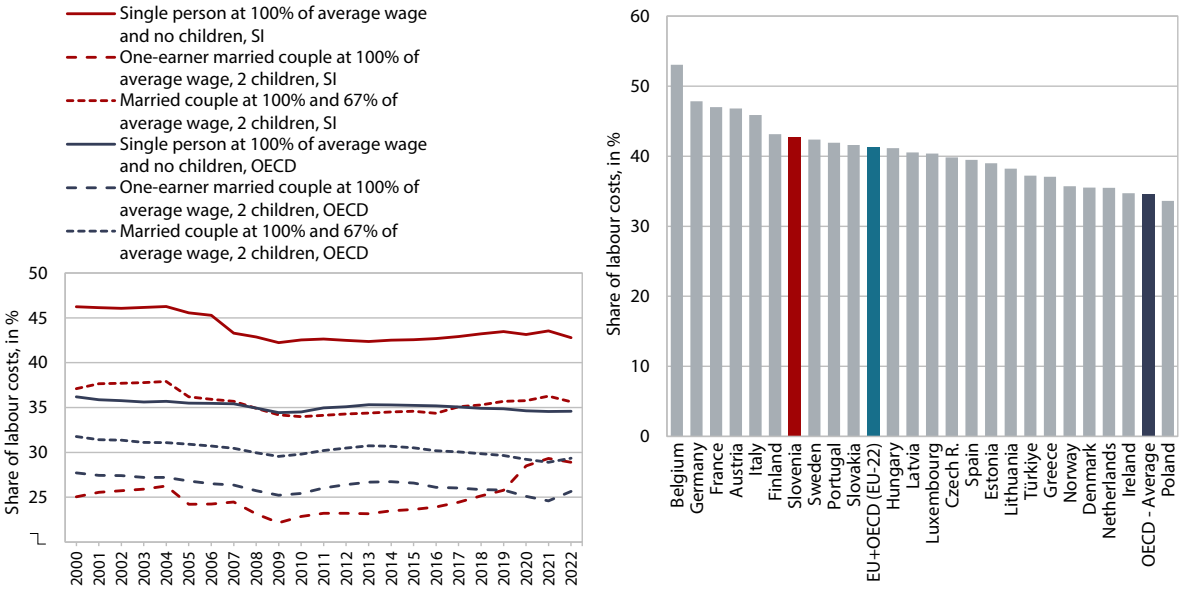
Source: OECD (2023g). Note: The tax shares as a percentage of labour costs in the graph on the left are for a single person without children earning the average wage.

[106] In 2023, the tax rate in the highest personal income tax bracket increased from 45% to 50%, and the income threshold for such taxation is lower than in other countries with the same high rate (in 2022, the 45% rate applied to an annual tax base above EUR 74,160, which is lower than in Austria, for example). The number of taxpayers in this income tax bracket is small. In 2022, they accounted for 5,158 or 0.3% of all personal income tax payers.

[107] The tax wedge (according to the OECD methodology) shows the total share of personal income taxes and employee and employer social contributions net of family benefits received as monetary transfers in the total labour costs which must be paid by employers for their employees.

[108] There are several classifications of welfare state systems. When classifying countries, these take into account a number of factors, such as the scope of public services, the way they are financed (social insurance or lack of it), etc. In Slovenia, public spending as a percentage of GDP is high and the state provides a wide range of rights in health, education, etc.

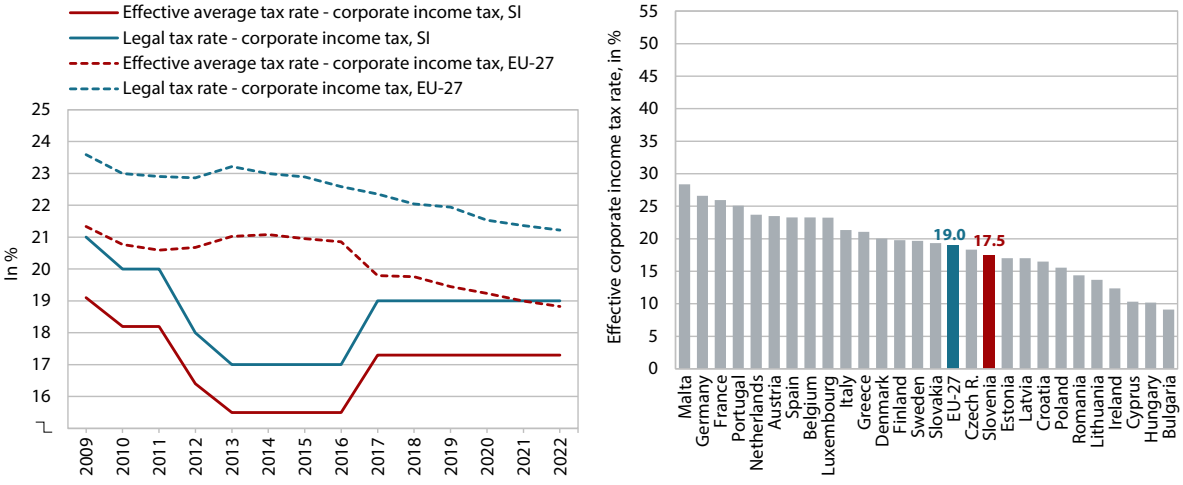
Figure 42: The tax wedge for different household types in Slovenia is well above the OECD average (left) and among the highest in the EU for a single person at 100% of average wage and no children (right)



Source: OECD (2023g).

On the other hand, Slovenia's corporate income tax (CIT) is lower than the EU average and among the lowest in the OECD. As a result of the impact of the global financial crisis on corporate performance and the reduction in the statutory CIT rate, CIT revenues in Slovenia declined between 2008 and 2013. They stood at 1.2% of GDP in 2013, which was also the year when the gap with the EU-27 average (2.4% of GDP) was the widest. After that year, revenues increased with the economic recovery and a renewed increase in the tax rate, reaching 2.3% of GDP in 2022 (2.9% of GDP in the EU-27 in 2021).

Figure 43: The statutory and effective corporate tax rates in Slovenia are lower than the EU-27 average (left); the effective rate is similar to some countries at a similar level of economic development but higher than in some neighbouring countries (right)



Source: EC (2023b).

Slovenia's effective corporate income tax rate in 2021 was among the lowest in the OECD. Countries are striving to create a more competitive tax environment, including through various tax reliefs, resulting in lower than statutory effective tax rates, including on corporate income taxes. The statutory CIT rate in Slovenia was 19% in 2022, lower than the EU-27 average (21.2%). Tax reliefs in Slovenia accounted for 0.67% of GDP in 2021, with the highest reliefs for investments in equipment and intangible assets, followed by reliefs for loss compensation and for investments in research and development (MF, 2023). The effective average CIT rate in Slovenia in 2022 according to the OECD methodology was 17.3%,[109] compared to an EU-27 average of 18.8%. However, the gap between the statutory CIT rate and the effective average CIT rate in Slovenia was lower than the EU-27 average over a longer period (Figure 43). The countries with the highest statutory CIT rates tend to be those with the largest gap between the statutory and estimated effective tax rates (e.g. Malta, Portugal, Estonia and Italy). This may imply that these countries allow greater reductions in the tax base or are more affected by the avoidance of the CIT payment.[110]

Analyses by international and national institutions suggest the need for fiscal restructuring. Slovenia stands out from the EU-27 and OECD averages in terms of some tax revenues, notably with lower capital and property taxes, while total revenue from taxes and social contributions as a percentage of GDP is also lower than the EU-27 average, reflecting a decreasing the tax burden since 2004 (Figure 44; see also IMAD, 2022b). In various analyses for Slovenia, which in recent years have mainly focused on the potential of tax changes in terms of increasing labour supply and boosting long-term economic growth (not only to boost competitiveness, but also to cope with demographic changes), the OECD, the IMF and the EC (OECD, 2018; IMF, 2019; EC, 2020) have proposed tax restructuring by reducing the burden of social security contributions on employees, with the revenue shortfall to be covered by broadening the tax base, increasing less distortionary taxes (consumption taxes) and introducing a property tax. Such a restructuring would change the financing of social protection systems, requiring changes on both the resource and the expenditure side (see also IMAD, 2019). Taxes and some other levies on energy products were also reduced in 2022 to alleviate the energy crisis, and recent analyses for Slovenia in particular draw attention to the potential for increasing these revenues[111] to meet environmental and emission reduction targets, especially in the transport sector (EC, 2022[112]; OECD, 2022[113]).

[109] The effective CIT rate in Slovenia was 14.8% in 2021, according to the assessment and methodology of the Ministry of Finance (MF, 2023).

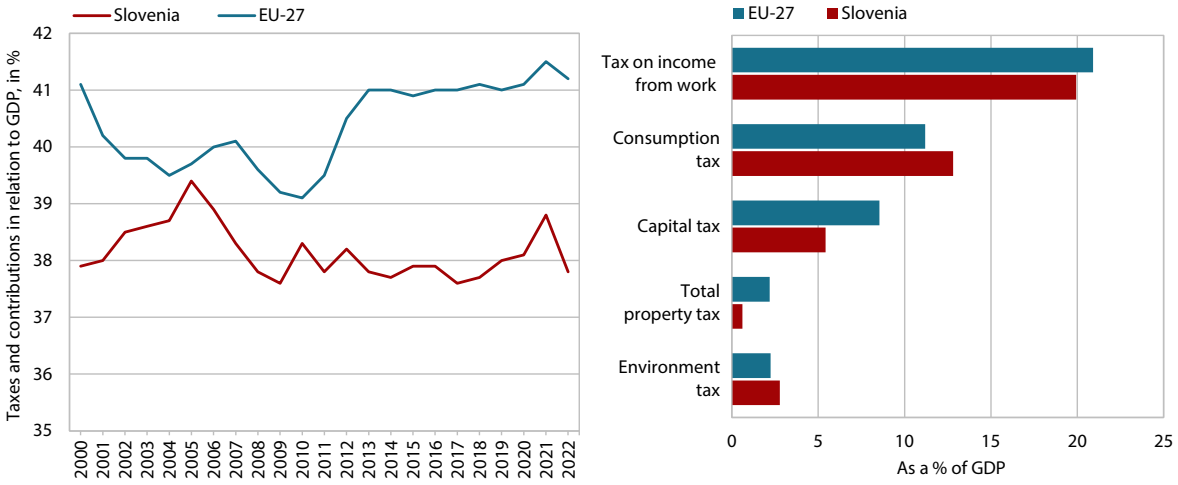
[110] Multinational companies are more likely to benefit from such approaches, as they can more easily transfer profits and activities between jurisdictions and combine the benefits of tax incentives in different countries (European Commission, 2021). In this context, it is worth mentioning the global initiative to prevent base erosion and profit shifting (BEPS), which is expected to have a positive impact on public finances in Slovenia.

[111] According to the 2021 data (Figure 44), Slovenia has a slightly higher share of environmental taxes in GDP than the EU average (with the gap narrowing since 2013), mainly due to high revenues from energy taxes, coupled with extensive use of motor fuels in road traffic and Slovenia's transit-oriented geographical position, as well as a dispersed population and less developed public transport.

[112] According to the EC, Slovenia could, for example, raise more revenue from environmental taxes by eliminating environmentally harmful subsidies such as excise duty refunds on commercial transport, the indexation of energy taxes and the payment of distance-based charges for passenger cars.

[113] To counter the upward trend in transport emissions, the OECD estimates that the government should increase taxes on transport fuels when the temporary excise duty reductions expire. It should also increase the tax on diesel proportionately to reflect its greater environmental damage. They also suggest that consideration should be given to basing the annual road user charge on environmental factors, although a toll system based on distance travelled and congestion would have a greater environmental impact. These measures could be combined with more ambitious regulatory measures such as the Commission's proposal for a zero emission limit from 2035 or a ban on diesel engines and a phase-out of internal combustion engines by 2035.

Figure 44: Taxes and contributions as a share of GDP are lower in Slovenia than the EU average (left), with the largest gap in 2021 coming from capital and property taxes (right)



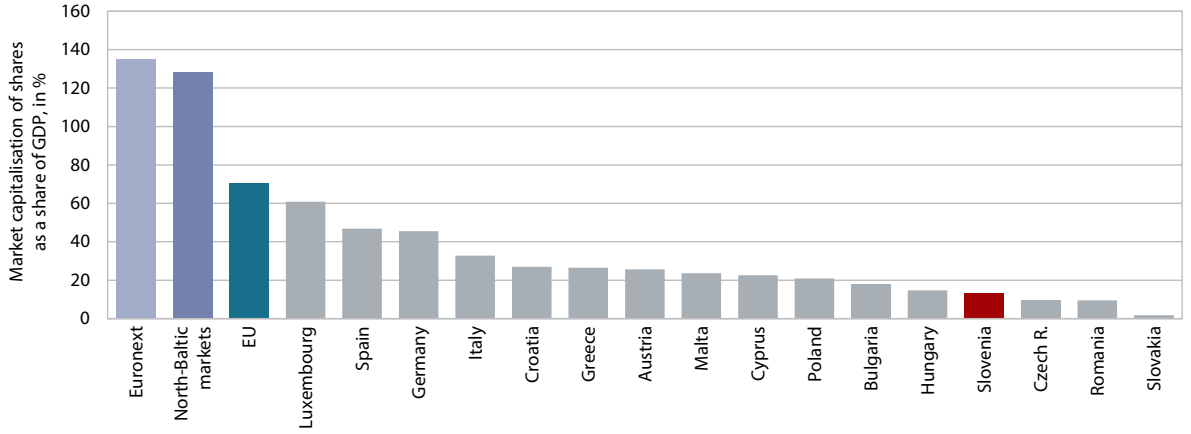
Sources: Eurostat (2023), EC (2023b).

3.3.2 Access to financing

Despite the generally favourable financing landscape, Slovenian companies face a relatively low level of capital market development. A survey by the European Commission and the ECB (EC and ECB, 2022)[114] suggests that access to finance is one of the least important problems for companies both in Slovenia and in the EU. However, Slovenian companies are challenged by a capital market that is relatively underdeveloped in terms of financial resources and characterised by its modest size and limited liquidity. The market capitalisation of shares listed on the Ljubljana Stock Exchange was EUR 7.6 billion or 13.4% of GDP at end-2022, one of the lowest among EU Member States. To a large extent, the Ljubljana Stock Exchange only trades existing securities, while new issues (mainly shares) are almost non-existent. In the last 15 years, there have been two major initial public offerings (IPOs) on the Ljubljana Stock Exchange, not to raise fresh capital but to privatise two of Slovenia's largest banks.

[114] According to the survey, high production and labour costs and a shortage of skilled labour are the biggest problems facing companies in both Slovenia and the EU.

Figure 45: The stock market capitalisation-to-GDP ratio is among the lowest in the EU



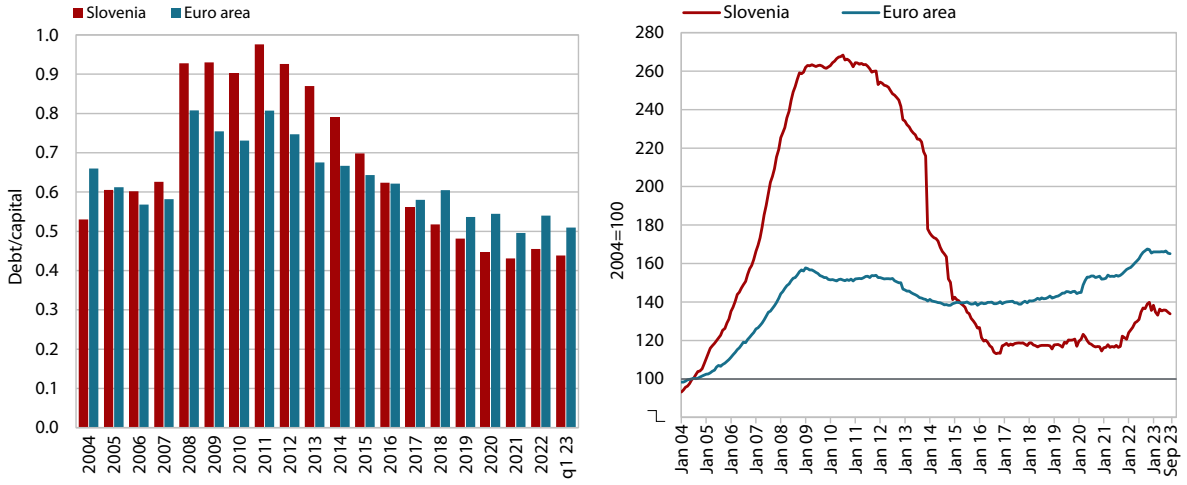
Sources: SURS (2023c), Eurostat (2023), Ljubljana Stock Exchange (2023), FESE (2023). Notes: * Euronext operates the exchanges in Paris, Amsterdam, Brussels and Lisbon. The Nordic-Baltic markets are covered by the Nasdaq Nordic and Baltic Exchanges (Denmark, Finland, Sweden), the Baltic Exchange (Estonia, Latvia, Lithuania) and the Icelandic Stock Exchange. The percentage for the EU also includes Iceland.

Slovenian companies deleveraged significantly during the financial crisis and their debt levels are relatively low, which may to some extent reflect untapped potential for investment financing. Before the onset of the global financial crisis, the increase in the sources of financing of non-financial corporations was mainly based on corporate borrowing and, to some extent, on the increase in the market value of shares on the stock exchange. Corporate debt[115] accounted for almost 40% of total liabilities in 2011 and has fallen sharply in recent years, accounting for less than a quarter of total liabilities in the first quarter of 2023. Corporate debt, as measured by the debt-to-equity ratio (0.44 in Q1 2023), has more than halved and is below the euro area average (0.51). In 2021 and the first half of 2022, credit activity started to pick up, but at a much slower pace than in the euro area, as borrowing conditions tightened and economic activity weakened, probably also, in our view, due to a high degree of corporate caution about the possibility of a renewed increase in indebtedness.

Despite notable improvements in the structure of companies' financing sources since the last financial crisis, the proportion of capital remains below the euro area average, primarily due to the low percentage of listed shares... Following the rehabilitation of the banking system and the economy's deleveraging, the significance of capital as a more stable financing source has progressively grown. Its volume has risen by more than 50% from its low levels in 2011. However, much of the capital increase was not driven by active fundraising on the capital markets, but by other factors such as acquisitions and capital injections from existing owners. As a result, the percentage of total corporate capital accounted for by listed shares remains relatively modest, which is common to many new EU Member States. The underdeveloped capital market poses a challenge, as companies have to contend with a diminished supply of long-term financing sources. This constraint adversely impacts the growth and development potential of both large established companies and small innovative companies, which also grapple with more limited access to funding.

[115] Financial debt comprises loans and debt securities.

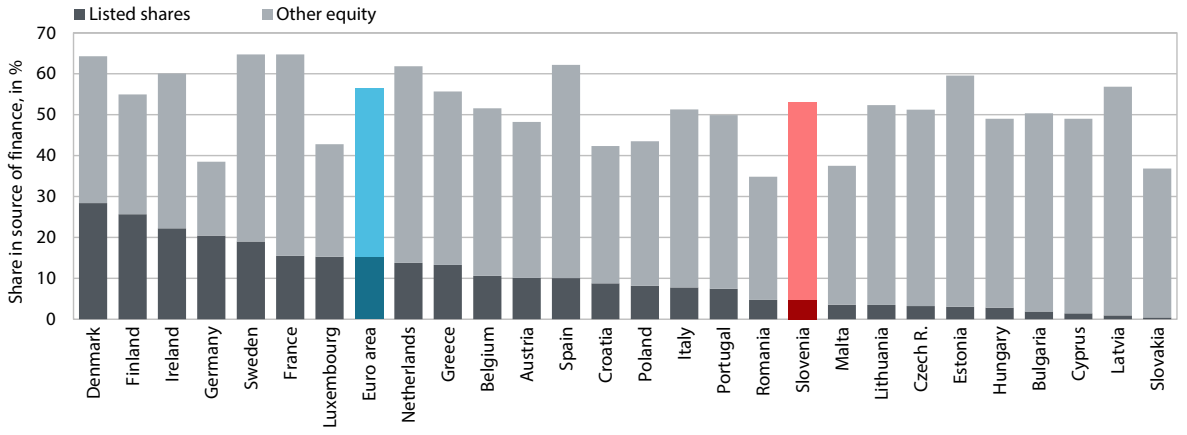
Figure 46: The level of corporate indebtedness in Slovenia is lower than in the euro area, and lending activity is similarly modest



Sources: Eurostat (2023), ECB (2023a), BoS (2023a); calculations by IMAD.

... which Slovenia also needs to address from the perspective of a successful green transition. Access to finance, in particular, plays a pivotal role in companies' decisions to invest in green technologies, resulting in reductions in emissions intensity and improvements in efficiency and productivity. OECD analysis for Portugal has shown that green investment is more responsive to financing conditions than other types of investment (Unsal et al., 2023). Slovenia has adopted a capital market development strategy (Ministry of Finance, 2023), which aims to increase access to finance, especially for small and medium-sized enterprises, and to promote digitalisation and financial education. In this context, we consider that in order to develop the capital market, it is not sufficient merely to stimulate the supply of financial instruments, but it is also essential to create conditions conducive to sufficient demand, which is important for preserving capital market liquidity. This can only be achieved by increasing the global visibility of the Slovenian capital market and by strengthening domestic institutional investors, which could also rely to some extent on household funds deposited in banks.

Figure 47: Listed shares are a relatively insignificant source of financing in Slovenia and other new Member States



Source: Eurostat (2023); calculations by IMAD.

3.3.3 Agility and institutional competitiveness

Slovenia's business environment has undergone a number of important changes in recent years... It continues to be characterised by uncertainty relating to the climate (stricter environmental standards and related legislation, reduction of greenhouse gas emissions and related changes, especially in the automotive industry) and demographic changes (e.g. ageing of the population, availability of skilled labour). Over the past year, the energy crisis (linked to the escalating geopolitical situation, in particular the war in Ukraine) and natural disasters (flooding) have had a significant impact on companies' operations. In this context, a number of measures (Act Determining Intervention Measures for Recovery from the Floods and Landslides of August 2023 – ZIUOPZP, 2023; Act Amending the Natural Disaster Recovery Act – ZOPNN-F, 2023; Act Governing Aid to Businesses to Mitigate Impact of Energy Crisis – ZPGOPEK, 2022) have been adopted to subsidise high energy prices,[116] provide liquidity to businesses[117] and mitigate the impact of floods. In recent years, several structural measures have also been taken to improve the business environment,[118] in particular digitalisation (of public services and public procurement, extension of business registration procedures, improvement of the one-stop shop (SPOT)), which is expected to have a significant impact on the ease and efficiency of doing business.

... but it remains less business-friendly compared to the innovation leaders and the EU average. International comparisons (IMD, 2023a; Kaufmann and Kraay, 2023) continue to show that, despite these measures, barriers to doing business remain higher than in the EU overall and in the innovation leaders. As in previous years, excessive bureaucracy and low institutional competitiveness, reflected in the density of regulations and lengthy procedures related to public services, remain among the main challenges. The gap with the innovation leaders is particularly large for indicators of participation and accountability (transparency of policies, accountability of politicians and public employees, state interference in business operations) and government effectiveness in supporting business operations[119] (Kaufmann and Kraay, 2023). In the surveys, business executives highlight frequent changes in legislation, the burden of labour costs, insufficient flexibility in labour legislation and the availability of suitably skilled labour as significant constraints. Additionally, there is also a notable low level of trust in the judiciary. Government accountability and efficiency persist as noteworthy challenges from a productivity standpoint, particularly in facilitating business operations, reducing administrative barriers, and streamlining the regulatory framework to increase simplicity and predictability.

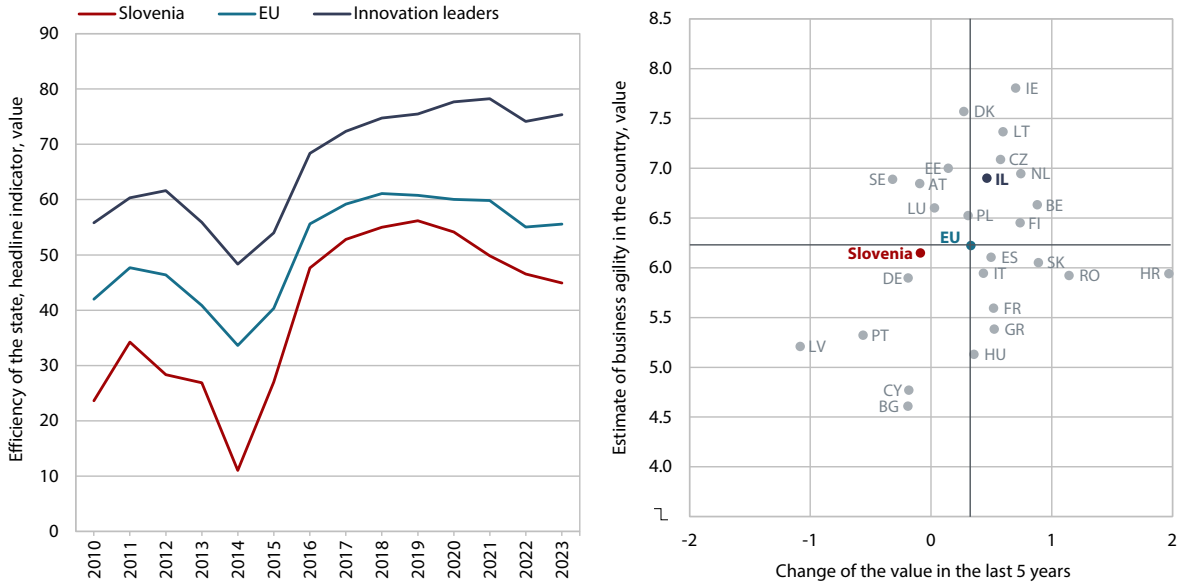
[116] The first part of the aid to the economy of EUR 79 million was disbursed at the end of March 2023, with a total of EUR 395 million to be disbursed to companies by the public agency SPIRIT Slovenia (SPIRIT Slovenia, 2023a).

[117] Liquidity loans totalling EUR 10 million were made available through crisis liquidity facilities provided by the Slovenian Enterprise Fund (Slovenian Enterprise Fund, 2023).

[118] The Debureaucratisation Act introduced several simplifications of existing legislation and mechanisms to prevent the accumulation of existing regulations and allow for the expiry of previous (outdated) laws and their implementing regulations (ZDeb, 2022). In order to support business operations, the Act Amending the Investment Promotion Act (ZSInv-B, 2022) was adopted in 2022 to encourage increased investment in research, development and innovation, in line with the requirements of the digital and green transitions. An amendment to the Companies Act was also adopted in 2023 to facilitate the establishment of companies and branches of foreign companies through online registration procedures, to make cross-border operations more efficient and to improve corporate governance (ZGD-1L, 2023).

[119] In the IMD survey (2023a), business executives (mid- and upper-level managers) give particularly low ratings to state ownership of companies, competition law, public procurement, labour law, availability of venture capital and access to capital markets.

Figure 48: Increasing the competitiveness of the corporate sector will also require improved government efficiency (left); entrepreneurs consider the agility of companies in Slovenia to be comparable to the EU average but lower than in the innovation leaders, while most other countries are making faster progress (right)



Source: IMD (2023a). Notes: Country performance is a composite indicator showing the distance to the most efficient country, with a maximum score of 100. It is composed of statistical and survey indicators, with the latter accounting for about half the weight in the calculation. The assessment of the agility of companies in the country is a survey questionnaire; the maximum possible score is 10. The survey takes place at the beginning of the second quarter of the year in which the results are published. The innovation leaders are Sweden, Finland, Denmark, Belgium and the Netherlands.

A dynamic and globally connected business environment requires companies and their managers to act and adapt quickly. An important factor in rapid adaptation is digitalisation and the use of agile methodologies[120] in business (see Section 3.1.3.1 for more on digitalisation). A particular challenge here is the introduction of artificial intelligence (e.g. ChatGPT) in business operations, which could have an impact on the introduction of new business models (Begović, 2023). According to CorpoHub (2022), the use of agile methodologies in Slovenian companies is increasing, but Slovenia lags behind the innovation leaders in their introduction.[121] The main constraints to wider uptake are a general resistance to change, a mismatch between organisational culture and agile values, and a lack of knowledge and experience with the concept. Public administration is still dominated by a more traditional way of working and, despite some positive developments, the introduction of the concept of agility is lower and is driven by technological change and an increased awareness of the importance of responding quickly to the needs of public services users (Pozderec and Kodra, 2021).[122] Slovenia ranks in the second half of EU Member States in terms of the development of management practices and lags significantly behind the innovation leaders (IMD, 2023a). While business executives indicate that companies are aware of the changing environment and are able to adapt quickly to the new conditions, weaknesses remain, mainly in the credibility of managers and the effectiveness of supervisory boards.

[120] Agile methodology is a project management approach that prioritises cross-functional collaboration and continuous improvement, with a focus on adapting to rapidly changing circumstances and customer needs. It divides projects into smaller phases and guides teams through cycles of planning, execution and evaluation (CorpoHub, 2022).

[121] In the IMD survey (2023a), the agility of Slovenian companies is rated around the EU average but much lower than in the innovation leaders.

[122] E.g. the Inovativen.si project (https://www.gov.si/zbirke/projekti-in-programi/inovativnost-v-javni-upravi-inovativen-si/).

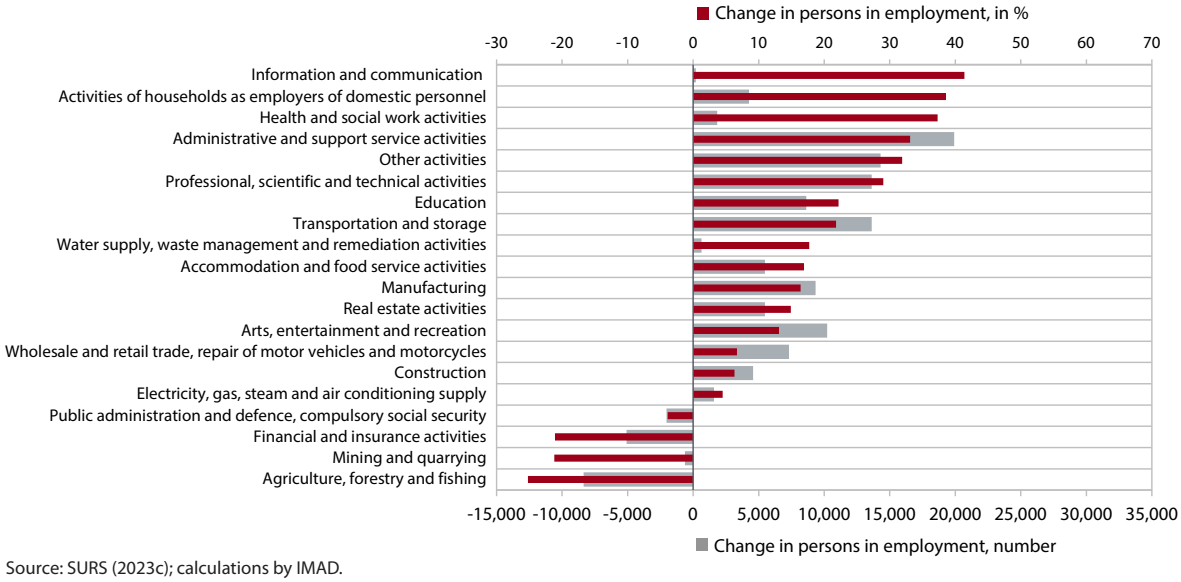
4 The labour market: yesterday, today, tomorrow

A country's prosperity is based on its ability to ensure productivity growth, the level of education and the skills of the workforce being important factors in this process (Rincón Aznar et al., 2015). But like other developed countries, Slovenia is experiencing a shortage of adequately qualified labour force, especially due to demographic changes but also to other structural and cyclic factors. The aim of this section is to shed light on the challenges for the Slovenian labour market based on previous trends and the current situation on the labour market and global trends in this area, particularly in terms of its role in the process of economic transformation and boosting productivity. The first part of the section presents the changes in the labour market in the 2010–2022 period and the situation in terms of rewarding the most productive and returns on education of different fields of tertiary education in the 2011–2021 period. The second part contains an overview of the current labour market situation and the labour shortage factors. The third part shows the global trends, encompassing changes in demographics, technological development and understanding of the life cycle and the flexibilisation of the labour market. The section concludes with an overview of the challenges that Slovenia is facing.

4.1 Changes in the labour market 2010–2022

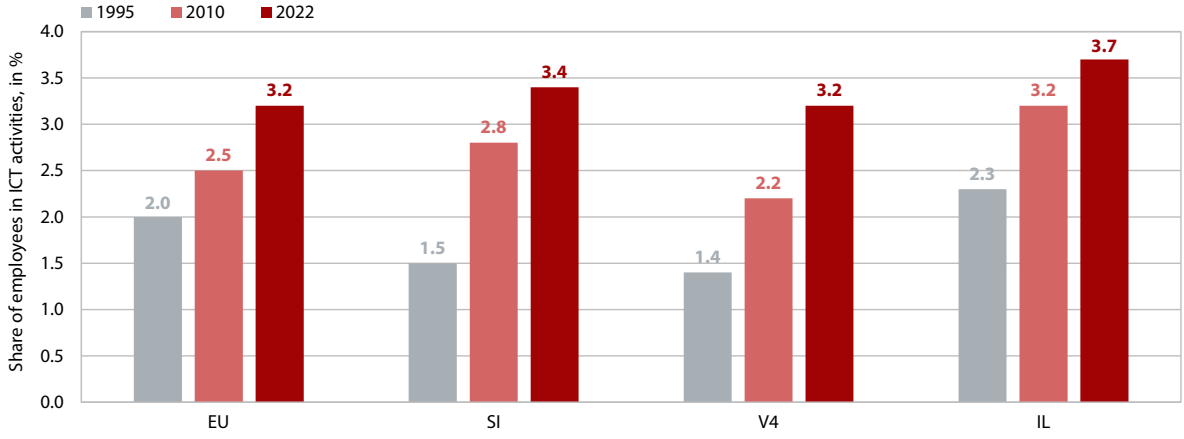
In the 2010–2022 period, employment in most activities increased, with the highest relative increase in activities with a large percentage of workers with tertiary education, and the employment structure changed. According to national accounts, aggregate employment in 2022 was 12% higher than in 2010, with the highest relative increases in the information and communications sectors. The active working population also increased by 30% in certain other activities employing a high percentage of people with tertiary education (finance and insurance, healthcare and social assistance, and education). The level decreased significantly in mining and agriculture (Figure 49). Due to differences in economic structure, the employment structure by activity differs from that of the EU average and innovation leaders. Compared to IL and the EU average, the percentage of persons employed in manufacturing and construction is significantly higher and the percentage of persons employed in market and public services significantly lower in Slovenia (see Appendix 6.3.2). The percentage of persons employed in ICT slightly exceeded the EU average but is lower than in the innovation leaders (Figure 50). Given the great demand for specialists in this field and the lower number of ICT graduates in recent generations for demographic reasons, there is a severe labour shortage in this area (see Section 4.2).

Figure 49: In the 2010–2022 period, the highest relative employment increase was in activities with a large percentage of workers with tertiary education, and the highest absolute employment increase was in manufacturing and other various business activities



Source: SURS (2023c); calculations by IMAD.

Figure 50: Despite a substantial increase, the percentage of persons employed in ICT still lags behind the innovation leaders



Source: Eurostat (2023); calculations by IMAD.

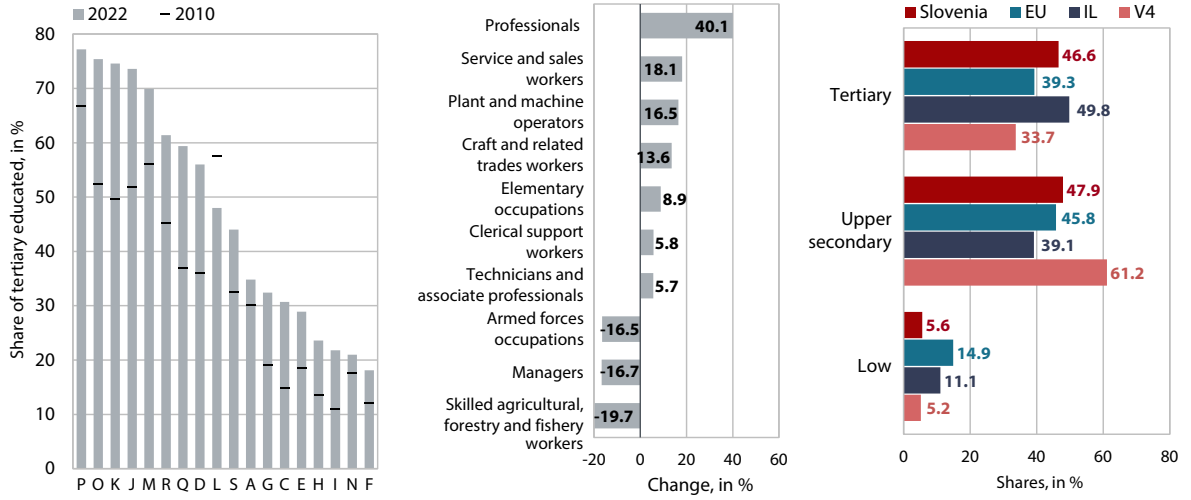
In terms of the educational structure of persons in employment, the percentage of persons with tertiary education increased, and the highest increase in occupational groups was in the number of specialists in employment.[123] In 2022, the percentage of persons with tertiary education amounted to 46.6% of the total number of employed persons, 16.8 p.p. more than in 2010.[124] The highest increases were recorded in financial and insurance activities (K) and public administration, defence and compulsory social security activities (O), where it was among the highest (Figure 51, left). This is also reflected in the significant increase in the

[123] According to the SKP-08 standard Classification of Occupations, specialists increase the existing scope of knowledge, develop and systematically study scientific and artistic concepts and theories, and can be employed in any combination of these three activities. Most such jobs or occupations require knowledge at a tertiary level of education. Examples of typical occupations are construction engineers, doctors, teachers, judges, system engineers, software developers, process and instrument control technicians, and stockbrokers (SURS, 2023b).

[124] According to internationally comparable labour force survey data.

number of specialists in employment, which grew the most among occupational groups (Figure 51, middle). The highest relative increases were in the numbers of ICT specialists (by 83.2%) and science and engineering specialists (by 62.4%). Despite this, the great demand for such specialists means that they also represent the greatest labour shortage. After a significant increase, the percentage of persons in employment with tertiary education in Slovenia is only slightly below the innovation leaders and substantially exceeds the EU average (Figure 51, right).

Figure 51: Between 2010 and 2022, the percentage of persons with tertiary education increased in all activities (left), with the highest increase among occupational groups in the number of specialists in employment (middle); based on the percentage of persons with tertiary education, Slovenia still lags a little behind the innovation leaders



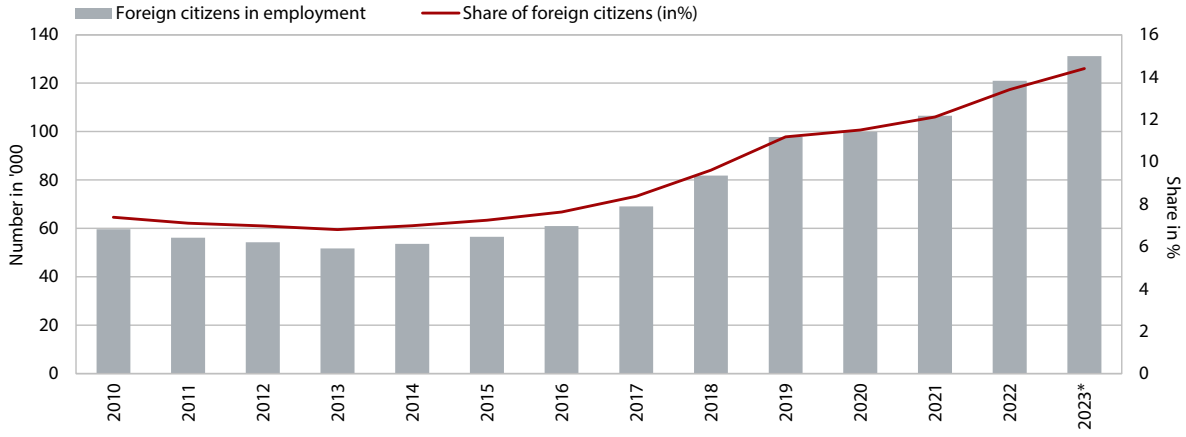
Sources: SURS (2023c); calculations by IMAD (left and middle); Eurostat (2023); calculations by IMAD (right). Note: Activities according to the Standard Classification of Activities (SKD): A – agriculture, forestry and fishing; B – mining and quarrying; C – manufacturing; D – electricity, gas, steam and air-conditioning supply; E – water supply, sewerage, waste management and remediation activities; F – construction; G – wholesale and retail trade, repair of motor vehicles and motorcycles; H – transportation and storage; I – accommodation and food service activities; J – information and communication; K – financial and insurance activities; L – real estate activities; M – professional, scientific and technical activities; N – administrative and support service activities; O – public administration and defence, compulsory social security; P – education; Q – human health and social work activities; R – arts, entertainment and recreation; S – other service activities; T – household activities.

Between 2010 and 2022, the employment of foreigners increased significantly, mostly, given the labour demand structure, of those with low and upper secondary education. The percentage of foreigners among the employed population has nearly doubled since 2010 (when it was 7.4%),[125] mostly in the sectors of construction (48%), transportation and storage (32%), and administrative and support service activities (26%).[126] The net migration therefore fluctuates according to the economic cycle (for more on net migration in the 2010–2022 period, see Appendix 6.3.1). The structure of employment of foreigners is related to the labour shortage in these activities (for more see Section 4.2), which also results in the education structure of foreigners, the most common being low and medium education. The percentage of foreigners with tertiary education in Slovenia (16.4%) is therefore much lower than the EU average (28.9%) and that in the innovation leaders (43%). In the ICT sector, employing mostly people with high education, the percentage of foreigners is relatively low (4.8%), which, given the serious shortage of such labour force in Slovenia, also reflects the difficulties of Slovenian companies in recruitment from abroad. The percentage of foreigners in employment is similarly low in other activities with a high number of people with tertiary education, such

[125] In the first half of 2023, it amounted to 14.5%.
[126] These are agency workers posted to work in other activities.

as financial services and insurance activities, public administration, healthcare, and education, which could be related to the required knowledge of the Slovenian language and/or Slovenian citizenship.

Figure 52: The labour shortage increased the employment of foreigners



Source: SURS (2023c); calculations by IMAD. Note: The figures for 2023 relate to the first nine months.

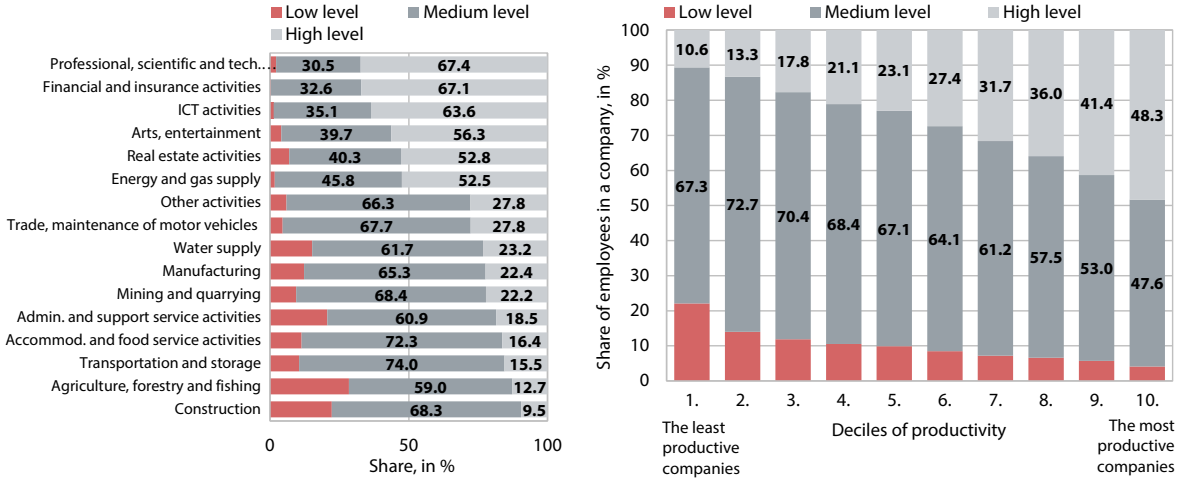
4.1.1 Productivity is higher in companies employing a higher number of people with tertiary education

Companies that employ people with higher education and are more successful at managing and combining their employees' skills and competencies are usually more productive. The education and skills of company employees are an important element of human and organisational capital and a key factor in ensuring productivity growth. They determine how well employees are able to carry out their tasks, which are becoming increasingly non-routine and creative, and use new technologies introduced by the companies. The manufacturing process and the introduction of new technologies also require collaboration between employees with different levels of knowledge and skills, which increases the need for the complementary management of employees with varying levels of education. The correlation between a higher level of employee education and higher company productivity in several developed countries is also confirmed by an OECD study (Criscuolo et al., 2021), which showed that the education structure differs considerably between companies with various productivity levels and that the most productive companies employ workers with a wide range of knowledge and skills.

An empirical analysis of Slovenia also shows the importance of education and knowledge in achieving higher productivity, which holds true for both knowledge-based companies and traditional labour-intensive sectors. As a rule, the percentage of employees with tertiary education is higher in knowledge-based sectors, which place a greater emphasis on innovation and training and invest heavily in tangible and particularly in intangible capital. Such sectors include information and communication, scientific and technical activities, and financial and insurance activities (Figure 53, left). In labour-intensive sectors, such as manufacturing, construction and transportation, employees typically have lower levels of education. Empirical estimates for Slovenia confirm the direct correlation between the percentage of employees with tertiary education and company productivity, both for companies in different sectors and for those of the same sector with similar demographic and employment structures. At the same time, estimates show that

the impact of an increase in HR with tertiary education on company productivity is particularly strong in the case of a lower baseline, typical of companies in labour-intensive sectors, where the education level of employees is generally lower.[127] Estimates also show that complementarity and synergy between employees with high and medium (but not low) education have an important impact on company productivity. Complementarity of employees with different skills and qualifications is also characteristic of the most productive companies. In the top 10% of companies according to productivity, the percentages of employees with tertiary and medium education are almost 50% (Figure 53, right).

Figure 53: Although the employee education structures differ considerably between activities (left), the complementarity of employees with different levels of education is also characteristic of the most productive companies (right)



Source: SURS (2023a); calculations by IMAD. Note: The figure on the left shows data for 2022 and the figure on the right for the 2013–2019 period. Low education comprises levels ISCED 0–2 (primary education or lower), medium education comprises levels ISCED 3 and 4 (upper secondary education and post-secondary non-tertiary education), and high education comprises levels ISCED 5–8 (from short-cycle tertiary education to doctoral or equivalent level).

4.1.2 Remuneration (salaries) of the most productive

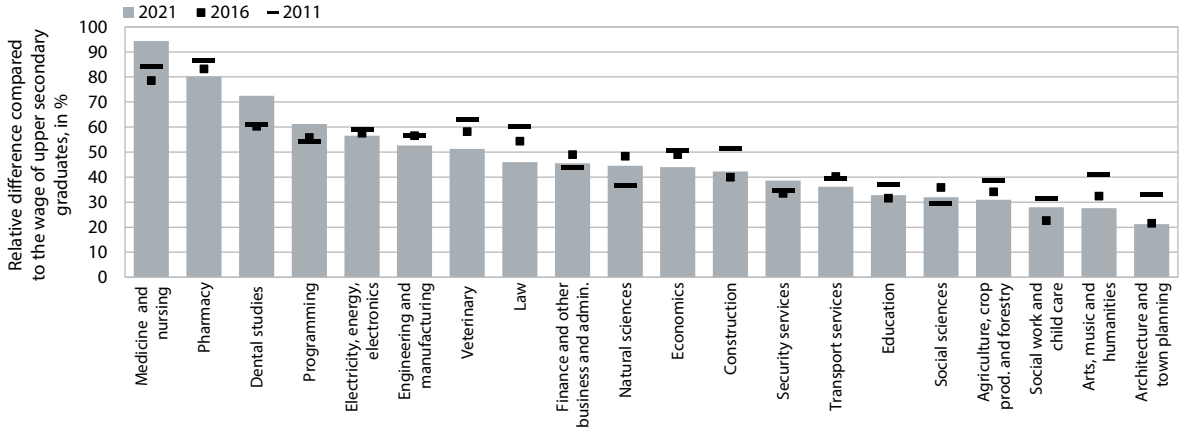
Salaries, one of the factors attracting people to a certain occupation, increased the least in the 2010–2021 period for those with tertiary education. Salaries of graduates (aged 20–34) are supposed to reflect the level of difficulty of studies and occupations and demand on the labour market; as a rule, the highest salaries are in natural sciences, medicine and similar fields (for more, see Appendix 6.3.4). Average gross salary growth in the 2010–2021 period differed considerably between education groups.[128] The highest salary increase was recorded for employees with low education (primary education or lower) and in less demanding occupations, which, according to our assessment, was due to the minimum wage increasing faster (44%) than the average salary (35.2%) in this period and a serious labour shortage in activities employing workers with low education (who are typically minimum wage earners). On the other hand, the increase in the salaries of highly educated employees was relatively low (until 2017, the average was even lower than in 2010, which was partly due to the Fiscal Balance Act adopted in 2012, reducing salaries

[127] When the percentage is already high, the impact is somewhat smaller, which suggests a decrease in the marginal contribution of a highly educated workforce. For a detailed overview of empirical estimates for Slovenia, see Appendix 5.1.3.

[128] In the 2010–2021 period, the average gross salary increased by 49.3% among employees with primary education or lower, by 33.3% among employees with medium education, and by 15.7% among employees with high education.

in the public sector, which has a relatively high percentage of highly educated employees). Furthermore, smaller differences in salaries between employees with low and high education might also be due to the fact that some employees with high education occupy posts requiring a lower level of education, as a result of which their salary is lower than it would be in a more demanding post (Laporšek et al., 2021). Analyses confirm that the percentage of highly educated employees working in posts and occupations requiring a lower level of education has increased over a long period of time in most OECD countries, including Slovenia.[129]

Figure 54: The returns to tertiary education over a longer period of time has reduced for most fields of education



Source: SURS (2023a); calculations by IMAD. Notes: The figure shows the difference (in %) in the salaries of employees with tertiary education by field of education in relation to employees with medium education. The estimates are based on the microdata from the Statistical Register of Employment, and fields of education (according to KLASIUS-P-16) are grouped into relevant broader categories. The sample includes employees who worked full time and were employed all year round. People with an unspecified or interdisciplinary field of education were not included in the estimates.

Econometric model estimates also show that the returns to higher education (the salary of a graduate compared to other education levels) has been falling over a longer period of time. The relative difference in the salaries of employees with tertiary education compared to those of other employees is called the return to tertiary education or the wage premium of tertiary education. According to econometric estimates, the returns to higher education is gradually but consistently decreasing, as a university graduate in 2021 received a 44% higher salary than a secondary school graduate, which is 6 p.p. less than in 2011.[130] The returns decreased more significantly among employees with the highest levels of education (master's or doctoral level).[131] Based on the field of education, the returns were lower in most fields, particularly in law, the humanities and arts, architecture, and construction, and higher especially in sciences, such as medicine, the natural sciences and programming.[132] The general decrease in returns to tertiary education could pose

[129] This is known as "job polarisation", which means that the percentage of jobs with a required medium education is decreasing, while the percentages of less demanding and more demanding jobs are increasing. At the same time, the decrease in the percentage of jobs of medium difficulty does not result in a decrease in the percentage of medium-paid jobs, as jobs occupied by highly educated people are increasingly not remunerated according to the level of education but according to the job (OECD, 2019b).

[130] An analysis by Bartolj et al. (2012) showed that the returns to tertiary education in the 1994–2001 period increased, which affected the growing demand for an educated workforce during Slovenia's transition to a market economy. Between 2001 and 2008, the returns decreased slightly, which could be due to the disproportionate supply of highly educated workers. The decrease in the returns to higher education coincides with the introduction of the Bologna reform, after which the number of persons with a completed high education increased significantly (Laporšek et al., 2021).

[131] Meanwhile, the yield was approximately 10 p.p. lower on the former master's degree and 12 p.p. lower on the doctorate.

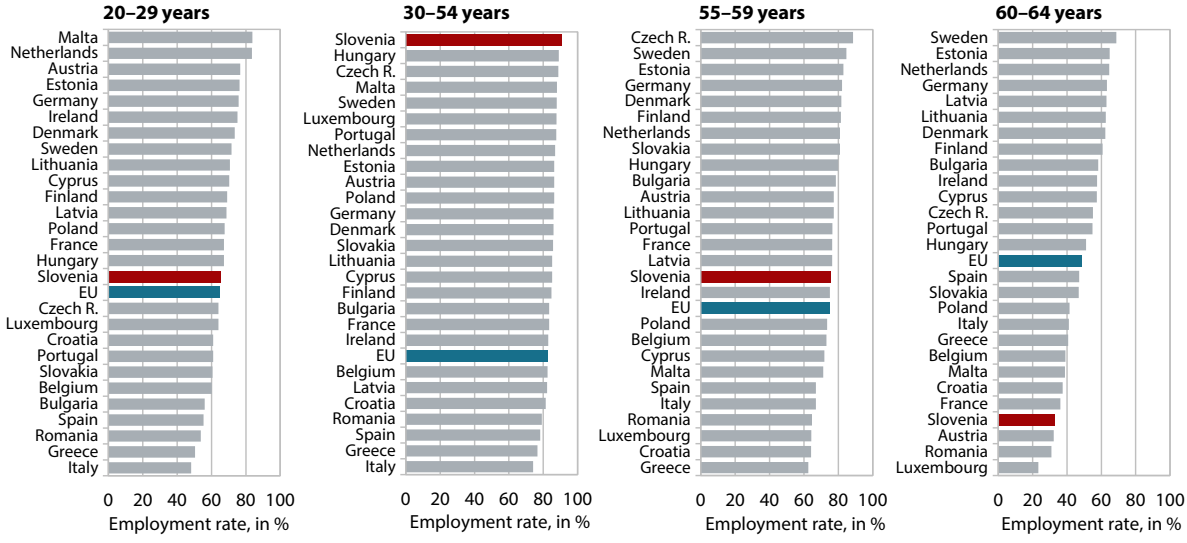
[132] The higher returns in medicine, nursing and dental care in 2021 was partly due to significant payments of bonuses related to the COVID-19 epidemic.

a long-term risk to attracting the highly educated workforce that the Slovenian economy needs to become more productivity-oriented. The decrease in the returns to tertiary education is characteristic of many other countries, although important differences between them remain (OECD, 2019).[133]

4.2 Reasons for the current situation on the labour market

With high labour demand in the post-COVID period, employment in Slovenia reached the highest and unemployment the lowest levels to date, and companies are experiencing problems in finding workers. Economic activity after the COVID-19 epidemic recovered quickly, which was reflected in growing labour demand. In mid-2023, employment achieved its highest ever level and unemployment a record low, which suggest modest available domestic HR capacities.[134] According to an international comparison of employment rates (Figure 55), some available capacities remain among young persons, where the rate is close to the EU average (Figure 55, left), and older persons, particularly the 60–64 age group, for whom, despite an increase in 2015, the rate remains one of the lowest in the EU. The labour shortage, which is reflected in the low unemployment rate (Figure 56, left), with a large percentage of companies reporting that labour shortage is a factor constraining their operations, is more pronounced in periods of economic growth and increased before the COVID-19 epidemic[135] (Figure 56, right).

Figure 55: Employment rates in 2022 show some available domestic HR capacities only among young persons and persons aged 60 and over



Source: Eurostat (2023).

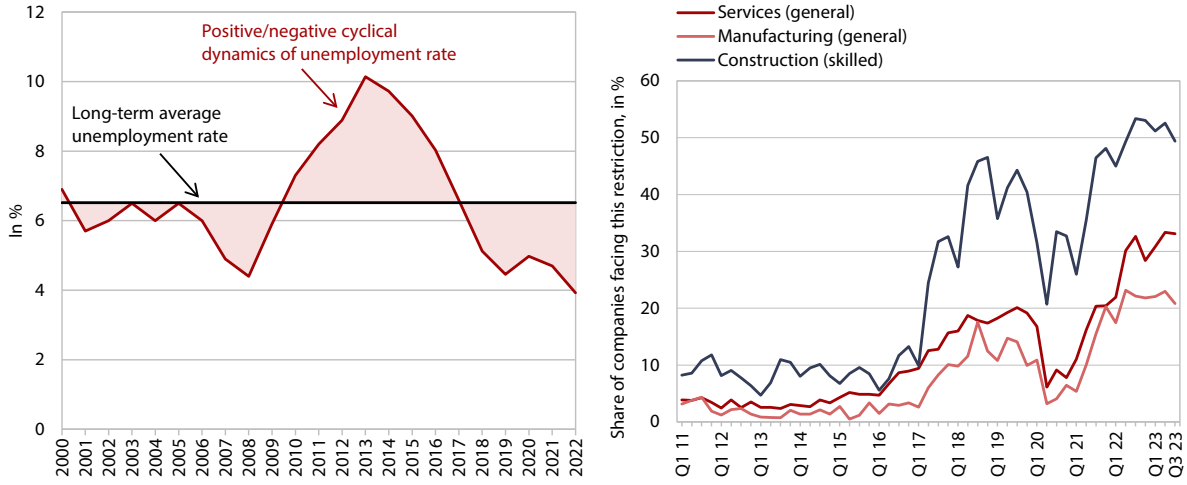
[133] A relatively recent overview of returns to tertiary education for OECD countries based on EU-SILC data shows that returns decreased in the 2006–2016 period by an average of 2.1 p.p. They decreased in 19 out of 32 OECD countries, including Slovenia, where the decrease was relatively large (around 12 p.p.). Analysis shows that a significant part of the decrease is due to job polarisation, as the percentage of highly educated employees is increasing in occupations and jobs where remuneration is lower and salary growth is more modest. On average, this can explain approximately 40% of the fall in the returns to tertiary education, and significantly more in countries where the fall was among the biggest (the polarisation in Slovenia can therefore account for approximately 80% of the fall). For an overview of studies, see also Psacharopoulos and Patrinos (2018).

[134] In addition to low unemployment, the low level of available domestic HR capacities is also suggested by the underemployment index, which takes into account the preferences of the active working population for increasing or reducing their working hours in the calculation of available capacities, and the unemployment index, which also takes into account the inactive population and the likelihood of their employment (for more, see Perko and Rogan (2023)).

[135] The labour shortage analysis was also the same in 2019. For more, see IMAD (2019d).

Labour shortage, which results from a combination of factors, is being experienced by many developed countries. The substantial labour shortage in Slovenia and other developed countries is being caused by cyclic and structural factors. The structural factors include demographic changes and changes in the structure of demand by certain skills (particularly in the light of technological advancement and the green and digital transitions), changes in migration flows, and less favourable working conditions in certain sectors or occupations.

Figure 56: In the short run, the intensity of labour shortage fluctuates depending on the economic situation (left); the percentage of companies reporting that labour shortage was a factor constraining their operations reached a record high in 2022 and 2023 (right)

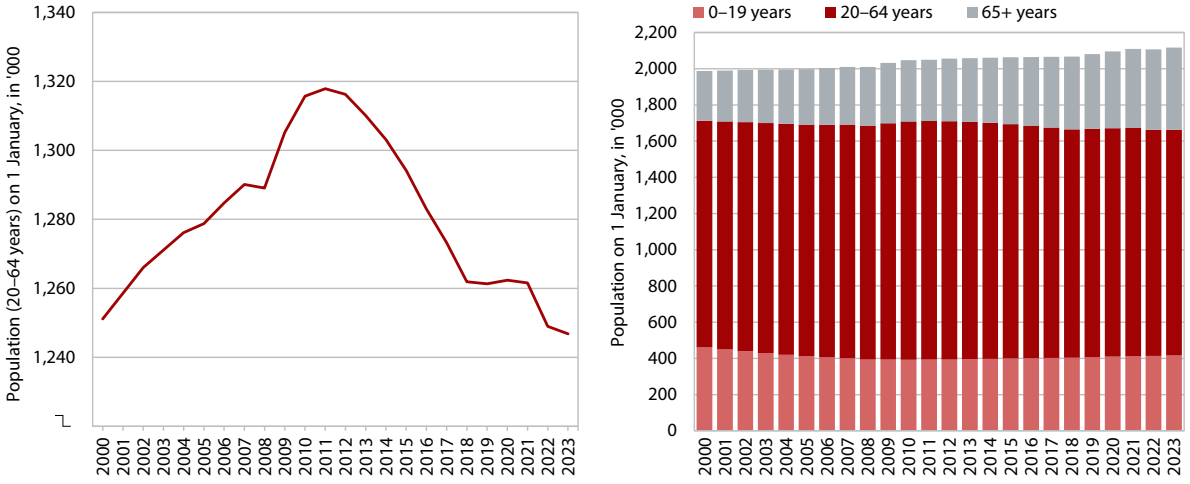


Source: SURS (2023c); calculations by IMAD.

Demographic trends in Slovenia are among the biggest structural factors in labour shortage, as population ageing in the last decade has been particularly pronounced. The number of residents aged 20–64, who are typically in employment, and the resulting potential labour supply have been decreasing since 2012[136] (Figure 57, left). Between 2012 and 2022, the supply decreased by a total of 67 thousand persons, meaning that the potential workforce each year was nearly 7 thousand persons less or that the number of employed persons decreased by more than 5 thousand based on the assumption of a 75% employment rate. There are several possibilities for covering this loss, i.e. from the group of unemployed or persons who have not yet entered the labour market (inactive persons) or foreigners.

[136] For more about demographic trends, see Bratuž Ferk (2023).

Figure 57: The number of residents in the 20–64 age group has been decreasing since 2012, while the number of persons over 65 is growing



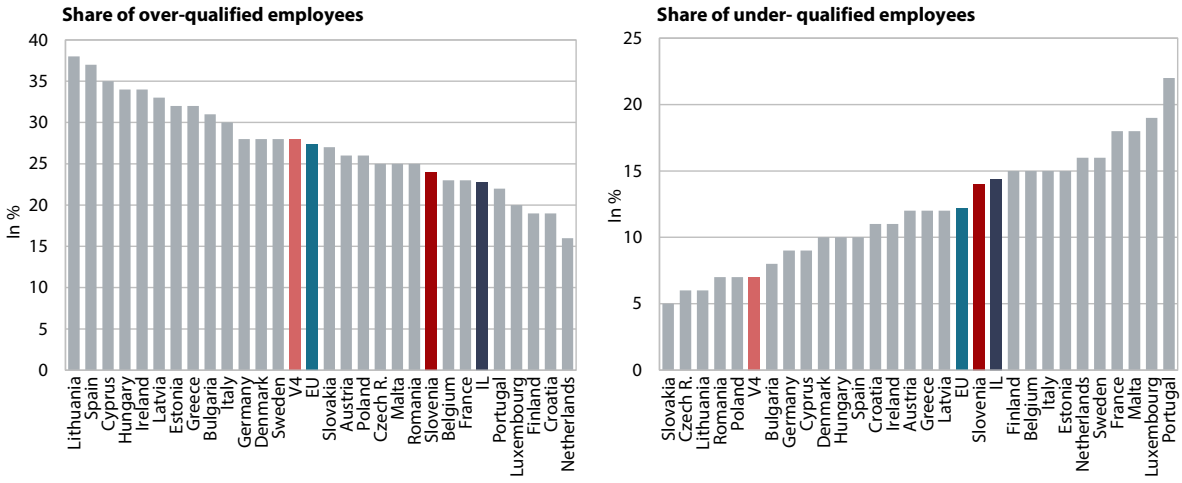
Source: SURS (2023c).

The labour shortage is also due to structural mismatches in the labour market. The employers' difficulties in finding workforce is exacerbated by mismatches in education or knowledge and competencies. The transition to a smart and green economy and an overall long-lived society are increasing the needs for specialists. For many years, employers have been facing a shortage in a number of professions requiring upper secondary vocational and professional education,[137] as well as those requiring a tertiary education. The shortage is particularly acute among digital specialists (DIH, 2023) and engineers, which hinders a faster transition to innovation-led growth. Other occupations requiring tertiary education where there is a shortage include healthcare and education professionals and professionals in certain fields of social sciences (e.g. law) (ESS, 2023b). Although there are numerous estimates concerning the shortage of specific occupations, accurate assessments based on a single methodology are lacking. The supply of certain occupations exceeds the demand, e.g. occupations in sales and procurement, administration, etc., graduates in the arts and humanities, and some social science graduates (ESS, 2023b). Investment in these occupations requiring tertiary education should therefore be reconsidered. Regardless of their education, job candidates often lack the appropriate transferable competencies,[138] job-specific and digital skills, and foreign language skills (ESS, 2022). Inconsistencies in education, which can also be represented by the percentage of employees with a higher or lower education than required, are not substantially different than in the innovation leaders or the EU average (Figure 58).

[137] As regards occupations requiring upper secondary vocational and technical education, there is a shortage of heavy truck and lorry drivers, welders and flamecutters, bricklayers, manufacturing labourers, sales workers, cooks, waiters, cleaners, helpers and others (ESS, 2023a).

[138] The greater the transferability of competencies, the greater the employability. Transferable competencies include reading, writing, numeracy, foreign languages, computer skills, communication skills, problem-solving, critical and analytical thinking, leadership, motivation, teamwork, lifelong learning, career planning, working under time pressure, planning and organisation, initiative, and adaptability and flexibility.

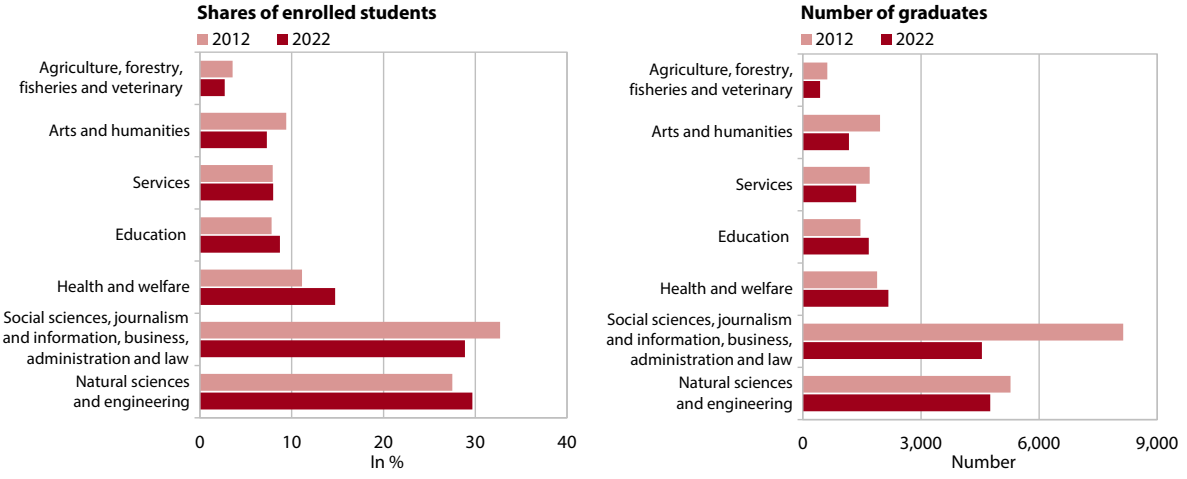
Figure 58: In 2021, around one-third of employees were over- or under-qualified for their job



Source: Cedefop (2022).

Structural mismatches in the labour market are largely due to slow changes in the structure of enrolment in education programmes in the past, combined with the impact of shrinking generations as a result of demographic changes. Due to years of lower enrolment in upper secondary education for demographic reasons (smaller generations), the number of upper secondary school graduates mostly decreased in the 2011/2012–2021/2022 period. Despite years of higher enrolment in vocational and technical education programmes, the number of graduates was lower in 2021/2022 than a decade ago. The potential number of young people for direct enrolment in tertiary education also decreased.[139] Despite the changing structure of enrolment in tertiary education resulting in an increase in the percentage of students enrolled in natural science and technology programmes, the number of such graduates was lower than a decade ago (Figure 59).

Figure 59: Despite the changing structure of enrolment due to demographic reasons, the number of students enrolled in certain programmes is still insufficient to meet the needs

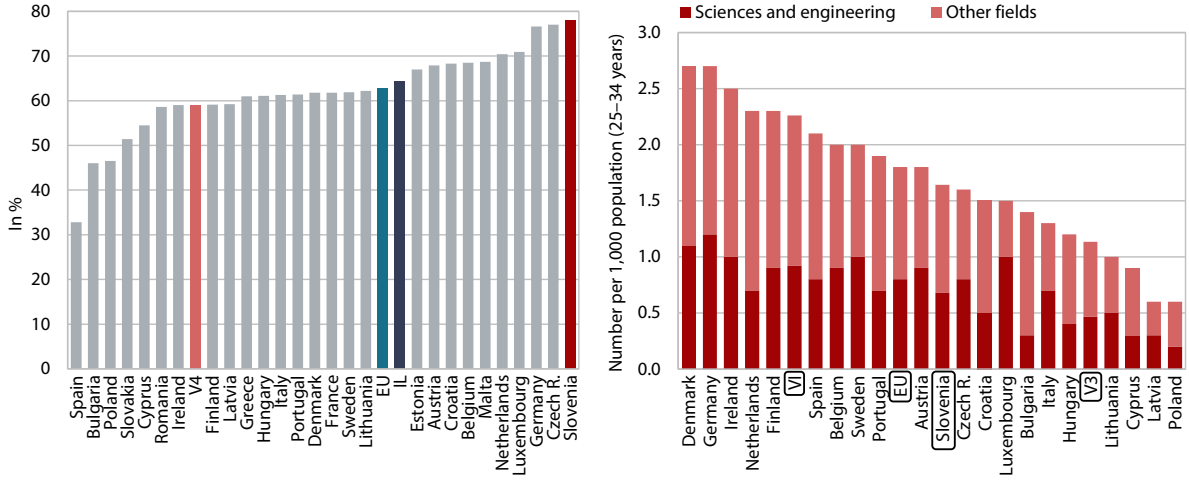


Source: SURS (2023c).

[139] Direct enrolment in tertiary education is enabled for all education programmes except short secondary vocational and upper secondary vocational programmes.

A smart and green economic transformation requires a faster development of specialists in numerous occupations. In the development of human resources important for innovation, the percentage of graduates in science and technology is higher than a decade ago and above the EU average and that of the innovation leaders.[140] Nevertheless, there is still a serious shortage of such occupations. The number of ICT graduates[141] is insufficient to meet the needs of digital transformation in the corporate sector[142] and is becoming one of the biggest challenges, not only in Slovenia but also in the EU (Figure 60, left). The development of AI specialists is also too slow, hindering the technology's broader use.[143] With regard to research and development specialists, there is a worrying trend towards a gradual decrease in the number of new PhD graduates, which fell below the EU average in 2021 (Figure 60, right). Special attention should be devoted to the development of specialists in the development of green technologies and ecological and other innovations, which are essential to the sustainable economic transformation.

Figure 60: In 2022, Slovenia had the highest percentage of companies experiencing difficulties in recruiting ICT specialists in the EU (left); the number of new PhD graduates was lower than the EU average in 2021 (right)



Source: Eurostat (2023). Note: V3 – the Czech Republic, Poland and Hungary.

Reducing structural mismatches in the labour market can be achieved through greater participation of adults in lifelong learning, with the cooperation of social partners playing an important role in the process. Since 2010, participation of adults and employees in lifelong learning has mostly decreased, particularly with the outbreak of the epidemic in 2020, when it first dropped below the EU average. A significant increase was recorded in 2021 and 2022, which was mainly due to the rise of webinars during the epidemic, the enhanced delivery of publicly funded training and the large supply of free training; the data was also affected by a methodological change.[144] In 2022, adult participation amounted to 21.6%, lagging behind only the innovation leaders. In terms of activity, the highest participation is

[140] In 2021, the percentage of science and technology graduates in Slovenia (according to the latest international data) was 28.1% (compared to 25.5% in the EU as a whole and 23.7% in the innovation leaders) (Eurostat, 2023).

[141] In 2021, the percentage of ICT graduates in Slovenia was 4.5% (compared to 4.2% in the EU as a whole and 5.1% in the innovation leaders) (Eurostat, 2023).

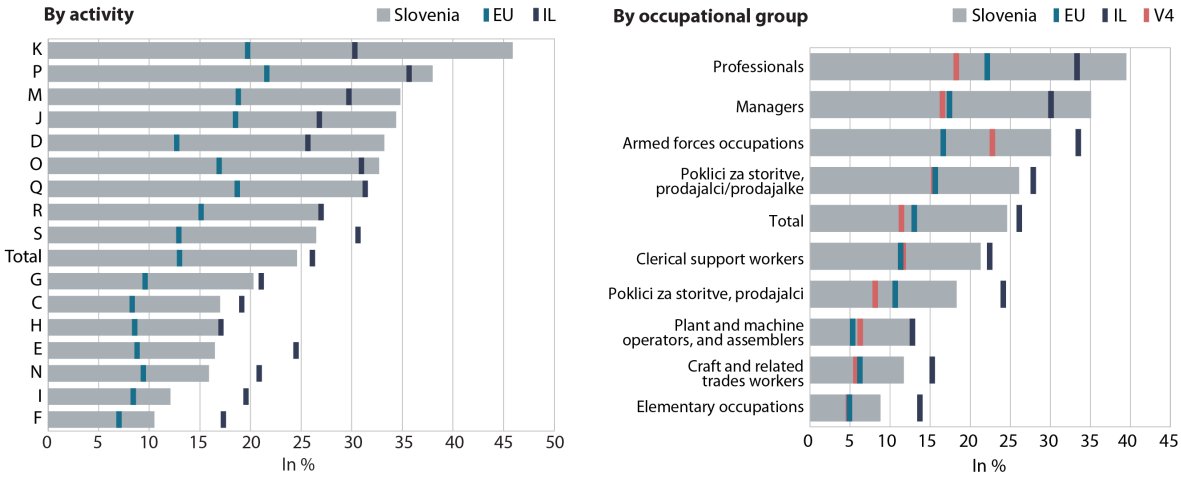
[142] The lack of adequate digital professionals or skills, experienced by 35.9% of companies in 2022, is the most common problem in business digitalisation (SURS, 2023c).

[143] In 2023, 53.8% of companies who wanted to introduce AI technology did not opt to take this step due to the lack of adequate skills (SURS, 2023c).

[144] In the Labour Force Survey, which is the source of data for the calculation of the adult participation in lifelong learning indicator, the target population is all residents of private households in Slovenia from the first quarter of 2021 and all residents of Slovenia up to and including the end of 2020.

among the employed persons and the lowest among the unemployed and inactive persons. Participation in activities and occupations is lower among employees with low education (Figure 61). Particularly at the industry level, social partners are not well represented in the processes of recognising needs, the planning of knowledge and competency development, the promotion of training, and the development of life-learning culture (Franca, 2023). At the international level, the participation of social partners in providing employee education and training is relatively low.[145] There is also a need for employee involvement in devising their own training plans and recognising competency shortcomings (Domadenik Muren et al., 2023).

Figure 61: Participation of employees in lifelong learning is higher in activities and occupations requiring high education, while lifelong learning must be strengthened among employees with vocational and low education



Source: Eurostat (2023). Note: Activities according to the Standard Classification of Activities (SKD): A – agriculture, forestry and fishing; B – mining and quarrying; C – manufacturing; D – electricity, gas, steam and air-conditioning supply; E – water supply, sewerage, waste management and remediation activities; F – construction; G – wholesale and retail trade, repair of motor vehicles and motorcycles; H – transportation and storage; I – accommodation and food service activities; J – information and communication; K – financial and insurance activities; L – real estate activities; M – professional, scientific and technical activities; N – administrative and support service activities; O – public administration and defence, compulsory social security; P – education; Q – human health and social work activities; R – arts, entertainment and recreation; S – other service activities; T – household activities.

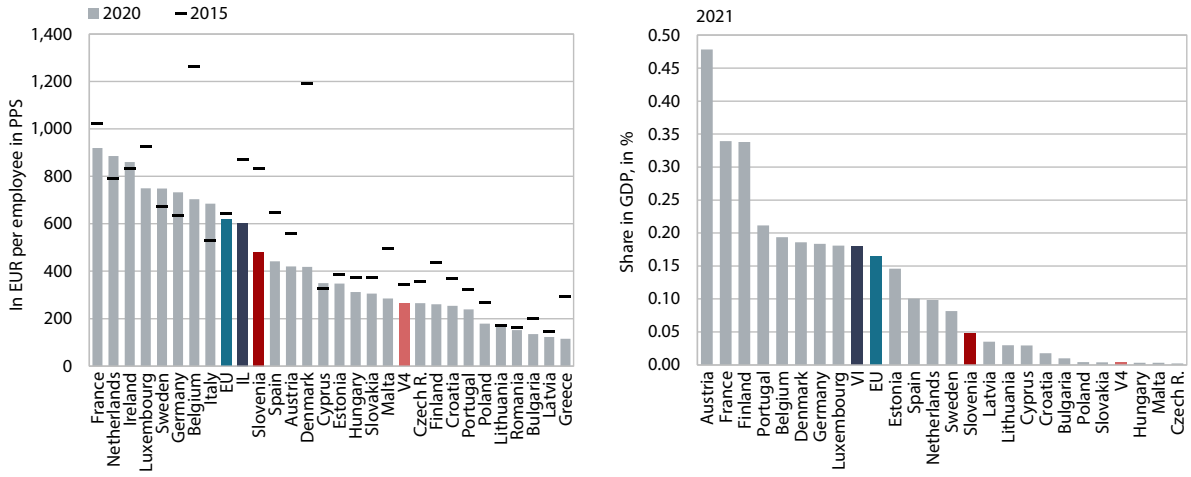
Based on the increased needs for strengthening adult education and (re-)training, investments in this area are insufficient. A study conducted in a sample of OECD countries (Cammeraat et al., 2021) and many others, for example Martins et al. (2022), have shown that digital and other employee skills and competencies and investment in employee education and training have a positive effect on company productivity. Company investments in adult education and training, which enables the acquisition of such skills, were below the EU average and that of the innovation leaders in Slovenia in 2020 (according to the latest available data), though significantly higher than in the countries of the Visegrad Group (Figure 62, left). At the same time, employees who were in education or training spent less time in education or training on average.[146] In addition to the need for constant acquisition of skills by employees, there is also a need to increase these investments. Since 2019, public expenditure on the education and upskilling of the employed and the unemployed as part of the active employment policy (AEP) has been between 0.04 and 0.05% as a share of GDP, lagging significantly behind

[145] According to a 2020 survey on the continuing vocational training of employees in enterprises, 17.1% of Slovenian companies had concluded a collective agreement containing provisions on education and training or included employee representatives in the management of education and training (compared to 23.3% in the EU as a whole and 25.4% in the innovation leaders) (Eurostat, 2023).

[146] In 2020, the average time spent in education or training in Slovenia was 21.3 hours (EU: 22.6 hours; innovation leaders: 25.5 hours), compared to 24.1 hours in 2015 (EU: 23.6 hours; innovation leaders: 27.9 hours).

the EU average (0.16% in 2020) (Figure 62, right) and is insufficient considering the growing need for investment in skills development of adult (re-)training due to the sustainable and digital transformation and other development trends.

Figure 62: Company investments in employee education and training in Slovenia (left) and public spending on education and training as part of the AEP (right) should be increased



Source: Eurostat (2023). Notes: According to data from a survey on company employee education and training. The figure on the right shows the EU average in 2020.

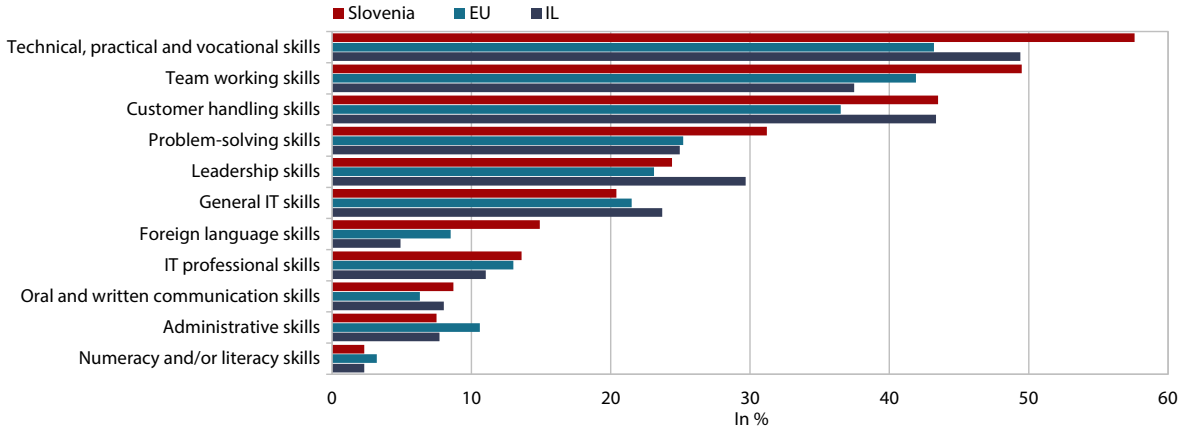
In addition to job-specific skills, raising productivity in Slovenia in the coming years will also require a variety of transversal skills. In a 2020 statistical survey on the vocational education and training of employees, the respondent companies in Slovenia indicated that the most important knowledge and skills for their development were technical, practical and vocational skills, as well as many other »transversal« skills and competencies[147] (Figure 63). According to the companies' assessment, certain skills and competencies are more important for their development than in the EU as a whole and in the innovation leaders. A study conducted by Domadenik Muren et al. (2023) in selected companies in Slovenia showed that certain skills will be even more important for company development in the coming years, namely teamwork, agility, flexibility, cooperation, thinking outside the box and a proactive approach to searching for new, innovative forms of collaboration. However, skill development contains certain deficiencies, as evidenced by the considerable needs for strengthening employee skills. There is also room for improvement in terms of creativity and the ability to solve (complex) problems, especially as regards testing new ideas in problem-solving.[148] With the growing number of immigrants and negative attitudes towards them in the working environment,[149] attention should be devoted to strengthening intercultural skills. As regards continuous learning, the ability to learn should be developed particularly among employees with learning difficulties or a reluctance to learn. Furthermore, management skills are underdeveloped (IMD, 2022).

[147] Transversal skills and competencies include, for example, communication, problem-solving, leadership, teamwork, flexibility and cooperation.

[148] According to Cedefop's European Skills and Jobs Survey, 12% of employees constantly or very often test new problem-solving ideas, ranking Slovenia in 12th place among 25 EU countries. It ranked higher, i.e. 8th place, in terms of the percentage of employees testing new or improving existing work methods (17%) and even higher, i.e. 4th place, in terms of the percentage of employees developing or creating new products or services (14%) (Cedefop, 2022).

[149] According to the Special Eurobarometer, 15% of respondents (compared to 12% of respondents in the EU as a whole) would feel very or somewhat uneasy about having an immigrant as a co-worker and 24% (compared to 19% in the EU as a whole) if they had an immigrant as a superior (EC, 2022).

Figure 63: The key importance of job-specific and other skills and competencies for the development of companies in Slovenia in the coming years, 2020



Source: Eurostat (2023).

4.3 Development trends: global and local

Notable global trends affecting economic and social development and labour market conditions are demographic changes and technological development, along with labour market flexibilisation and changes in the understanding of the labour life cycle.

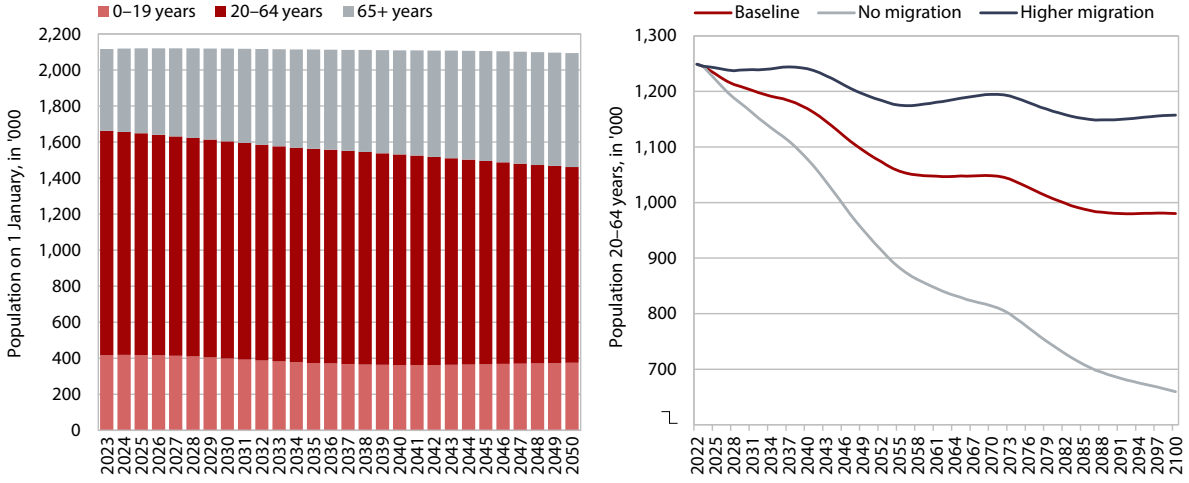
4.3.1 Demographics: labour shortage as the new constant

Demographic projections show a further decrease in the number of residents aged 20–64; despite positive net migration, it will not be possible to ensure further employment growth in the medium term without high net migration in the following decades. According to baseline scenario projections of EUROPOP2023, the total number of residents is expected to increase only until 2026 and should start falling gradually in the following 20 years. A somewhat faster decrease is projected around 2045, when the impact of ageing is expected to reach its highest level. The gap between numbers of residents over 65 and residents aged 20–64 (the working age population), which has grown since 2012, will increase further in the following years, as the older population are the only resident group to increase in number. The decrease in the number of residents aged 20–64, representing a potential labour supply, will therefore continue (Figure 64, left). According to the baseline scenario, accounting for modest net migration, their number will decrease by 43,000 between 2022 and 2030 and by 162,000 by 2050. This could somewhat diminish a higher net migration (Figure 64, right). In addition to the baseline scenario, the EUROPOP2023 projection of net migration also provides versions with lower, higher and zero net migration.[150] However, even if the scenario of high net migration happened, the number of residents aged 20–64 would merely be maintained at the current level until around 2040 (which, in the medium term, would still allow a modest growth in

[150] The assumption of the baseline scenario is that, following slightly higher migration at the beginning of the projection period in 2022 and 2023 (slightly over 11,000 people per year), the average net migration between 2024 and 2100 would amount to 6,083 people per year. The scenario of higher net migration projects an average of 9,702 people (an annual average of 11,906 until 2030) and the scenario of lower net migration an average of 2,583 per year.

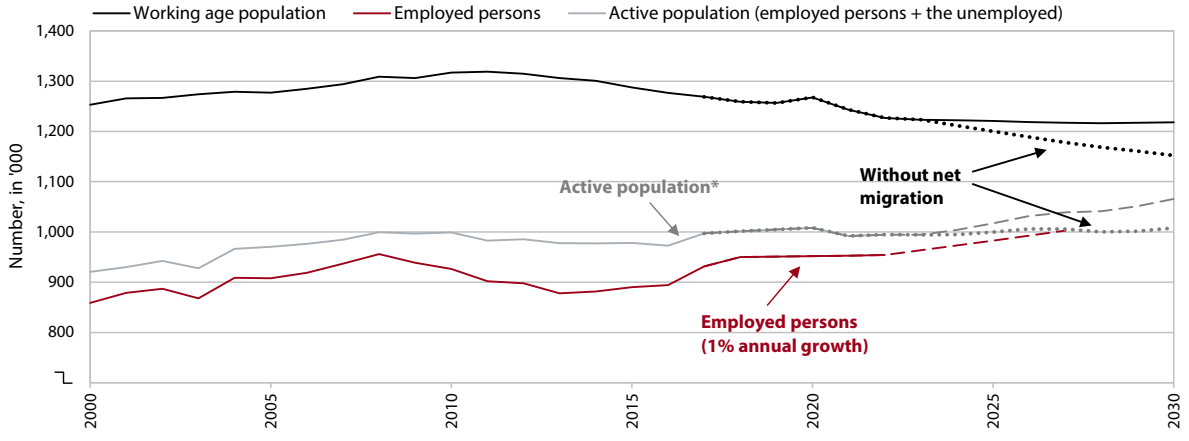
the active working population), after which it would start to decline (Figure 65). This means that, even in the event of this scenario, a labour shortage would be visible but less pronounced. With lower net migration, problems with ensuring an adequate workforce would continue to grow, which would affect the country's ability to increase economic activity and thus the functioning of society and all its systems in ensuring the welfare of the population. The education structure of migrants plays an important role, as model simulations in the case of a higher percentage of people with higher education show a significantly higher positive effect of net migration on Slovenia's gross domestic product per capita (Figure 66).

Figure 64: By 2050, the EUROPOP2023 baseline scenario projects a significant increase in the number of older people and a decrease in the number of people aged 20–64 (left); even under the scenario of higher net migration, the working age population would be smaller (right)



Source: Eurostat (2023).

Figure 65: The scenario of fluctuations in the working age and active population suggests limited growth in the active population in the medium term



Source: Eurostat (2023); calculations by IMAD. Note: * The scenario of active population growth is based on Peschner and Fotakis (2013), which includes the continuation of the upward trend in the number of highly educated people, the equalisation of the (lower) activity rate of women with the (higher) activity rate of men by 2030 and an increase in the activity rate of older people by 15 p.p. by 2030.

Additional attention should be devoted to attracting and retaining foreign specialists and people with tertiary education. In terms of work and quality of life, Slovenia is less attractive for foreign specialists than many other OECD countries.[151] Foreign specialists are deterred by unstimulating remuneration (high taxes) (Section 3.3.1.1). Furthermore, companies in Slovenia devote less attention to attracting and retaining specialists than in more economically developed EU countries,[152] although they do more than a decade ago. Foreign researchers are also deterred from coming to Slovenia by poor research infrastructure (EMN, 2022) and complicated procedures related to the employment of foreign specialists (CCIS, 2022). It is essential to follow other countries and implement stronger measures to attract foreign specialists.[153]

Measures to reduce the brain drain and promote circular migration should also be strengthened. The supply of Slovenian specialists is also decreasing, as they migrate to other countries to find professional and career development and promotion opportunities abroad (Valentinčič et al., 2022). The brain drain, which has a greater negative effect on economic competitiveness than in more economically developed countries,[154] shows the need for strengthening measures to retain specialists in Slovenia (Court of Audit of the Republic of Slovenia, 2023). In addition, measures for the return of specialists who have left Slovenia must be strengthened, as experience shows that they face various obstacles (bureaucracy, employment, etc.) when they return (Valentinčič et al., 2022).

More efficient administrative procedures, better living and working conditions, and appropriate social and cultural policies to integrate migrants and their families into society are needed to successfully attract and retain all foreign workers. Foreigners often face complicated and lengthy procedures for obtaining work permits, while applicants for international protection have little chance of integrating into the labour market or gaining asylum and eventual citizenship. Lower-educated foreign workers in particular, whose share is steadily rising, are usually without a worker representative and often work in inadequate working conditions. They are often confronted with violations of labour laws (Working group on asylum and the Counselling office for workers, 2021; IRSD, 2023) and unequal treatment by co-workers[155] and the wider environment, which can lead to discrimination.[156] Jobseekers born abroad also face obstacles due to discrimination, lack of knowledge of the Slovenian language and non-recognition of education obtained abroad (Medvešek et al., 2022). In terms of living conditions, migrants

[151] In terms of attraction for foreign specialists, Slovenia ranked 18th on the OECD scale among 37 OECD countries and 11th among 22 EU countries. The measurement of country attraction takes into consideration various aspects of work and life (for more details, see the methodology at https://www.oecd.org/migration/talent-attractiveness/, OECD (2023h)).

[152] In terms of attracting and retaining talent as a company priority, Slovenia ranked 14th on the 2022 IMD scale (the higher the ranking, the better the result) among 26 EU countries (IMD, 2023b).

[153] In April 2022, Slovakia, for example, introduced a so-called national visa for nationals of non-EU countries, which facilitates the procedure of recruitment of third-country specialists. In October 2023, it facilitated the process of qualification recognition and simplified requirements concerning the knowledge of Slovakian to tackle the labour shortage in healthcare (OECD, 2023c). In 2017, Finland started implementing its 2017 Talent Boost programme, providing a framework for long-term collaboration between various stakeholders (the state, cities, educational institutions and companies) required to attract specialists, students and researchers, integrate them into society, and benefit from their knowledge and skills (EMN, 2022).

[154] In terms of the negative effect of brain drain, Slovenia ranked 10th on the 2022 IMD scale (the higher the ranking, the worse the result) among 26 EU countries and lower than all the innovation leaders (IMD, 2023b).

[155] According to the Eurobarometer, 24% of respondents would feel (somewhat or completely) uncomfortable having a non-EU migrant as their superior, and 15% would feel uncomfortable having a non-EU migrant was their co-worker (EC, 2022c).

[156] According to the Slovenian Public Opinion 2022/1 survey, 4.1% of respondents are in favour of Slovenia not allowing people of other nationalities to immigrate, 73.4% are in favour of allowing some or very few to immigrate, 19.1% would not want a Muslim as a neighbour, 12.9% would not want a migrant or a foreign worker as a neighbour, and 12.6% would not want a person of another race as a neighbour (Hafner-Fink et al., 2022).

often face barriers in accessing social transfers (IMAD, 2021) and discrimination in accessing adequate housing[157] (Bajt et al., 2021); they also sometimes reside on construction and other work sites, and sometimes their accommodation is managed by their employer. Migrants face poverty and social exclusion much more often than Slovenian citizens[158] (IMAD, 2023). Therefore active policies of housing and cultural desegregation and social and societal integration of foreign workers must be put in place, developed between migrants and the rest of the population together. The social and societal integration of children and other family members of migrants or foreign workers in Slovenia is also very important.

Box 3 Assessment of the macroeconomic effects of net migration to Slovenia, taking into account the different educational structure of migrants

To estimate the macroeconomic effects of net migration to Slovenia, a Slovenian labour market model was used.[159] Net migration effects were estimated at 8,000 people aged 15–69 per year till 2050. The labour market characteristics[160] of migrants were assumed to be the same as those of the current Slovenian population. Two scenarios were developed, differing according to the assumed educational structure of net migrants. The first scenario (Scenario 1) was based on the assumption of the same educational structure for net migrants as for foreigners in Slovenia.[161] In the second scenario (Scenario 2), net migrants were assigned the same educational structure as foreigners in the innovation leaders.[162] The age and education structure of net migration as projected by the two scenarios is shown in Appendix 6.1.5. (Table 2).

Model simulations show that attracting better-educated individuals from abroad could have a significant positive impact on GDP per capita in the long run, given the right investments. From an economic point of view, net migration of the working age population (aged 20–64) can increase labour supply. Higher labour supply, employment and consequently higher investment would lead to a higher GDP. The model estimates show that in the first scenario, in which net migrants have the same educational structure as foreigners in Slovenia, the short- and medium-term effects of net migration on Slovenian GDP would be between 0.7% and 2.1%, while in the long term (30 years from now, around 2050), Slovenian GDP could be about 13% higher than in the baseline scenario.[163] In the second scenario, which assumes an education structure of net migrants similar to that of foreigners in the innovation leaders, the effects on GDP would be larger.

[157] In 2022, 36.2% of adult foreigners (EU: 28.3%) and 8.5% of Slovenian nationals (EU: 13.9%) lived in overcrowded dwellings (Eurostat, 2023).

[158] The risk of social exclusion was 26.1% in 2022 for foreigners and 13.2% for the population as a whole in Slovenia (Eurostat, 2023).

[159] A macroeconomic general equilibrium model developed by Berget et al. (2009). The model has been calibrated for a number of countries, including Slovenia, and is an upgrade of the QUEST model (D'Auria et al., 2009). The calibration of the model for Slovenia was carried out in cooperation between the European Commission, the Austrian Institute for Economic Research EcoAustria and IMAD.

[160] Especially concerning participation, unemployment and salaries.

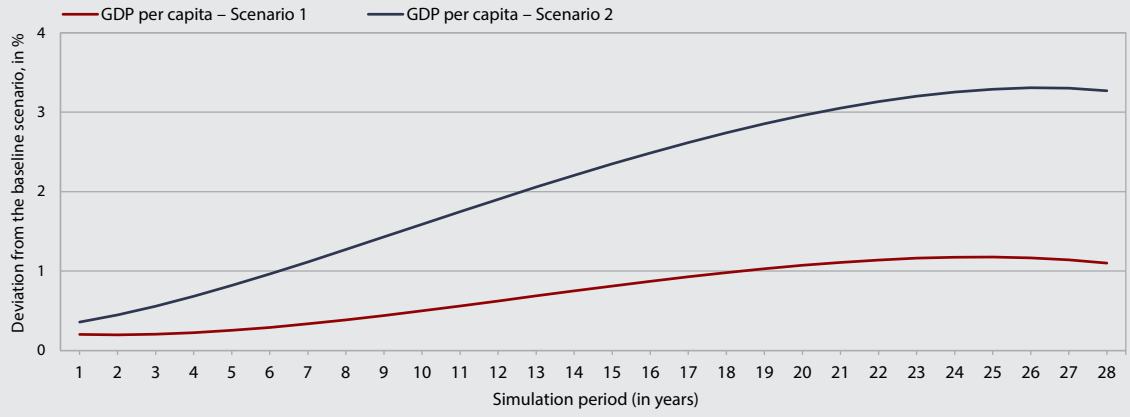
[161] In the 2011–2021 period, 27.7% of foreigners in Slovenia were low-educated, 61.9% were medium-educated and 16.4% were highly educated.

[162] Among foreigners in the innovation leaders, 29.5% are low-educated, 27.5% are medium-educated and 43% are highly educated. Among foreigners in the innovation leaders, 29.5% are low-educated, 27.5% are medium-educated and 43% are highly educated.

[163] The baseline scenario assumes a constant population of just over 1.75 million people (the average of the EUROPOP2023 zero migration scenario) aged 15 years and over and the current educational structure of the Slovenian population consisting of 13% low-educated, 57% medium-educated and 30% highly educated individuals.

In the short and medium terms, Slovenian GDP would be 0.8–2.5% higher than in the baseline scenario, and around 16% higher in the long term. GDP per capita, which is a better indicator of welfare, would be 1.3% higher in the long term in the first scenario than in the baseline scenario and 3.4% in the second scenario. Higher GDP per capita would mean more resources available for the state to provide public goods and services to its citizens, contributing to a better quality of life. In the light of these findings, designing appropriate policies to attract and integrate the most skilled and highly educated workforce into the Slovenian labour market is crucial to ensure the long-term prosperity of the country and its people. A table estimating the effects on additional variables can be found in Appendix 6.1.5.

Figure 66: Model-based assessment of the effects of two scenarios of the educational structure of net migrants on GDP per capita



Source: Slovenian labour market model, IMAD estimates. Note: Scenario 1 – the educational structure of net migrants is the same as the educational structure of foreigners in Slovenia; Scenario 2 – the educational structure of net migrants is the same as the educational structure of foreigners in the innovation leaders.

4.3.2 Technological development

In addition to the digital and sustainable transition,[164] the impact of generative artificial intelligence (generative AI) is increasingly emerging as a decisive macrotrend from 2023 onwards, greatly expanding the possibilities of automation. If until now, automation has mainly addressed repetitive, physical or optimisation-related tasks, generative AI[165] also enables tasks requiring cognitive skills, meaning that it can be used for areas such as expression, reasoning and communication, coordination, and working with ideas or design (OECD, 2023f; WEF, 2023; Tolan et al., 2021). Experts estimate that generative AI will reach human capabilities in areas such as creativity and logical reasoning and problem-solving within this decade (Chui et al., 2023).

[164] For a more detailed overview, see the 2020 and 2022 Productivity Reports (IMAD, 2020a, 2022b).

[165] The OECD (2023f) defines artificial intelligence as a machine-based system that is capable of influencing the environment by making predictions, recommendations or decisions according to a defined set of objectives. Generative AI is a subset of artificial intelligence that uses generative models to recognise patterns from large amounts of potentially unstructured data and create entirely new content in the form of text, images, video or audio in a way that has so far been attributed solely to human abilities (Wikipedia, 2023; Gartner, 2023; Ellingrud et al., 2023).

The impact of the green transition on the labour market and jobs is expected to be mainly positive, while opinions on the impact of automation and generative AI on the labour market are more divided. Although the green transition is associated with major challenges, for example re-training (OECD, 2023a) or uneven territorial effects (OECD, 2023d), its aggregate impact is expected to be positive (EC, 2023c; WEF, 2023). On the other hand, opinions are much more divided on the impact of automation on the labour market and generative AI in particular, notwithstanding the fact that the impact of automation, especially robotics, on jobs in Europe has been positive so far (Klenert et al., 2023; Santos et al., 2023). The global risks associated with replacing people in the work process as a result of technological advances are expected to increase (Autor et al., 2022), as new applications mean that many more activities can be automated[166] than previously expected. According to an updated OECD methodology (2022; 2023f), the share of employees in occupations with the highest risk of potential automation, also taking into account the impact of AI, is thus expected to increase from 17% to 28% in EU countries that are also members of the OECD.[167]

While preliminary estimates of the impact of automation and generative AI on productivity are positive... If such intensive automation were to take place, it would also result in a strong acceleration of economic and productivity growth. At a global level, consultancies estimate that GDP could increase significantly, by around 7%, over the next ten years (Chui et al., 2023; Hatzius et al., 2023). When it comes to productivity, it could be boosted by 1.4 p.p. globally (Hatzius et al., 2023) or even by up to 3.3 additional p.p. (Chui et al., 2023). These estimates assume the use of generative AI in all types of work processes and occupations, while the impact is estimated to be about half as high based on concrete business examples from practice (ibid.).

... they may well be overestimated, with the more ambitious countries expected to benefit more. The above estimates should be treated with caution, as not only are they inherently uncertain (WEF, 2023), but historically they have been either exaggerated (The Economist, 2023) or premature (Hatzius et al., 2023). At the same time, it is true that the empirical studies so far on the impact of AI for Europe paint a rather positive picture: Czarnitzki et al. (2022), for example, find a positive and significant impact of AI on the productivity of German companies, while a more comprehensive[168] analysis by Calvino and Fontanelli (2023) also finds a significant impact, but only where complementary technologies and skills were also present. The key point seems to be that the positive effects will be stronger in the more ambitious countries: in Germany and France, productivity growth could thus be boosted by up to 3.9 and 3.7 p.p. respectively in the rapid deployment scenario or by only 1.6 and 1.3 additional p.p. respectively in the slow deployment scenario (Chui et al., 2023). Not only is accelerated deployment important in terms of its impact on productivity growth, but, at least as the controlled experiments carried out so far in a real environment show, the use of generative AI is also expected to improve the quality of work (Dell'Acqua et al., 2023).[169]

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[166] According to some estimates, at least 80% of jobs in the US could be automated at least 10% of the time (Eloundou et al., 2023) or, theoretically, it would be possible to automate tasks that currently take as much as 60–70% of the time (Chui et al., 2023). Similarly, LinkedIn (2023) estimates that 84% of its US members could automate at least a quarter of their repetitive tasks with generative AI.

[167] The initial estimate is based on Nedelkoska and Quintini (2018); for presentation, see IMAD (2020a). Similar estimates have been made by others: for example, WEF (2023) estimates that the share of automated tasks could rise from 34% to 42% by 2027, and Goldman Sachs estimates that 24% of jobs in the euro area could be affected by generative AI (Hatzius et al., 2023)

[168] The study is based on micro-data from 11 countries, seven of which were European, and uses more recent data than other studies (different for each country, but ranging from 2016 to 2021).

[169] Boston Consulting Group employees completed 12.2% more tasks 25.1% faster using generative AI, while the

Generative AI will also have a strong impact on the highly educated and well-paid. While jobs characterised by routine and repetitive activities have been more exposed to automation so far, generative AI is expected to have an impact on jobs that are more knowledge- and cognitive-based. Thus, while generative AI is expected to affect employees with higher education (Chui et al., 2023) and higher salaries (Eloundou et al., 2023), this does not necessarily mean that working conditions for them will also deteriorate in practice. In fact, in parallel with exposure, automation is also increasing the demand for highly skilled workers, which is why the OECD estimates that the net effect of generative AI deployment on them will nevertheless be positive (OECD, 2023f).[170] While generative AI can bring a range of qualitative benefits to which employees globally are quite open,[171] the risks at the company and individual level should not be overlooked.[172]

More innovative countries should be less exposed to job automation... As shown in Figure 67, not only countries that are production-oriented, but especially those that are functionally specialised in simpler tasks, should be significantly more exposed to potential risks: 23% of employees in the innovation leaders, 31% in Slovenia and 35% in the V4 countries are estimated to be exposed. The positive impact on economic growth is estimated to be higher in more innovative countries (Chui et al., 2023; Hatzius et al., 2023), which sends an important message to countries such as Slovenia that they need to invest more in this type of transformation than the most developed countries.

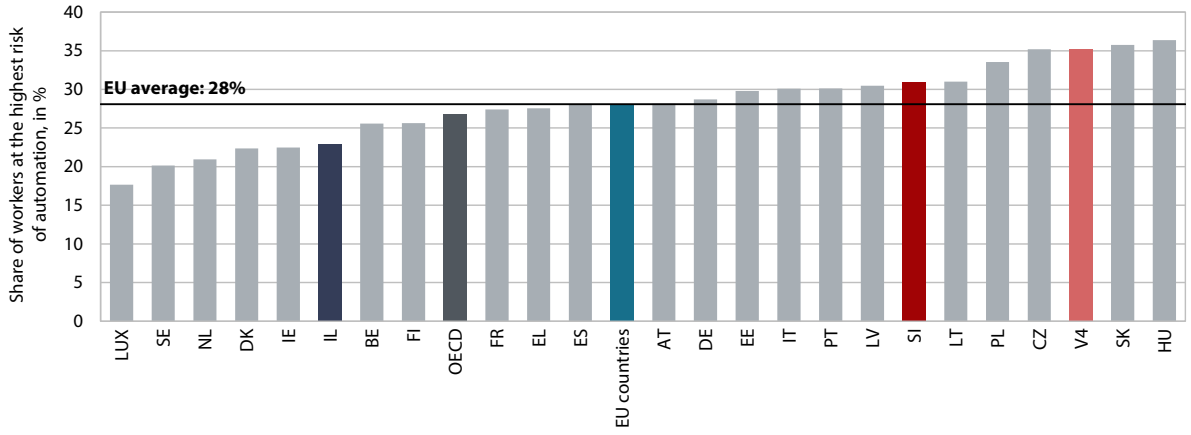
quality of their work was 40% higher compared to the control group. This applies to tasks where the use of generative AI makes sense.

[170] Although Goldman Sachs (2023) lists "office support staff", "professionals", "their technical staff" and "managers" as the most exposed generative AI occupations and Felten (2023) lists "specialists", "their technical staff" and "managers" as the most exposed generative AI occupations, the OECD continues to consider these groups as having the lowest actual risk, and "fishermen and hunters", "miners", "foresters", "railwaymen" and "maintenance workers" as having the highest risk (Lassébie and Quintini, 2022).

[171] This should improve the mental and physical health of employees, including through their having less repetitive and tedious tasks (OECD, 2023f), allowing employees more time to work with customers and interact with their co-workers (Milanez, 2023). Studies show that new technologies can, under the right conditions, benefit less experienced, skilled or successful employees more when performing the same tasks (OECD, 2023f; Dell'Acqua et al., 2023), so it is perhaps not surprising that despite people's concerns about their jobs, they are also willing to delegate work to AI. This applies to 62% of people in Europe according to Microsoft (2023), i.e. 69% of respondents would feel comfortable delegating administrative tasks and 70% and 62% respectively analytical and creative work.

[172] Automation, and in particular generative AI, brings a number of risks, such as potential increases in work intensity and stress and negative impacts on privacy and autonomy, and the (lack of) transparency of algorithmic decision-making can be problematic, further promoting bias and even raising ethical issues, while at the societal level, generative AI can further contribute to income inequality and change the social work environment (OECD, 2023f; Acemoglu, 2021).

Figure 67: The most jobs exposed to automation are in the Visegrad Group and Slovenia



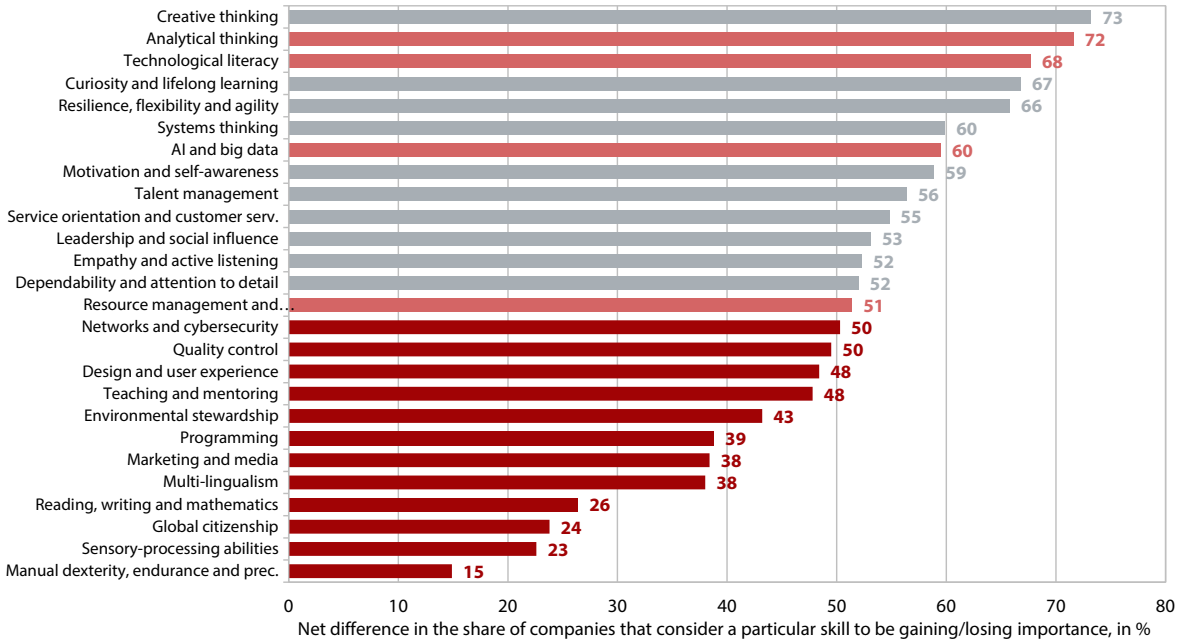
Source: OECD (2023f), based on Lassébie and Quintini (2022); presentation by IMAD. Note: "EU countries" refers to EU countries that are also members of the OECD.

The use of generative AI is still relatively limited at the moment but will accelerate significantly in the coming years. The potential exposure to automation does not yet translate into an actual impact on the labour market, as companies can also adapt in other ways (e.g. by redeploying employees), and the uptake of these technologies is still relatively limited (OECD, 2023f).[173] But this is set to change in the coming years, with 75% of companies globally expecting to use generative AI in the next five years (WEF, 2023) and 44% of companies in the US expecting to do so in the next year (LinkedIn, 2023). In response to all these trends, global companies are announcing two priority strategies (WEF, 2023): (i) accelerating investment in learning and training and (ii) accelerating automation processes (the first is highlighted by 81% and the second by 80% of the companies surveyed).

For new technologies to contribute to people's well-being, it will be essential to focus education and training on the skills of the future. As shown in Figure 68, in addition to analytical thinking and technological literacy, the importance of soft skills, which are specifically highlighted as crucial by the French Productivity Board (Du Roscoat et al., 2022), will increase substantially in the coming years. Companies are thus highlighting creativity and creative and critical thinking as some of the key skills of the future (WEF, 2023). Improving these skills has also been identified as one of the key conditions for maintaining the competitive advantages of the Slovenian economy (Sumanth et al., 2023). Given that education and training systems in Central and Eastern Europe are the least successful in this area (IMAD, 2022a), this should also be one of the priorities for the reform of education and training systems.

[173] According to a McKensey survey (Deveau et al., 2023), for example, generative AI is rarely or never used in marketing and sales by 60% of companies, but 35% of companies are expected to use machine learning in conjunction with these functions always or often and a further 40% occasionally.

Figure 68: According to a WEF survey, companies believe that soft skills will become increasingly important



Source: WEF (2023); presentation by IMAD. Note: Among skills that are gaining in importance, those that can be classified as soft skills, are highlighted in grey, while technical skills are highlighted in light pink.

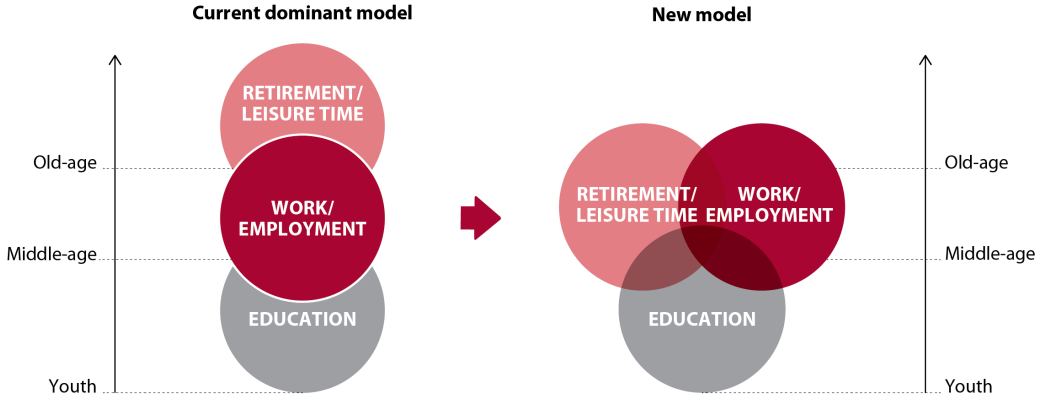
4.3.3 Labour market flexibilisation and the necessary changes in understanding the labour life cycle

The flexibilisation of the labour market, reflected in the rapid development of flexible (atypical) forms of work, brings with it a number of challenges as well as benefits. The development of digital platforms has brought new atypical forms of work, such as platform work. These forms of work generally make it easier for people to balance work and family responsibilities, but EU countries often do not regulate their employment status. This translates into workers having restricted access to social security and their incomes fluctuating widely (Eurofound, 2018). Thus greater uncertainty in the labour market and more atypical (also precarious) forms of work are, in addition to demographic changes, important factors that also require that systems of social protection be adapted to provide a sustainable transition between different stages of life.

The prevalence of certain atypical forms of work in Slovenia lags far behind the EU average, with only traditional fixed-term work recording about the same average. In all countries, temporary employment (fixed-term work) is higher than average among young people. However, part-time work is significantly lower in Slovenia than the EU average and in the innovation leaders. Similarly, data on homeworking shows that 7.4% of employees in Slovenia worked from home in 2020 (the latest available data), compared to an EU average of 12.3%, and that it was most widespread in Finland (25.1%). The share of self-employed in Slovenia is also lower than the EU average but similar to that of the innovation leaders. The share of fixed-term work in Slovenia in 2022 was similar to that in the EU and lower than in 2013. For many new forms of work (such as platform work), data on their prevalence is not yet available.

Technological development and an ageing population are bringing about a necessary change in the understanding of the labour life cycle. Increasing life expectancy and the faster introduction of technological changes in society and the economy are also increasingly changing the understanding of the labour life cycle (Véron et al., 2007). With the lengthening of life expectancy, changes in occupations and a greater need for life-long learning, the traditional life cycle (education, active working period, retirement) is being replaced by a more adaptive and variable cycle (Figure 69): an individual may pursue several careers and will have to be educated or trained in all stages of life (also due to technological development, changes in professions, and the need for new knowledge and skills) and stay active after formal retirement and contribute to the community (part-time jobs, mentoring, volunteerism, social entrepreneurship, amateur activities).

Figure 69: Changes in the life cycle



Source: Bednaš and Kajzer (2017).

4.4 Future labour market challenges for Slovenia

A skilled workforce will become even more important in the future to boost productivity and prosperity, which will require a deliberate and strategic approach to human resource development. With slow changes in the structure of enrolments, combined with demographic changes, we are already facing severe labour shortages in a number of areas. The transition to a smart and green economy and a long-lived society will change the structure of demand for workforce even more dramatically in the future, with fewer people needed to meet the demand, and a strategic approach to human resource development where every individual counts will be crucial. In line with labour market projections and trends to date, the need for specialists is set to increase, with a particular shortage of digital specialists and engineers, which is holding back the transition to innovation-led growth. Even today, there is a shortage of tertiary educated workers in the healthcare and education sectors. Ensuring a sufficient supply of adequately trained staff is therefore an increasing challenge, which is also being faced by many other countries. It is therefore imperative to take action.

Demographic labour shortages are becoming a constant feature of development and **priority measures are needed to ensure a sufficient labour force**, including:

- an active migration policy to attract labour, especially educated labour, from abroad and to encourage the return of Slovenian specialists, i.e. through the establishment of a circular migration system;
- an appropriate policy to integrate migrant workers and their families into society by establishing conditions for the participation of nationals and non-nationals;
- the creation of conditions for longer working lives, which includes on the one hand allowing young people to enter the labour market earlier and, on the other, enabling older people to stay in work longer by adapting jobs to an older workforce and promoting new approaches to human resource management in companies (e.g. age-management, which combines the strengths of different generations to achieve optimal results), as well as pension reform;
- designing a public sector salary system that provides decent and attractive pay for a sufficient workforce to deliver quality public services;
- fiscal restructuring towards lower taxation of labour to better reward the most productive, along with increasing revenues from other sources and restructuring expenditure.

Further strengthening education and training for all employees and fostering a culture of lifelong learning are essential to ensure adequate skills. This requires measures aimed at:

- increasing investment by business and government in education and training for employees, with appropriate financial incentives, because the need for new skills is high and without them new technologies cannot be used and productivity cannot be increased;
- fostering a company culture based on positive attitudes towards learning and encouraging involvement in lifelong career orientation at people's universities;
- developing human resources in companies, including by identifying skill and competency gaps among employees and planning their education and training accordingly;
- increasing the responsiveness of the education system to the changing medium-term needs of the economy, driven by the green and digital transformations, an ageing population, and other development trends;
- establishing a flexible adult education and (re)training system that responds quickly to the needs of the economy (e.g. setting up a system of micro-credentials for short-term training);
- increasing access to training for the green and digital transitions, including for the unemployed and inactive, which requires the design and strengthening of active employment policy programmes;
- raising people's awareness of the need for lifelong learning.

A prerequisite for successfully addressing challenges in the area of human resources development is the establishment of a comprehensive system for identifying and forecasting human resources and skills needs, which remains a challenge. The absence of an integrated mechanism for identifying and forecasting the human resources and competencies needed for the development of the economy and society at large contributes significantly to structural mismatches in the labour market, as has already been pointed out (see IMAD, 2020b, 2022a). For the time being, only individual elements of a comprehensive competency needs forecasting system are available. This includes a project by the Ministry of

Labour, Family, Social Affairs and Equal Opportunities to develop a "labour market platform" to collect data on occupational and competency needs. The first results, which mainly present employment growth by activity and occupational group on the basis of trends to date, point to further employment growth up to 2037 in the activities where growth has already been highest (e.g. ICT, professional, scientific and technical services) and a strong demand for specialists (see Appendix 6.3.6). This could mean that the modelling approach used has a limited ability to predict needs as they arise and new skills are required. The model at this stage also does not yet cover the identification and prediction of skills needs, which is expected to result from the further development of the labour market platform.

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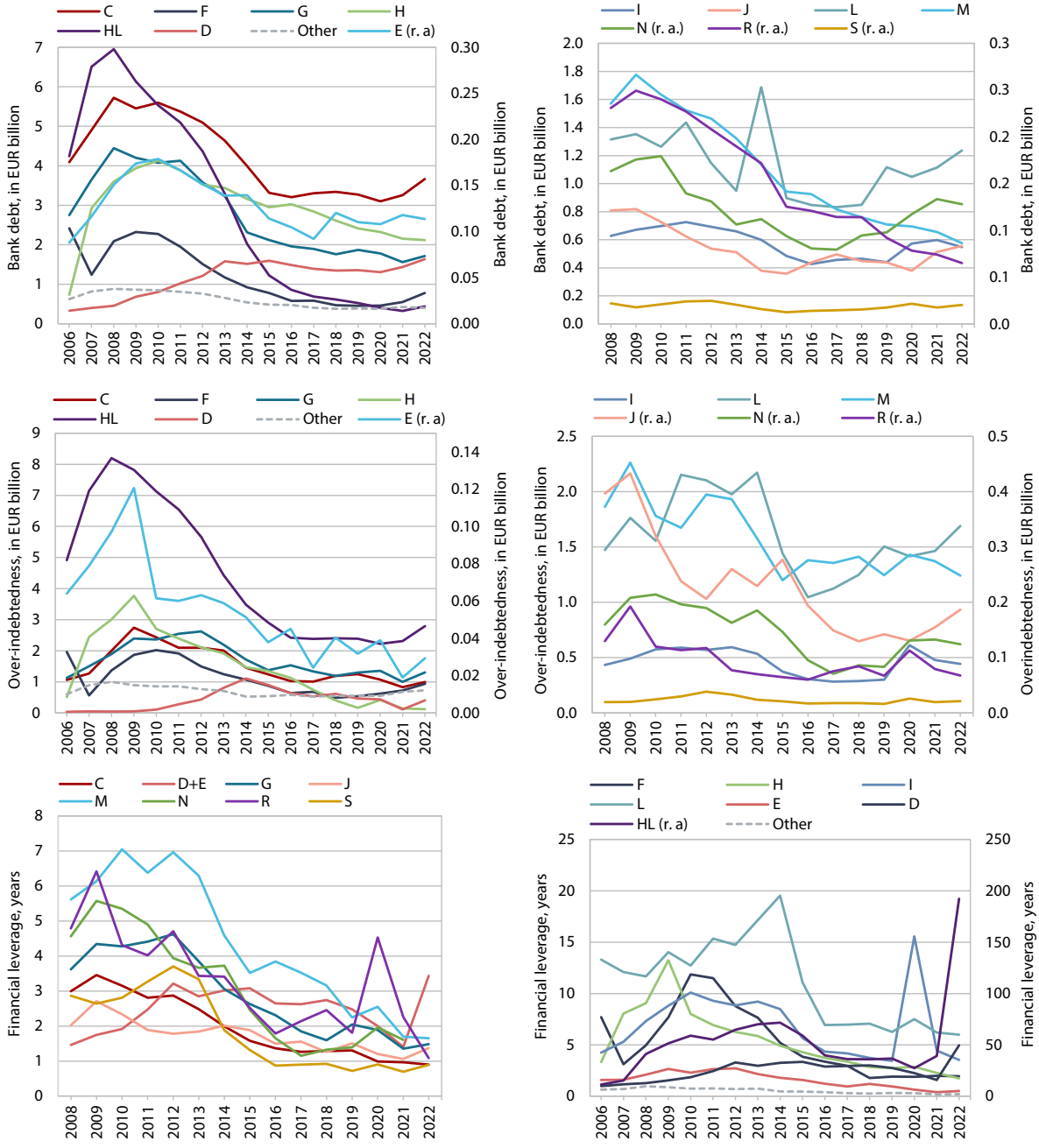
6 Appendices

6.1 Detailed data on the financial performance of companies

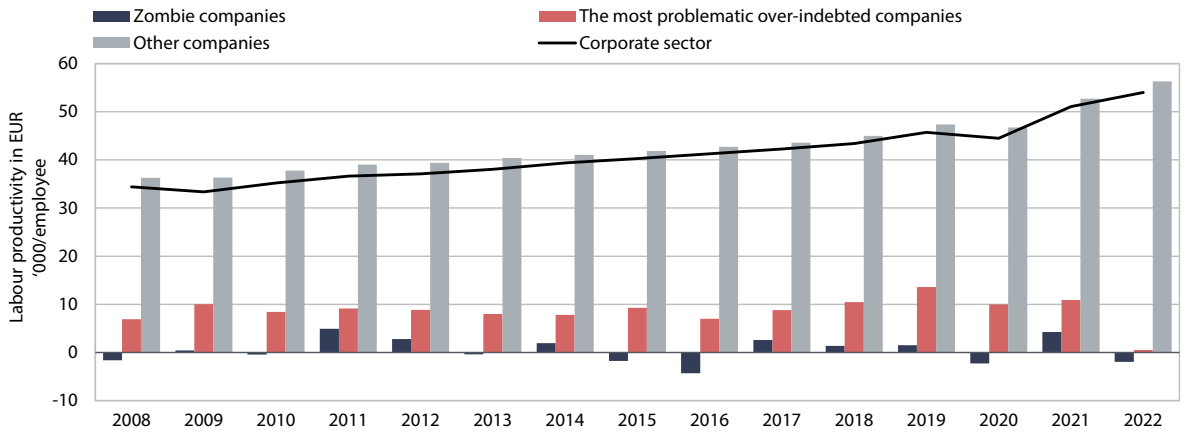
Figure 1: In 2020–2022, bank debt, financial leverage and over-indebtedness increased, especially in some of the sectors most affected by the epidemic and rising energy prices



Source: AJPES (n. d.); calculations by IMAD. Notes: Financial leverage – net financial debt/EBITDA, which shows the ability to repay debt and how many years it would take for a company to repay its debt and interests with the cash flow generated (assuming that net financial debt and EBITDA are held constant). Companies with a lower indicator value repay their liabilities with a lower risk; Over-indebtedness – net concept; Other – A, B, part of K, O–Q, T;[174] r. a. – right axis.

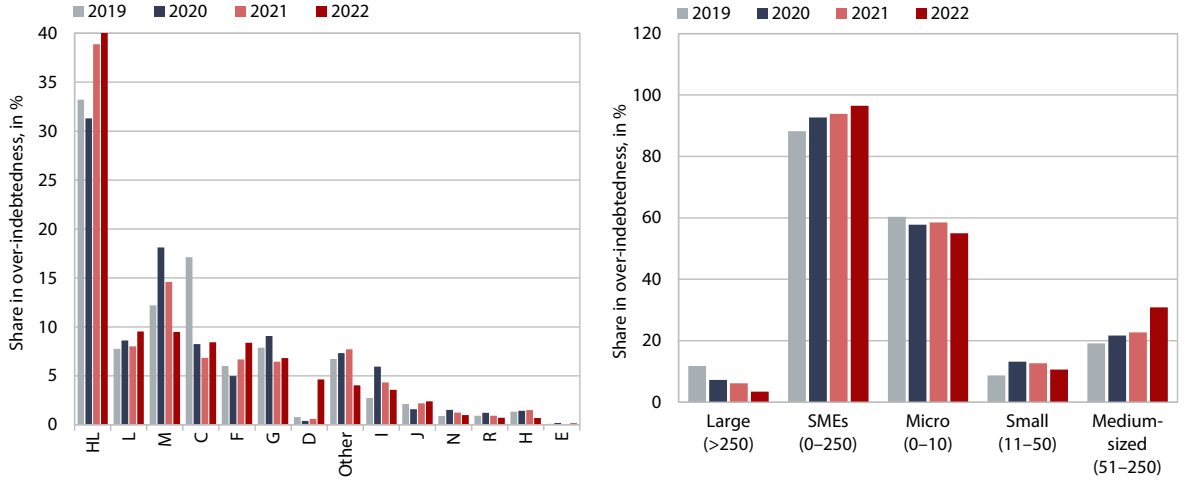
[174] For details, see the Standard Classification of Activities 2008 (Braunsberger et al., 2010).

Figure 2: Low productivity of companies with a relatively high exposure to insolvency risk[175]



Source: AJPES (n. d.); calculations by IMAD. Notes: The most problematic over-indebted companies have a net financial debt and a negative EBITDA; zombie companies (belonging to the group of the most problematic over-indebted companies) have a net financial debt and a negative EBITDA for at least three consecutive years, so the data are only available from 2008 onwards.

Figure 3: Over-indebtedness of the most problematic over-indebted companies was highest in activities of holding and leasing companies, followed with more than 5% by real estate, professional and technical activities,[176] manufacturing,[177] construction and trade



Source: AJPES (n. d.); calculations by IMAD. Notes: SMEs – micro, small and medium-sized enterprises; Other[178] – A, B, part of K, O–Q, S and T.

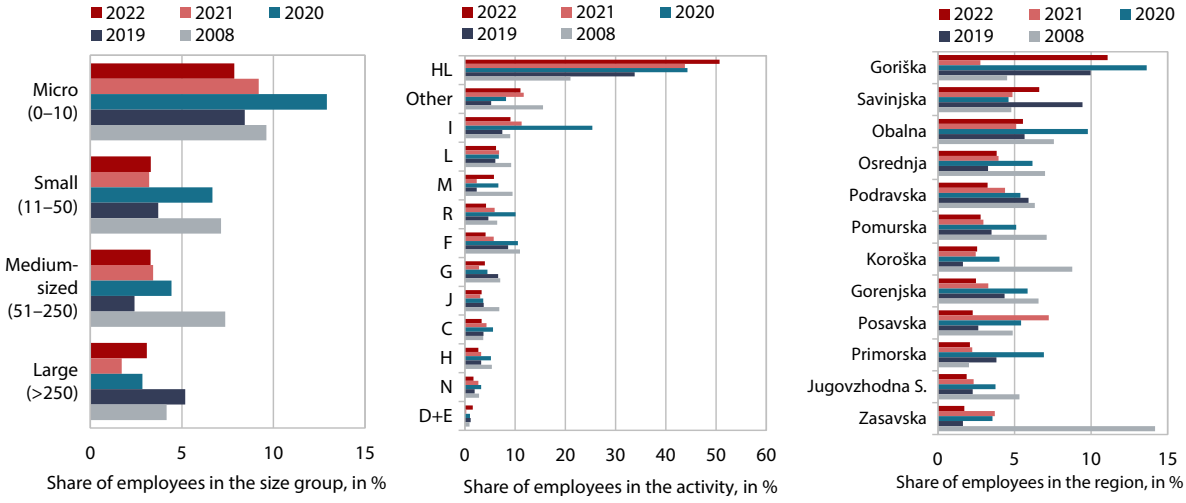
[175] In the period 2008–2021, slightly more than three-quarters below the level of the corporate sector as a whole; in 2022 it reached its lowest levels due to a significant decline in value added.

[176] In the activities of head offices (NACE Rev. 2: 70), bank debt accounted for 62% of total bank debt and over-indebtedness accounted for 75% of total over-indebtedness. This activity also had a dominant share of companies, which employ about one-fifth of all employees in professional and technical activities. Their contribution to value added was 25%.

[177] Indebtedness and over-indebtedness of energy-intensive manufacturing companies (NACE Rev. 2: 17, 20, 23, 24) accounted for about one-fifth of total indebtedness and over-indebtedness in manufacturing. The share of energy-intensive companies was around 7%. These companies employed around 14% of all employees and contributed about 17% to the value added generated in manufacturing.

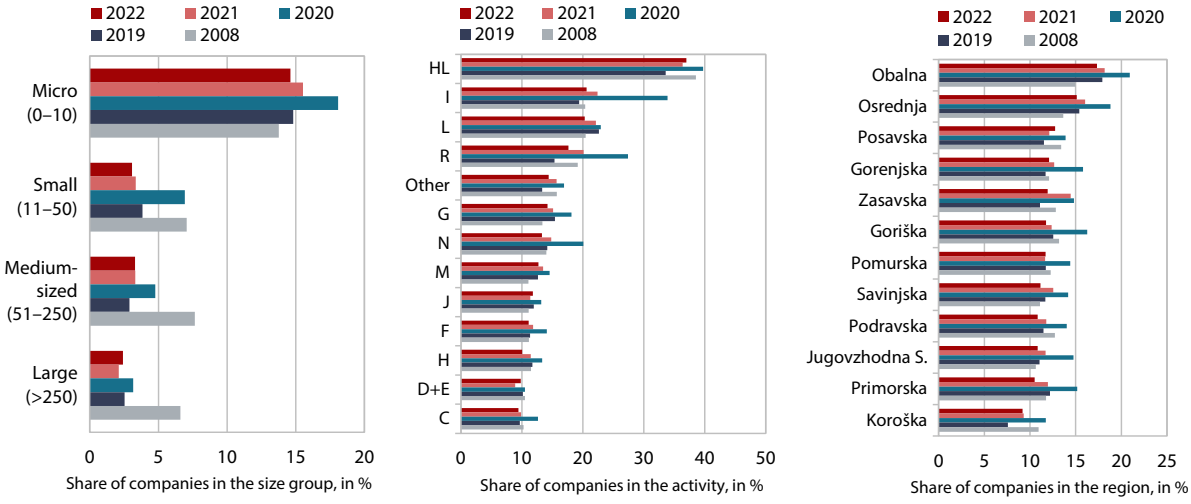
[178] Other (A, B, part of K, O–Q, S and T) – In analysing the structure of over-indebtedness, other service activities (S) are included in the Other category, as their share of the total structure of over-indebtedness only accounted for 0.2% despite the activity being affected during the epidemic (in 2020–2022).

Figure 4: In 2022, the share of employees in companies with a relatively high exposure to insolvency risk was highest in SMEs, in activities of holding and leasing companies, accommodation and food service activities, and in the Goriška, Savinjska and Obalno-kraška regions[179]



Source: AJPES (n. d.); calculations by IMAD. Notes: Other – A, B, part of K, O–Q, S and T; for the sake of clarity, activities D and E are combined, as both activities have small shares; Obalna – Obalno-kraška; Osrednja – Osrednjeslovenska; Primorska – Primorsko-Notranjska; Jugovzhodna S. – Jugovzhodna Slovenija.

Figure 5: In 2022, the share of companies with a relatively high exposure to insolvency risk was highest in SMEs, in activities of holding and leasing companies, accommodation and food service activities, real estate activities, arts and recreation, and in the Obalno-Kraška and Osrednjeslovenska regions[180]



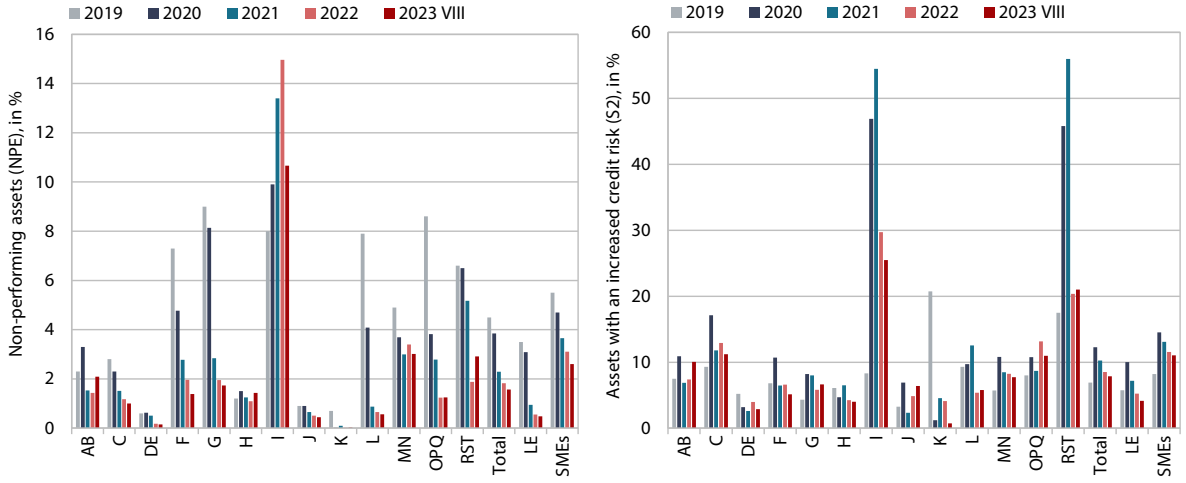
Source: AJPES (n. d.); calculations by IMAD. Notes: Other – A, B, part of K, O–Q, S and T; for the sake of clarity, activities D and E are combined, as both activities have small shares;[181] Obalna – Obalno-Kraška; Osrednja – Osrednjeslovenska; Primorska – Primorsko-Notranjska; Jugovzhodna S. – Jugovzhodna Slovenija.

[179] Compared to 2019, the share was higher among medium-sized enterprises, by activity in activities of holding and leasing companies, administrative and support service activities, accommodation and food service activities and electricity and gas supply, and by region in the Goriška, Koroška and Osrednjeslovenska regions.

[180] Compared to 2019, the share was higher among medium-sized enterprises, by activity in activities of holding and leasing companies, arts and recreation, and accommodation and food service activities, and by region in the Koroška, Posavska and Zasavska regions.

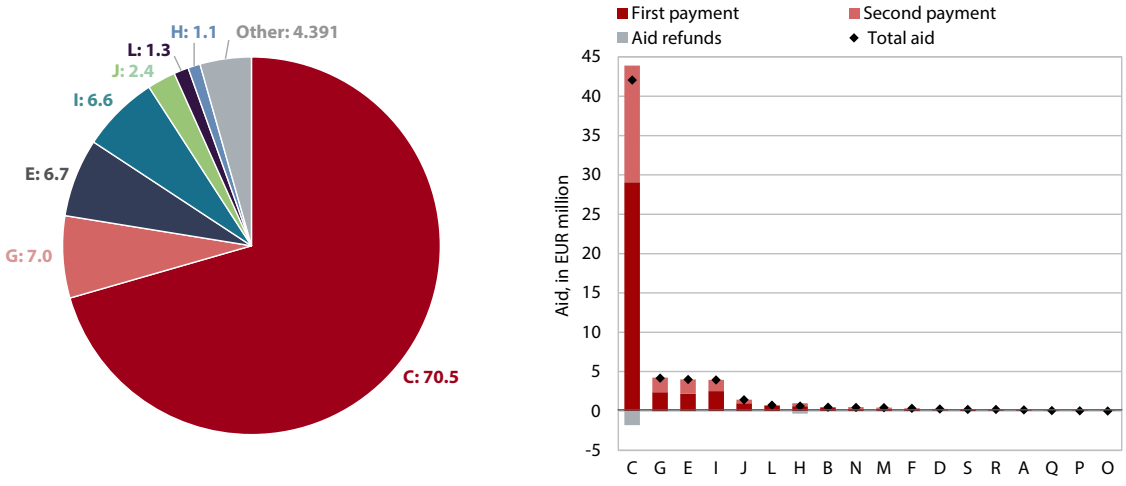
[181] Electricity and gas supply (2022: 11.6%, 2019: 11.6%, 2008: 16%) and public utilities (2022: 6.5%, 2019: 7.4%, 2008: 6.2%).

Figure 6: The share of non-performing assets and claims against companies with significantly increased risk have declined and are at a low level in 2023, but the accommodation and food service activities[182] and some other services[183] are still subject to increased risks



Source: BoS (2023b). Note: LE – large enterprises, SMEs – micro, small and medium-sized enterprises.

Figure 7: Almost two-thirds of the ZPGVCEP grants went to manufacturing activities,[184] while other activities received less than one-tenth of the grants



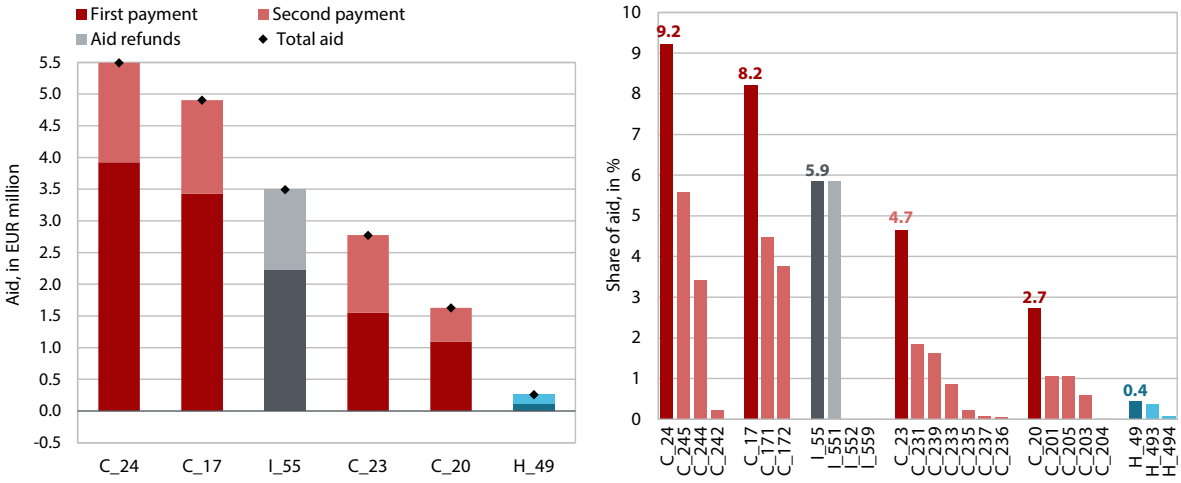
Source: SPIRIT Slovenija (2023c); calculations by IMAD. Notes: first payments (realised: 21 December 2022, for the period 6–9/2022): aid in the amount of EUR 40 million; second payments (realised: 15 March 2023, for the period 10–12/2022): about EUR 21.9 million; aid refunds: about EUR 2.3 million; Other: B, N, M, F, D, S, R, A, Q, P, O.

[182] Despite the improvement in the business of accommodation and food service companies, which is also reflected in a decrease in both shares in the first seven months of 2023 (NPE: by 4.3 p.p. to 10.7% and S2: by 4.2 p.p. to 25.5%), the shares in this activity remain the highest. Indebtedness and over-indebtedness are higher in accommodation (NACE Rev. 2: 55), where they account for a good two-thirds of total indebtedness and over-indebtedness. This activity also has a predominant share of enterprises and employees. Its contribution to value added was 45%.

[183] Compared to 2019, the share of NPEs is higher only in accommodation and food service activities and in transportation, while the share of S2 is also higher in culture and other activities, information and communication, education, health and public administration, agriculture, forestry, fishing, mining and quarrying, trade, professional, administrative and support service activities, and manufacturing.

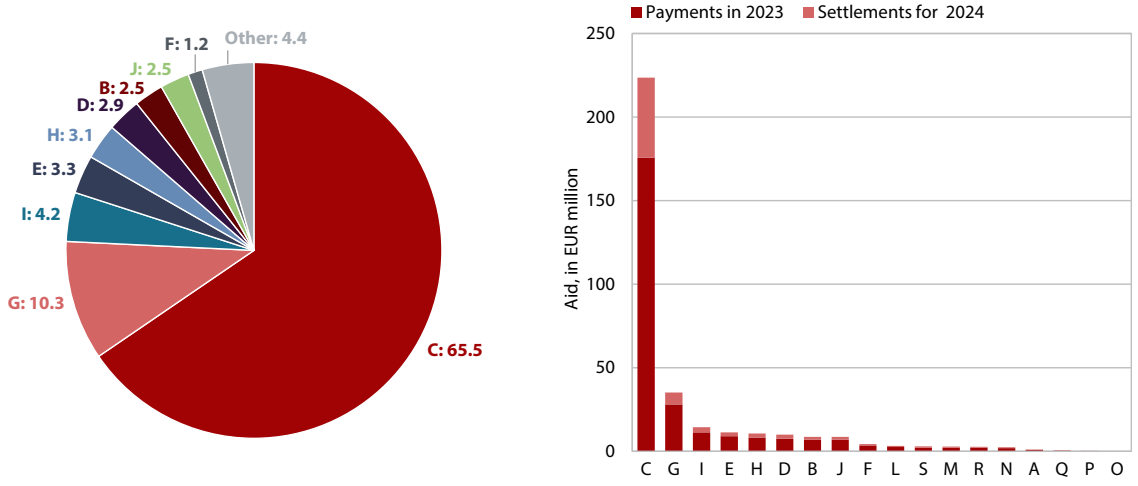
[184] In 2022, manufacturing companies received 29.9% (EUR 269.6 million; 20.8% in 2014–2019) of all subsidies to the corporate sector, which is nearly one-third more than in 2021.

Figure 8: Share and amount of aid to energy-intensive activities[185] based on the ZPGVCEP



Source: SPIRIT Slovenija (2023c); calculations by IMAD. Notes: first payments (realised: 21 December 2022, for the period 6–9/2022): aid in the amount of EUR 40 million; second payments (realised: 15 March 2023, for the period 10–12/2022): about EUR 21.9 million; aid refunds: about EUR 2.3 million; red shades – manufacturing; grey shades – accommodation and food service activities; blue shades – transportation and storage; C_17: Manufacture of paper and paper products; C_20: Manufacture of chemicals and chemical products; C_23: Manufacture of other non-metallic mineral products; C_24: Manufacture of basic metals; I_55: Accommodation; and H_49: Land transport and transport via pipelines.[186]

Figure 9: Almost two-thirds of the ZPGOPEK grants will go to manufacturing activities, one-tenth to trade, while other activities will receive less than 20% of the grants

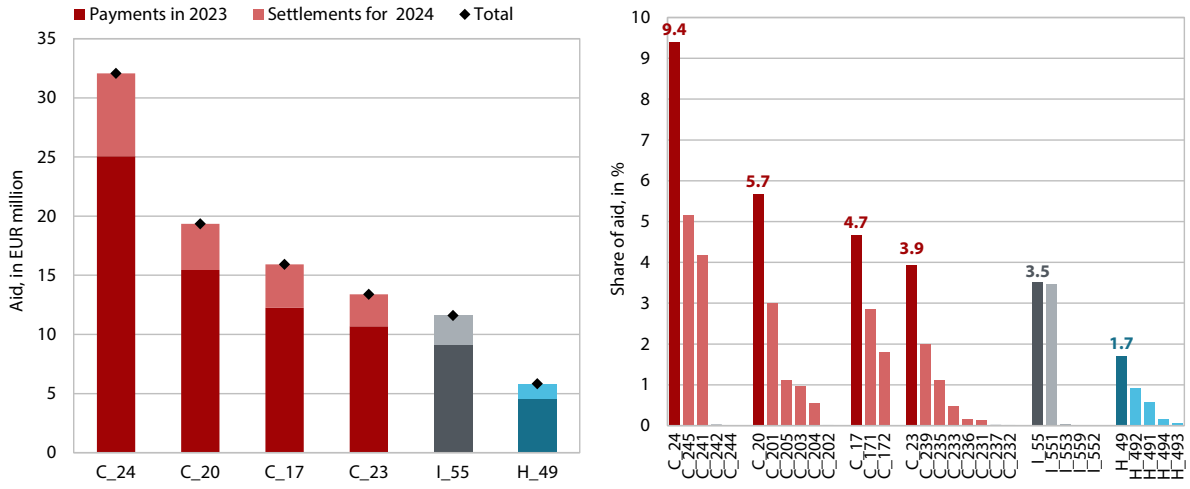


Source: SPIRIT Slovenija (2023b); calculations by IMAD. Notes: Estimated aid amounts (September 2023), as the correction procedure will run until 31 January 2024. Payments in 2023 (80% of each payment's aid amount; realised in the period 3–12/2022 (monthly)): aid of around EUR 268.4 million; settlements for 2024 (20% of the aid amount or the difference up to the total amount of aid; realised by the end of February 2024): around EUR 73.1 million; Other: L, S, M, R, N, A, Q, P, O.

[185] In 2022, energy intensive manufacturing activities received 7% (EUR 63.1 million; 2.3% in 2014–2019; the highest share went to the manufacture of basic metals and chemicals), accommodation 2.1% (EUR 18.5 million; 0.5% in 2014–2019) and land transport 25.5% (EUR 229.4 million; 30.6% in 2014–2019) of all subsidies to the corporate sector.

[186] C_171: Manufacture of pulp, paper and paperboard; C_172: Manufacture of articles of paper and paperboard; C_201: Manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics and synthetic rubber in primary forms; C_203: Manufacture of paints, varnishes and similar coatings, printing ink and mastics; C_204: Manufacture of soap and detergents, cleaning and polishing preparations, perfumes and toilet preparations; C_231: Manufacture of glass and glass products; C_233: Manufacture of refractory products; C_235: Manufacture of cement, lime and plaster; C_236: Manufacture of articles of concrete, cement and plaster; C_237: Cutting, shaping and finishing of stone; C_239: Manufacture of abrasive products and non-metallic mineral products n.e.c.; C_242: Manufacture of tubes, pipes, hollow profiles and related fittings, of steel; C_244: Manufacture of basic precious and other non-ferrous metals; C_245: Casting of metals; H_493: Other passenger land transport; H_494: Freight transport by road and removal services; I_551: Hotels and similar accommodation; I_552: Holiday and other short stay accommodation; and I_559: Other accommodation.

Figure 10: Share and amount of aid to energy-intensive activities based on the ZPGOPEK

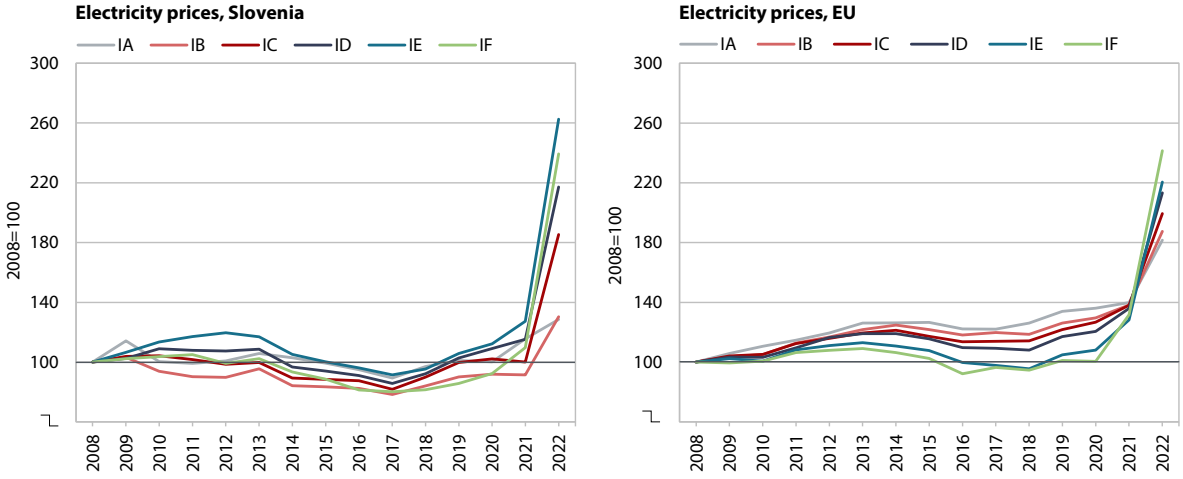


Source: SPIRIT Slovenija (2023b); calculations by IMAD. Notes: Estimated aid amounts (September 2023), as the correction procedure will run until 31 January 2024. Payments in 2023 (80% of each payment's aid amount; realised in the period 3–12/2022 (monthly)): aid of around EUR 268.4 million; settlements for 2024 (20% of the aid amount or the difference up to the total amount of aid; realised by the end of February 2024): around EUR 73.1 million; red shades – manufacturing; grey shades – accommodation and food service activities; blue shades – transportation and storage; C_17: Manufacture of paper and paper products; C_20: Manufacture of chemicals and chemical products; C_23: Manufacture of other non-metallic mineral products; C_24: Manufacture of basic metals; I_55: Accommodation; and H_49: Land transport and transport via pipelines.[187]

[187] See also note 186. C_202: Manufacture of pesticides and other agrochemical products; C_205: Manufacture of other chemical products; C_232: Manufacture of refractory products; C_241: Manufacture of basic iron and steel and of ferro-alloys; C_491: Passenger rail transport, interurban; C_492: Freight rail transport; and C_553: Camping grounds, recreational vehicle parks and trailer parks.

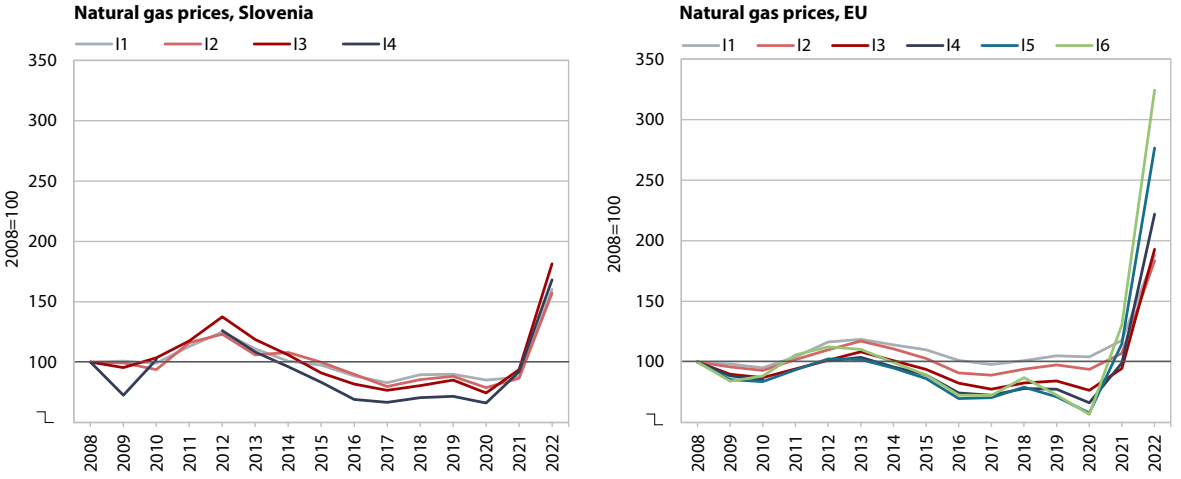
6.2 Detailed data on the impact of rising energy costs on the business performance of companies

Figure 1: Development of electricity prices by consumer type, Slovenia and EU average



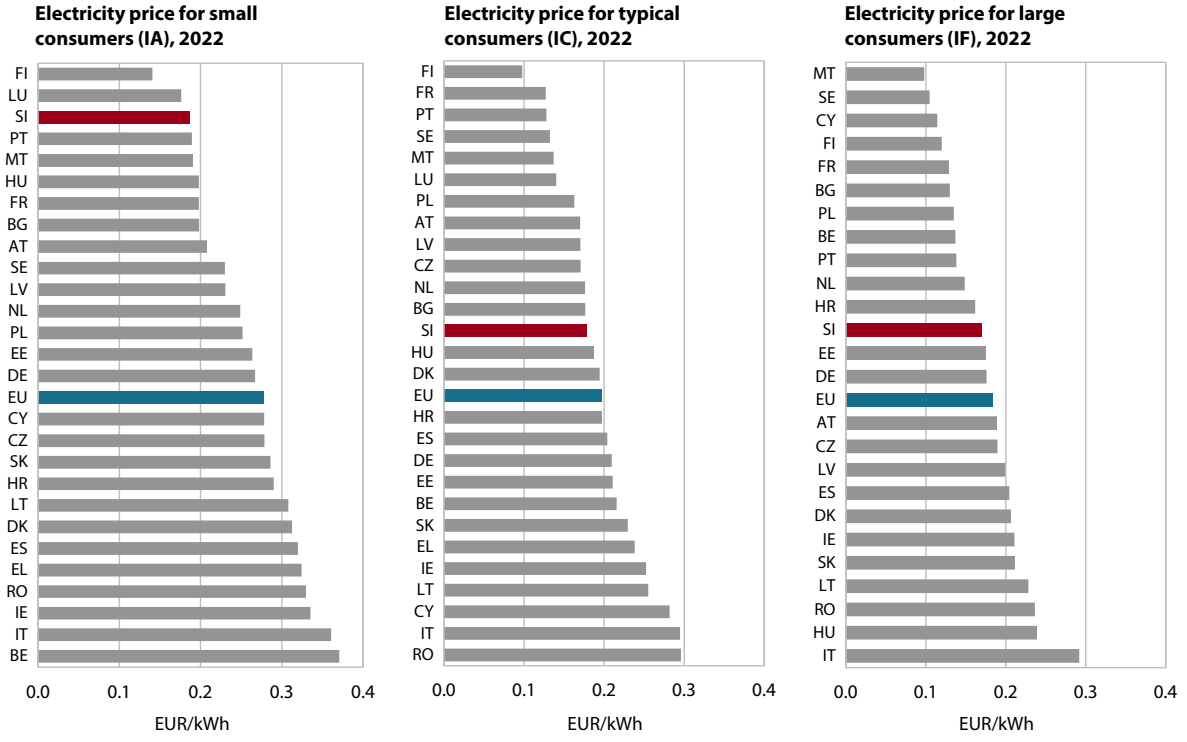
Source: Eurostat (2023); calculations by IMAD. Notes: Electricity consumption bands: IA: < 20 MWh; IB: 20 MWh–500 MWh; IC: 500 MWh–2,000 MWh; ID: 2,000 MWh–20,000 MWh; IE: 20,000 MWh–70,000 MWh; IF: 70,000 MWh–150,000 MWh; IG: > 150,000.

Figure 2: Development of natural gas prices by consumer type, Slovenia and EU average



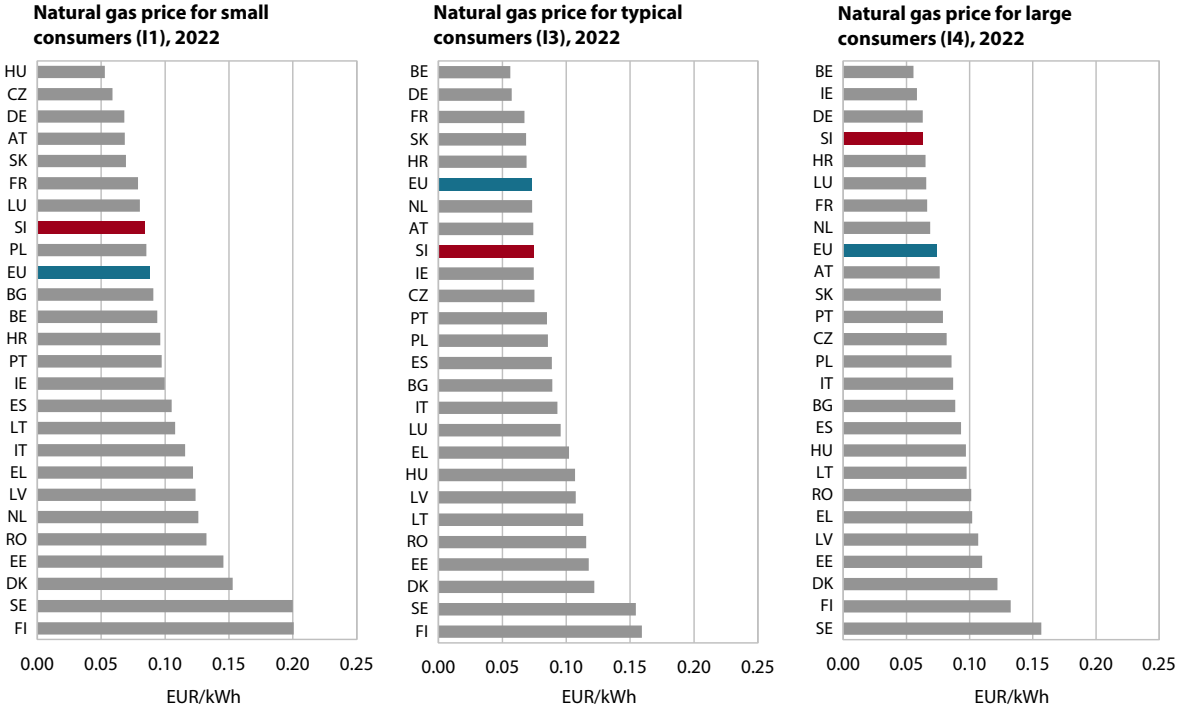
Source: Eurostat (2023); calculations by IMAD. Notes: Natural gas consumption bands: I1: < 1,000 GJ; I2: 1,000 GJ–10,000 GJ; I3: 10,000 GJ–100,000 GJ; I4: 100,000 GJ–1,000,000 GJ; I5: 1,000,000 GJ–4,000,000 GJ; I6: > 4,000,000 GJ.

Figure 3: Electricity price level (excluding VAT) by consumer type, Slovenia and EU Member States, 2022 average



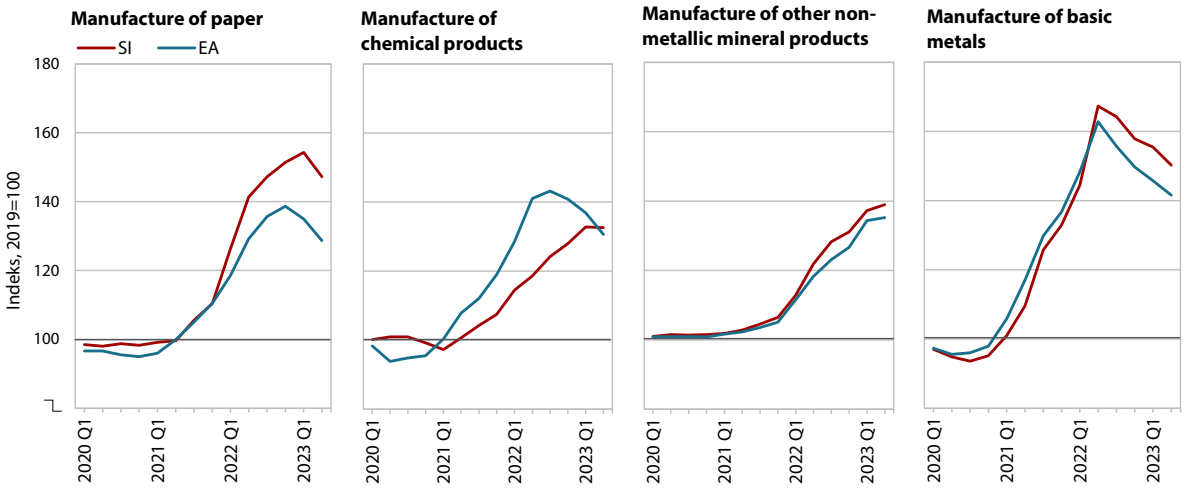
Source: Eurostat (2023); calculations by IMAD. Notes: Electricity consumption bands: IA: < 20 MWh; IC: 500 MWh–2,000 MWh; IF: 70,000 MWh–150,000 MWh; IG: > 150,000.

Figure 4: Natural gas price level (excluding VAT) by consumer type, Slovenia and EU Member States, 2022 average



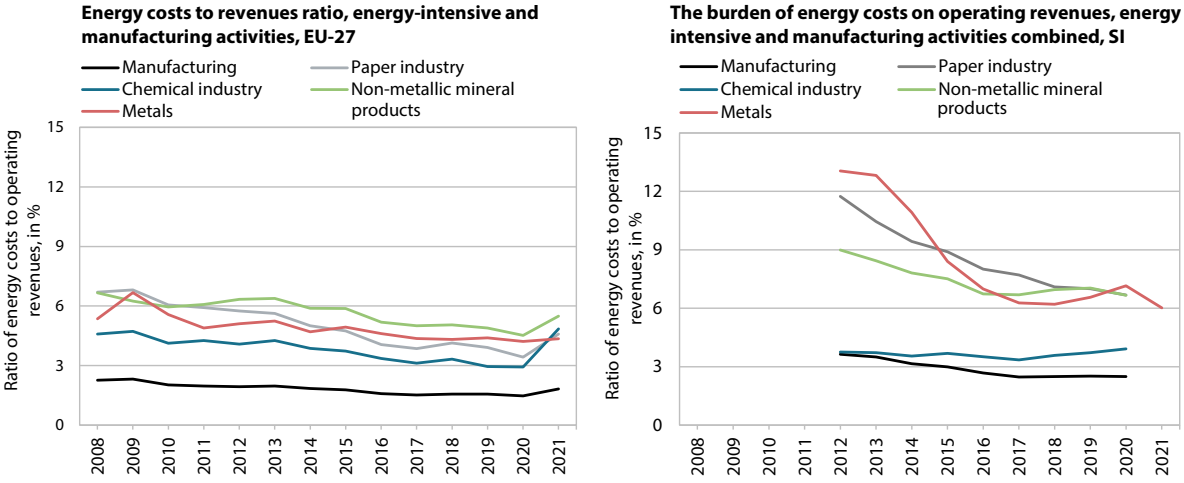
Source: Eurostat (2023); calculations by IMAD. Notes: Natural gas consumption bands: I1: < 1,000 GJ; I3: 10,000 GJ–100,000 GJ; I4: 100,000 GJ–1,000,000 GJ.

Figure 5: Industrial producer price index of energy-intensive manufacturing activities (total on the domestic and foreign market), Slovenia and euro area average



Source: Eurostat (2023).

Figure 6: The burden of energy costs on operating revenues in manufacturing and energy-intensive manufacturing activities, Slovenia and euro area average



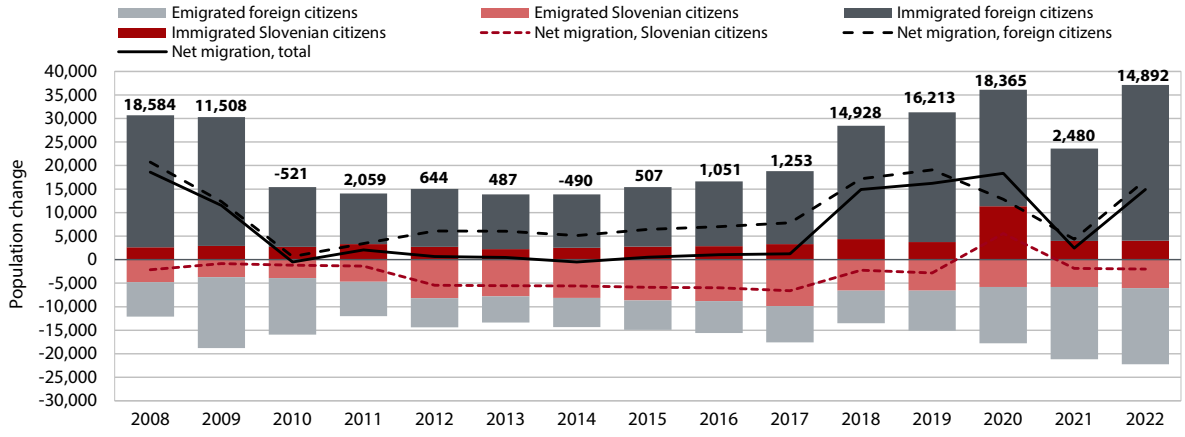
Source: Eurostat (2023); calculations by IMAD.

6.3 Appendices to Chapter 4, "Labour market: Yesterday, today, tomorrow"

6.3.1 Net migration in 2010–2022 in Slovenia

In recent years, net migration in Slovenia has been tightly linked to the economic cycle and demand for labour. For example, when economic activity in Slovenia strengthened in the period 2014–2019, net migration increased. In 2020[188] and 2021, actual net migration declined, mainly due to the COVID-19 crisis, but also due to increased uncertainty caused by geostrategic tensions. In 2022, net migration rose again to around 15,000 immigrants against the backdrop of increasing labour shortages, which, in addition to demographic trends and structural imbalances in the labour market, were also influenced by stronger demand in the context of rising economic activity. In recent years, employment growth has been increasingly supported by immigration (positive net migration) and by daily commuters, mainly from Croatia.

Figure 1: Net migration fluctuates with the economic cycle



Source: SURS (2023).

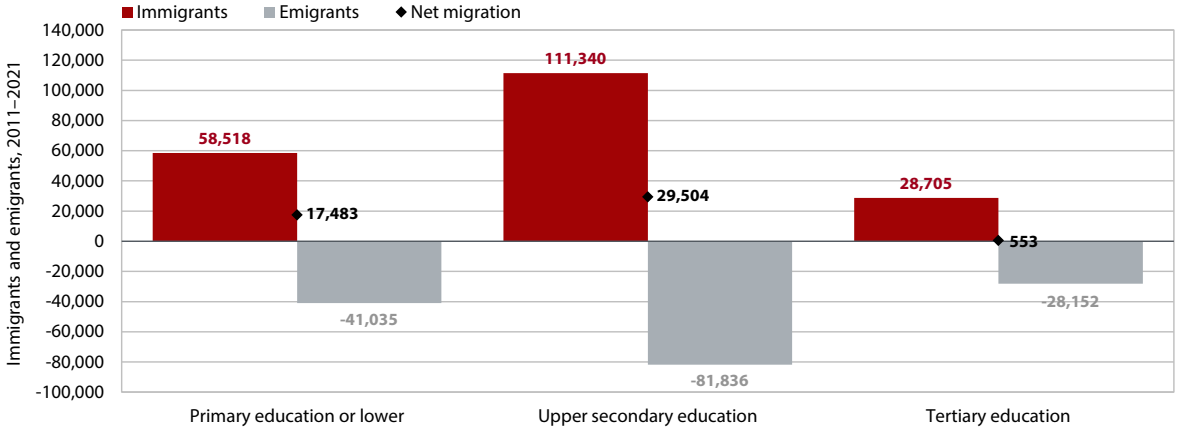
In terms of educational attainment, the highest net migration flows were observed among people with upper secondary education, while net migration flows were very low or even negative among people with tertiary education. In the period 2011–2021,[189] the largest group of immigrants to and emigrants from Slovenia (aged 15 years and older) were persons with upper secondary education (net migration in this period totalled 29,504). The net migration of people with primary education was 17,483, while the net migration of people with tertiary education was only slightly positive (553 people, with 2020 standing out as a year of positive growth, but without this year the net migration would be negative – by 2,545 people in the period 2011–2021).[190]

[188] The high number of immigrants (predominantly Slovenian citizens) in the third quarter of 2020 was mainly due to administrative changes in the population register in accordance with the Residence Registration Act (Official Gazette of the Republic of Slovenia, No. 52/16). Using different additional data sources, especially those that define a person's activity status and using which we assume that a person is actually present in Slovenia, SURS eventually included slightly less than 7,500 of these persons in the final population count (among them 97% Slovenian citizens and 3% foreigners). The majority of these residents most likely returned to Slovenia years or even decades ago but failed to register their return at the administrative unit for whatever reason (see Razpotnik et al., 2021, and Razpotnik, 2021).

[189] Data is available from 2011 onwards.

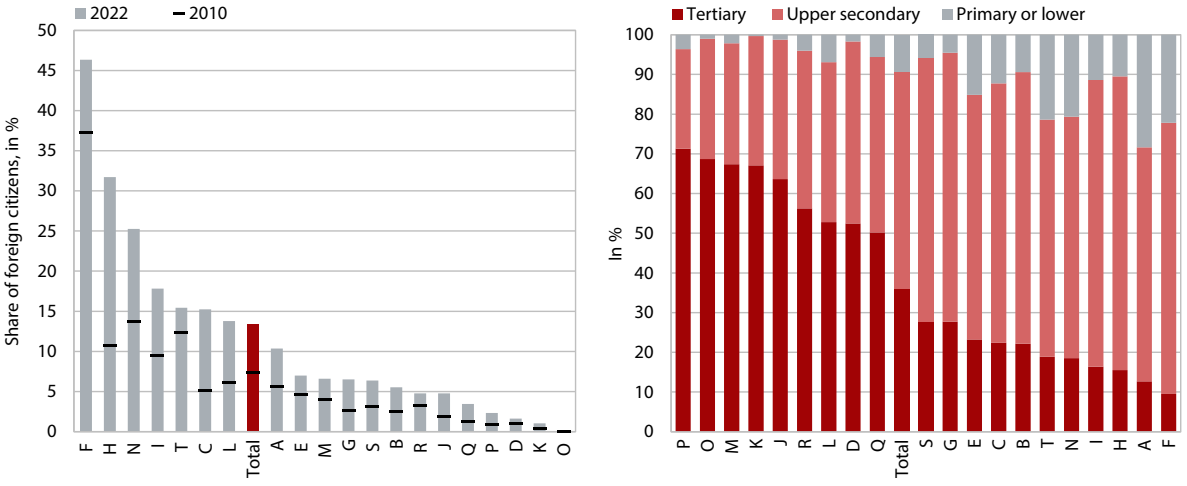
[190] This is due to the immigration of foreigners with tertiary education, as the net migration of Slovenian nationals with tertiary education was negative (-8,349 persons, or -10,368 persons if we exclude 2020, which was the only year with positive net migration of Slovenian nationals with tertiary education; see footnote 189).

Figure 2: In the period 2011–2021, the majority of immigrants were those without tertiary education



Source: SURS (2023). Note: Net migration = immigrants – emigrants. Immigrants and emigrants include both foreign and domestic immigrants and emigrants.

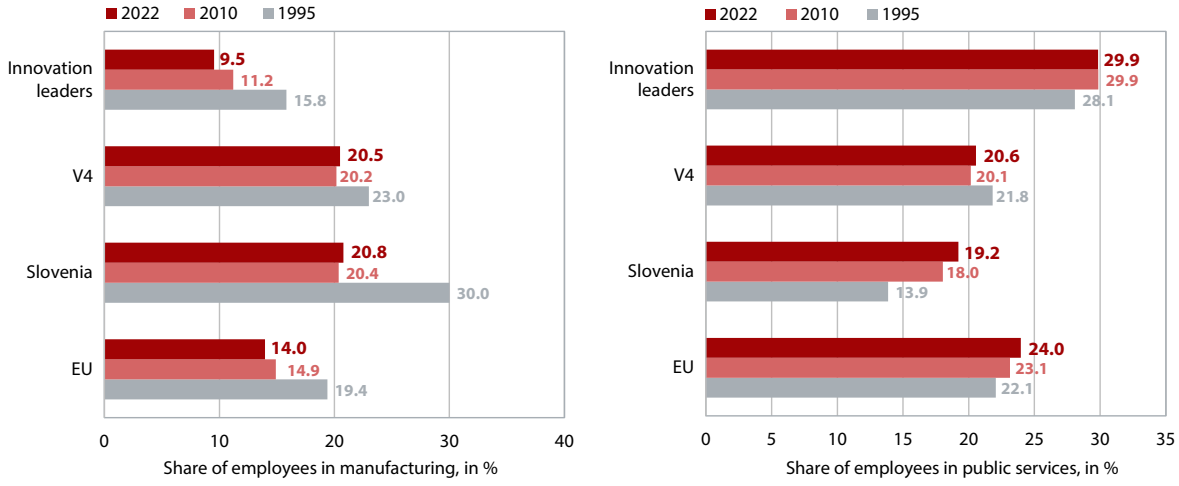
Figure 3: The share of foreigners in total employment increased in all activities between 2010 and 2022 (left); foreigners are more likely to be employed in activities that predominantly employ workers with low and upper secondary education (right)



Source: SURS (2023); calculations by IMAD. Note: Activities based on NACE classification: A – Agriculture, B – Mining and quarrying, C – Manufacturing, D – Electricity, gas, steam and air conditioning supply, E – Water supply, sewerage, waste management and remediation activities, F – Construction, G – Wholesale and retail trade, repair of motor vehicles and motorcycles, H – Transportation and storage, I – Accommodation and food service activities, J – Information and communication, K – Financial and insurance activities, L – Real estate activities, M – Professional, scientific and technical activities, N – Administrative and support service activities, O – Public administration, P – Education, Q – Human health and social work activities, R – Arts, entertainment and recreation, S – Other service activities, and T – Activities of households.

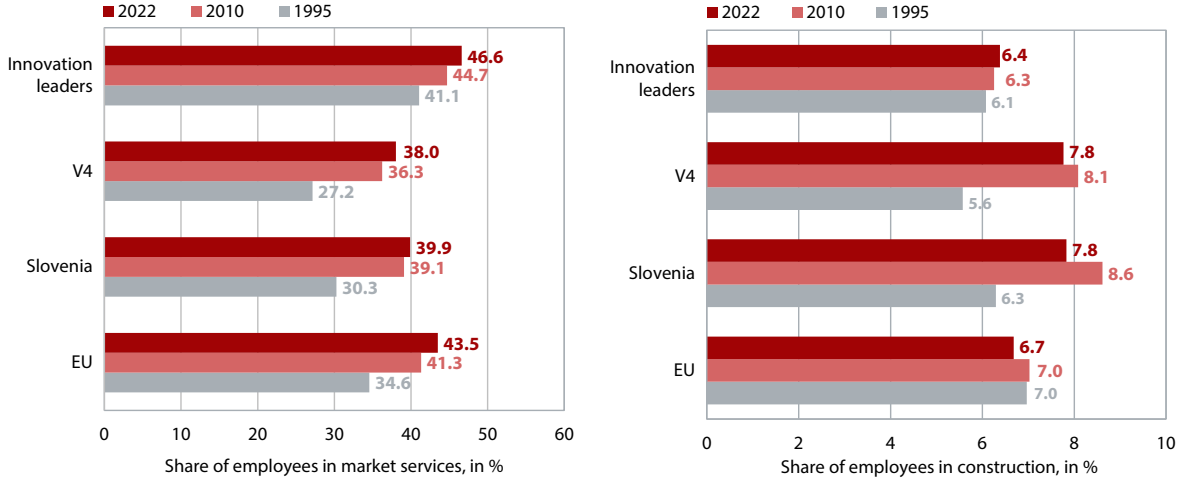
6.3.2 Comparison of employment structure

Figure 1: Slovenia has a much higher share of employees in manufacturing than the innovation leaders (left) and a much lower share in public services (right)



Source: Eurostat (2023); calculations by IMAD.

Figure 2: Slovenia has a lower share of employees in market services than the innovation leaders (left) and a higher share of employees in construction (right)



Source: Eurostat (2023); calculations by IMAD.

6.3.3 An econometric analysis of the impact of tertiary educated workers on firm productivity

The regression analysis estimates are based on the OECD researchers' analysis (Criscuolo et al., 2021). We used microdata from the combined database of the Statistical Register of Employment and the AJPES annual accounts. The data cover the period 2015–2019 and the estimation includes about 29 thousand observations or 8 thousand different companies with at least 10 employees. The analysis includes companies between the 1st and 99th percentile in terms of value added, productivity, EBITDA and debt. We have estimated two models derived, with minor modifications, from models adopted by the authors of the above analysis (equation 1). They enable an insight into the relationship between the company's productivity and the structure of the company's workforce. In both models, the dependent variable is the log of labour productivity ($\frac{DV}{L}$) in firm *i* and year *t*, and the explanatory variables are the share of highly educated employees ($HighEd_{it}$) (with its second power), the share of low-educated employees ($LowEd_{it}$) and their interaction, demographic-occupational variables such as the shares of highly demanding occupations ($Profes_{it}$) and less demanding occupations ($Elemen_{it}$) according to the NACE classification and their interaction, the share of female employees ($Gender_{it}$), the share of young employees aged 15–29 ($Young_{it}$), the share of older employees aged 55–64 (Old_{it}), the share of foreign employees ($Foreign_{it}$), the share of employees with fixed-term contracts ($FixTerm_{it}$) and the three size classes of companies according to ZGD-1 ($Size_{it}$). In Model 2, we include additional financial variables, such as the company's capital (Cap_{it}), earnings before interest, taxes, depreciation and amortisation ($EBITDA_{it}$) and the company's overindebtedness – assumes the value 1 if the financial debt is greater than five times the EBITDA or the EBITA is less than 0 ($Indebt_{it}$). In both models, fixed effects are added for the interaction between activity *j* (NACE Rev. 2 classification) and year (δ_{jt}). This allows a comparison of the relationship between educational attainment and productivity of firms of similar size, demographics and employment structure, in the same industry and in the same year. For both models, standard errors were clustered at the firm-level.

$$\log\left(\frac{DV}{L}\right)_{it} = \beta_1 High_{it} + \beta_2 Low_{it} + \beta_3 (High_{it})^2 + \beta_4 High_{it} * Low_{it} + \beta_5 Profes_{it} + \beta_6 Elemen_{it} + \beta_7 Profes_{it} * Elemen_{it} + \beta_8 Gender_{it} + \beta_9 Young_{it} + \beta_{10} Old_{it} + \beta_{11} Young_{it} * Old_{it} + \beta_{12} Foreign_{it} + \beta_{13} FixTerm_{it} + \beta_{14} FirmSize_{it} + \beta_{15} Cap_{it} + \beta_{15} EBITDA_{it} + \beta_{16} Indebt_{it} + \vartheta_{jt} + \epsilon_{ijt} \quad (1)$$

The estimates show that in both models the sign of the share of highly educated workers is positive, which means that a higher share of highly educated workers is positively related to the firm productivity. The share of low-educated workers has a negative sign and is negatively related to productivity. Both are statistically highly significant. In a situation of very low proportion of highly educated employees, its increase of 1 p.p. leads to an increase in productivity of 1.2% (the proportion variable ranges between 0 and 1). However, since the interaction term (squared) of the proportion of highly educated employees is negative, the positive effect of its increase decreases with higher proportion of highly educated employees. A negative sign for the interaction term of the proportion of the highly educated and the proportion of the low-educated indicates that there is no complementarity between the highly educated and the low-educated, but rather a complementarity with those with upper secondary education (omitted term).

When interpreting the relationship between productivity and educational attainment of employees, it should be borne in mind that the model estimates may show a certain bias due to omitted variables that were not included in the model.

One example could be firm capital, which may be higher in firms with a higher proportion of highly educated employees. As a result, the coefficient for the share of the latter would also reflect differences in the capital intensity of firms and not just the effect of an educated workforce. We have therefore included additional financial control variables in Model 2. The estimates in Model 2 are similar to those in Model 1, meaning that the inclusion of additional variables does not significantly change the conclusions drawn in Model 1.

Table 1: Regression analysis estimates

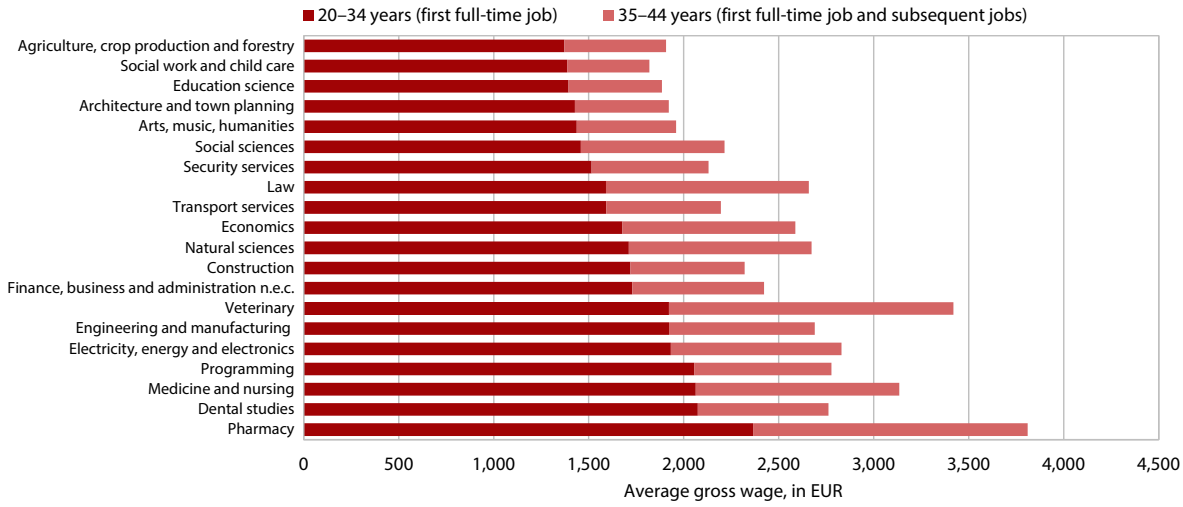
Variables	(1)	(2)
Share of highly educated	1.282117***	1.212016***
	(0.069746)	(0.0668369)
Share of low-educated	-0.1780256***	-0.1717553***
	(0.0303372)	(0.0288814)
Share of highly educated * share of low-educated	-0.5350467*	-0.4446127
	(0.3197275)	(0.3010324)
Share of highly educated * share of highly educated	-0.5152947***	-0.4988498***
	(0.0819135)	(0.0776882)
Control variables (occupational and age structure, share of women, share of foreigners, share of fixed-term work contracts)	yes	yes
Additional control variables (capital, EBITDA, over-indebtedness indicator)	no	yes
Fixed effects (year and activity by NACE classification)	yes	yes
R^2	0.4211	0.4875
No. of observations	29,672	29,672

Source: SURS (2023a), estimated by IMAD. Note: Standard errors are in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

6.3.4 Wages of graduates by field of study

An overview of the wages of employees in their first full-time job by field of study shows that wages are highest on average in fields such as pharmacy, medicine and related fields, programming and mathematics, and are also high in electrical engineering, nursing, finance, mechanical engineering and technology, etc. (see Figure 1). On the other hand, wages in the arts, humanities and social sciences are among the lowest. The average wage by field of study is influenced, among other things, by the profession and its complexity,[191] the economic sector, the demand on the labour market for certain profiles, and the individual skills and competencies of employees. Over the course of a career, an employee's wage may also increase as a result of pay rises, promotions or change of employment, with the relative differences being greatest in the highest-paid fields.

Figure 1: The average wages of graduates in their first job are the highest especially in medicine and related fields and in natural sciences and mathematics



Source: SURS (2023a); calculations by IMAD.

[191] It is common for graduates not to work in a job related to their field of study.

6.3.5 Detailed data based on the estimate of macroeconomic effects of net immigration to Slovenia

Table 1: Age and educational structure of net immigrants

			Educational structure of foreigners in Slovenia		
	Age group	Number	Low (21.7%)	Medium (61.9%)	High (16.4%)
Scenario 1	15–19	876	190	542	144
	20–24	1,889	410	1,169	310
	25–39	3,415	741	2,114	560
	40–54	1,691	367	1,047	277
	55–69	128	28	80	21
	Total	**8,000**	**1,736**	**4,952**	**1,312**

			Educational structure of foreigners in innovation leaders		
	Age group	Number	Low (29.5%)	Medium (27.5%)	High (43.0%)
Scenario 2	15–19	876	259	241	377
	20–24	1,889	557	519	812
	25–39	3,415	1,008	939	1,469
	40–54	1,691	499	465	727
	55–69	128	38	35	55
	Total	**8,000**	**2,360**	**2,200**	**3,440**

Source: Eurostat (2023); calculations by IMAD.

Table 2: Macroeconomic effects of net migration (Scenario 1)

Variable/year	2	3	4	5	10	20	30
GDP, in %	0.66	1.11	1.58	2.05	4.54	9.58	13.41
GDP per capita, in %	0.20	0.20	0.20	0.22	0.44	1.03	1.25
Population, in %	0.46	0.91	1.37	1.82	4.08	8.46	12.01
Employment (No. of workers), in %	0.52	1.09	1.67	2.27	5.27	10.83	14.54
Participation rate, 15–69 years, in p.p.	0.01	0.04	0.08	0.12	0.35	0.68	0.72

Source: Slovenian labour market model; calculations by IMAD. Note: The values in the table are expressed as deviations from the baseline scenario, in % or p.p.

Table 3: Macroeconomic effects of net migration (Scenario 2)

Variable/year	2	3	4	5	10	20	30
GDP, in %	0.82	1.36	1.93	2.52	5.57	11.56	15.86
GDP per capita, in %	0.36	0.45	0.56	0.68	1.43	2.85	3.43
Population, in %	0.46	0.91	1.37	1.82	4.08	8.46	12.01
Employment (No. of workers), in %	0.52	1.12	1.74	2.38	5.67	11.69	15.59
Participation rate, 15–69 years, in p.p.	0.00	0.04	0.09	0.15	0.51	1.04	1.14

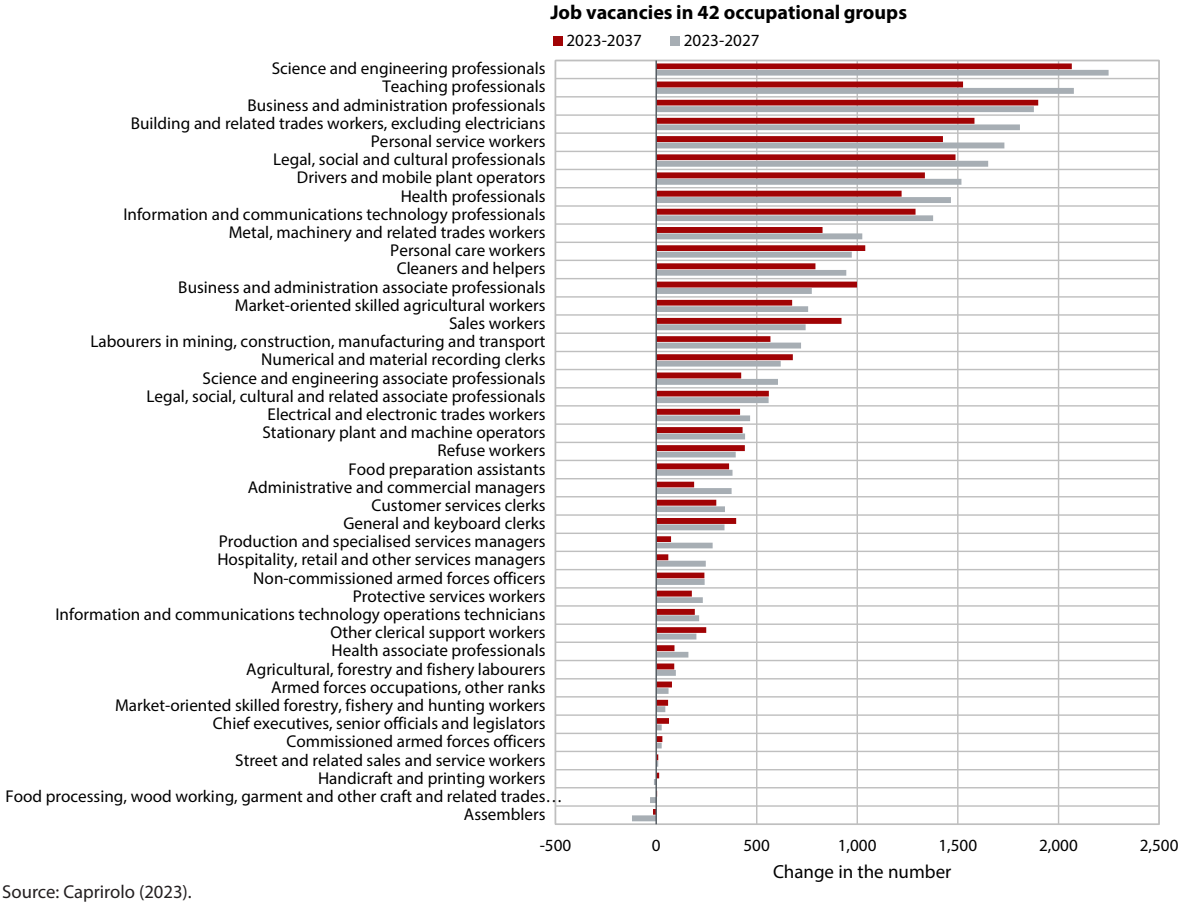
Source: Slovenian labour market model; calculations by IMAD. Note: The values in the table are expressed as deviations from the baseline scenario, in % or p.p.

6.3.6 The first results of the "labour market platform" for labour market forecasts

The Ministry of Labour, Family, Social Affairs and Equal Opportunities has published the first results of its "labour market platform", which aims to collect data on occupations and skills and produce short-, medium- and long-term forecasts. Its aim is to determine the need for human resources, formulate a migration policy and identify the training needs of the employed and the unemployed (Caprirolo, 2023).

According to previous medium-term forecasts of labour market needs, the growth of the working population is expected to continue in the period 2023–2027, but not in all sectors. In some activities, the number of employees is expected to fall (especially in manufacturing), while it will rise in several activities (especially in professional, scientific and technical activities (M) and in information and communication (J)).[192] Broken down by occupational group, occupation expected to have the highest number of job openings in the 2023–2037 projection period, i.e. in the long term, is professionals.[193] This is also the only occupational group where new jobs are expected to be created in addition to job openings due to replacement needs (retirements etc.), while employment in other occupations will only be of a replacement nature (due to retirements).

Figure 1: Modelling forecasts show a sharp increase in demand for professionals



Source: Caprirolo (2023).

[192] The strongest increase in the number of jobs in the period 2023–2027 is expected in professional, scientific and technical activities (M) (Caprirolo, 2023).

[193] The greatest demand for professionals in the period 2023–2027 is expected in the fields of science and engineering, business and administration, ICT, law, social sciences, culture, education, and health (Caprirolo, 2023).

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