GERMAN COUNCIL
of Economic Experts

STRUCTURAL CHANGE IN GERMANY: PRODUCTIVITY, REGIONAL ASPECTS AND THE LABOUR MARKET

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4

STRUCTURAL CHANGE IN GERMANY: PRODUCTIVITY, REGIONAL ASPECTS AND THE LABOUR MARKET

I. Introduction

II. Background: structural change and economic growth
1. Influence of structural change on potential growth
2. Structural change in Germany
3. Regional differences in the economic structure

III. Structural change: drivers and regional development
1. International trade
2. Automation, digitalisation & artificial intelligence
3. Decarbonisation
4. Demographic change

IV. Challenges for the regions and the labour market
1. Polarisation and skill mismatch
2. Characteristics of the regions – challenges for adaptation

V. Fields of action
1. Strengthening growth momentum in structural change
2. Moderating regional frictions of structural change through regional policy
3. Enable and facilitate structural change in the labour market

A differing opinion

Appendix

References

This is a translated version of the original German-language chapter "Strukturwandel in Deutschland: Produktivität, regionale Aspekte und Arbeitsmarkt", which is the sole authoritative text. Please cite the original German-language chapter if any reference is made to this text. This translation was generated using AI.

KEY MESSAGES

↘ Changes in international trade relations, decarbonisation, digitalisation, artificial intelligence (AI) and demographic change are accelerating structural change.

↘ In the future, also regions that have so far been successful with stable industry compositions will be affected by structural change, especially if they specialise in knowledge-intensive manufacturing.

↘ More efficient use of information and communication technologies (ICT) and AI can boost productivity. Attractive training measures and regional funding can improve future prospects, facilitate adaptation and thus also improve the societal acceptance of structural change.

EXECUTIVE SUMMARY

The term **structural change refers to** shifts of economic activity between sectors or regions. In recent decades, many developed economies have experienced a **continuous shift from the industrial to the service sector**. Structural change has been accompanied by a shift from economic sectors with higher productivity growth, such as manufacturing, to areas with lower productivity growth, particularly in parts of the service sector. This shift is slowing productivity growth and, as a result, weakening overall growth momentum.

In Germany, the manufacturing sector's share of gross value added has remained comparatively **stable** to date as a result of historical specialisation and locational advantages. However, structural change is likely to accelerate. Current drivers of structural change are changes in international trade relations, decarbonisation, digitalisation and AI, as well as demographic change.

Due to the heterogeneous spatial distribution of value creation and employment, the **impact of structural change varies from region to region**. Metropolitan areas and economically strong rural regions benefit from positive agglomeration effects. By contrast, disadvantaged regions are threatened by a decline in employment. Regions with a high degree of specialisation in individual sectors are especially vulnerable to unexpected contractionary shocks because they cannot switch quickly to alternatives. In addition to regions that have already been severely affected, **regions that have been economically successful with stable industry compositions up to now will also be affected by structural change in the future**, especially if their economic structure is focused on knowledge-intensive manufacturing. By contrast, regions with a high proportion of knowledge-intensive services will be less affected.

Structural change is is reshaping the landscape of occupations and areas of work, creating demand for new qualifications. **Suitable and attractive training measures** for those affected and support for mobility **can limit structural unemployment**. Economic policy can counteract the possible negative productivity effects of structural change by promoting technological progress, for example in the field of ICT and AI.

Regional adjustment frictions can be addressed by investing in infrastructure, research and development, as well as by **measures to promote regional economic development**. In this context, the aim should not be to prevent structural change. However, the societal acceptance of structural change depends crucially on whether it is possible not only to improve economic indicators, but also to create future prospects for regions that are particularly affected and disadvantaged.

I. INTRODUCTION

280. **Structural change** refers to the **shift in the shares of value creation and employment between economic sectors and regions**. Developments such as the energy crisis in the wake of the war in Ukraine, changes in geopolitical relations, decarbonisation, digitalisation and demographic change are currently accelerating structural change in Germany. For a long time, Germany has concentrated on medium-tech industries, whose global growth momentum is now lagging behind that of high-tech sectors. At the same time, Germany is experiencing below-average growth in innovative knowledge-intensive services compared to other countries. As a result, it has not been possible to develop a dynamic supply of business-related services. This will have different regional effects depending on the economic, social and demographic conditions in the regions (IAB, 2021; BBSR, 2024). Some regions, economic sectors and employees will benefit from structural change, while others will be adversely affected by it.

In this chapter, the German Council of Economic Experts discusses the **effects of different drivers** of structural change, ↘ ITEMS 315 FF. describes **the regionally heterogeneous adjustments** ↘ ITEMS 346 FF., and discusses **possible courses of action** for economic policy and companies ↘ ITEMS 347 FF. to **mitigate the frictions** arising from structural change and **stimulate growth**.

281. **Structural change** is **a normal economic process**. ↘ BACKGROUND INFO 10 ↘ BOX 19 Since the Industrial Revolution, **increasing prosperity** has been accompanied by a shift in the shares of value creation between economic sectors in almost all of today's developed economies (Vollrath, 2020). ↘ BOX 25 APPENDIX ↘ ITEMS 287 FF.

282. The impact of structural change on a country's macroeconomic development and prosperity depends on its drivers and the speed at which it takes place. A **structural change caused by shifts in demand with steadily increasing prosperity** must **be assessed differently** in terms of economic policy than a structural change **caused by external crises, changes in the competitive environment or technological innovations**. Furthermore, regional differences within a country can be considerable. While certain regions benefit from new economic developments and innovations, others can be negatively affected.

283. **Structural change has an impact on the growth rate of total factor productivity** and thus on economic growth. The reallocation of production factors between different economic sectors influences long-term growth, as the economic sectors differ in their levels and growth of productivity. For example, the value-added shares of economic sectors with rather low productivity growth have been increasing for decades, with the result that macroeconomic productivity is growing less quickly than in the past. ↘ ITEM 289

284. Structural change alters the demand for labour in the affected sectors of the economy. In the long term, companies and workers can adapt to the changed conditions. **However, if structural change** occurs very **quickly**, and labour supply

and demand **diverge regionally**, this can lead to considerable **adjustment frictions** for companies and employees, as well as to regional unemployment (Leach et al., 2021; Gagliardi et al., 2023). ↘ ITEMS 308 FF. In Germany, this was the case after the decline of the coal industry and after reunification. ↘ BOX 20

285. The current **structural change is leading** in particular **to shifts in the demand for labour in certain occupational profiles**. ↘ ITEMS 314 AND 320 While industrial manufacturing occupations are becoming less important, there is growing demand for service occupations (Boddin and Kroeger, 2022) and more highly qualified employees. ↘ ITEMS 311 F. AND 339 The better the existing qualification profiles match the required skills of the labour factor, or can be adapted by means of training and further education, the more efficiently structural change takes place (Adão et al., 2024). ↘ BOX 20

↘ BACKGROUND INFO 10

Definition: Structural change

Structural change refers to the change in the contributions of economic sectors to macroeconomic gross value added or their shares of employment. According to the broadest definition, structural change describes the shift in production and employment from the primary ↘ GLOSSARY via the secondary ↘ GLOSSARY to the tertiary ↘ GLOSSARY sector (Grimm, 2012; Herrendorf et al., 2014). This definition can be extended from a purely sectoral view to deeper and differently structured levels. For example, structural change can refer to the shift in value added between individual economic sectors within an economic sector or between individual regions.

286. The accelerated pace of structural change presents economic policy with the task of **stimulating growth while limiting social and regional adjustment frictions**. Growth-promoting conditions, investment in digital and physical infrastructure ↘ ITEMS 349 FF. and an effective skills strategy ↘ ITEMS 375 FF. can help increase long-term productivity growth. The focus should be on market-based processes and innovation, where possible coordinated at the EU level. Vertical industrial policy, on the other hand, should be limited to the temporary promotion of future-oriented activities, while structure-preserving measures should be avoided. Targeted regional support measures can help to reduce structural regional imbalances and strengthen the adaptability of the regions. ↘ ITEMS 363 FF. The societal acceptance of structural change depends crucially on whether it is possible not only to improve economic indicators, but also to create future prospects for particularly affected and disadvantaged regions. ↘ ITEMS 371 FF.

II. BACKGROUND: STRUCTURAL CHANGE AND ECONOMIC GROWTH

287. **Structural change** is closely linked **to economic development** (Herrendorf et al., 2014). As income rises, the proportion of income spent on services increases (Boppart, 2014). ↘ BOX 19 In addition to the currently weak investment and a declining growth rate of total factor productivity, this has **a dampening effect on economic growth**, as productivity growth in the manufacturing sector is generally higher than in the service sector (Draghi, 2024a; GCEE Annual Report 2019 items 140 ff.; GCEE Annual Report 2023 items 93 ff.; GCEE Annual Report 2024 items 91 ff.).

↘ BOX 19

Background: Structural change and economic growth

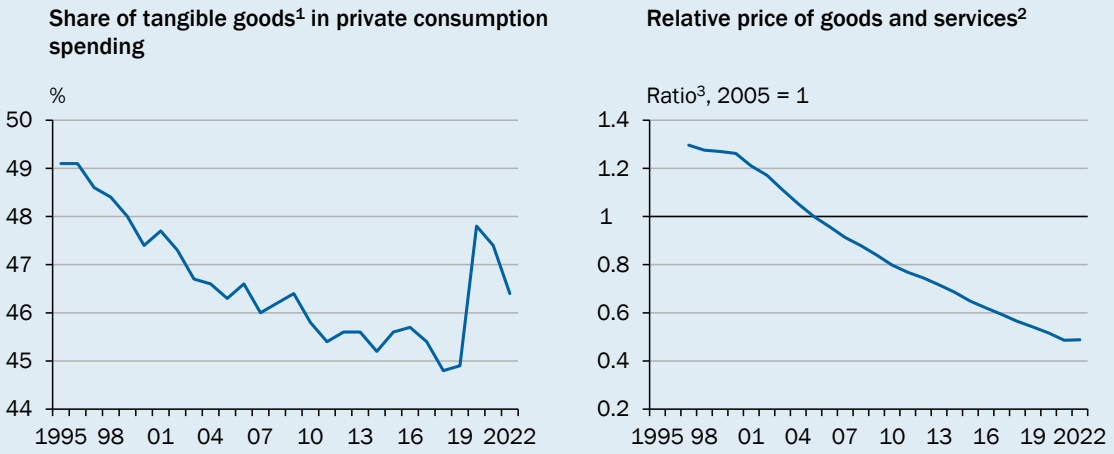
The composition of demand structure is altered as the economy grows. This can be attributed to **technology and preferences.** For example, sectoral differences in technological progress and productivity growth alter the **relative prices** of goods and services. Labour is especially difficult to substitute in the case of non-tradeable services, such as hairdressing (Baumol, 1967). As a result, the service sector typically exhibits lower productivity growth than the manufacturingsector. In Germany, average annual labourproductivity growth between 1970 and 2017 was 2.5 % in manufacturing, compared to 1.8 % in services. In western EU member states, this sectoral difference was much higher on average at 1.2 percentage points (Dürnecker and Sanchez-Martinez, 2023). Such **sectoral differences in productivity growth** generally lead to lower costs and therefore typically lower prices ofgoods relative to services. This effect is especially pronounced when strong productivity and wage growth in the manufacturing sector raise the general wage level, thereby inflating labor costs in the services sector, even though productivity in this sector is growing more slowly ('Baumol's cost disease'). In Germany, the price of goods relative to services has fallen by more than half since the end of the 1990s. ↘ CHART 45 RIGHT

If goods and services are **complementary**, goods consumption only increases slightly relative to the consumption of services despite the change in relative prices, such that the share of goods in consumer spending decreases. In Germany, this share fell by around four percentage points between 1995 and 2019. During the COVID-19 pandemic, it rose again temporarily. ↘ CHART 45 LEFT **Economic activity** (measured as gross value added or employment) thus generally shifts to **the sector with low productivity growth** (Ngai and Pissarides, 2007; Acemoglu and Guerrieri, 2008). ↘ BOX 26

The composition of private consumption spending may also change with **rising income** if consumers have non-homothetic **preferences.** ↘ GLOSSARY If the demand for goods tends to be income-inelastic and that for services tends to be elastic, **the share of services in private consumption increases** as income rises (Kongsamut et al., 2001; Foellmi and Zweimüller, 2008; Boppart, 2014).

The openness of the economy influences how changes in the composition of domestic demand affects its sectoralstructure. In a closed economy in which domestic supply and demand are equalfor every good, theeffects are particularly pronounced. In an **open economy**, in which manufactured goods can be exported and consumer goods imported, the sectoral structure also depends on the comparative advantage and the country's **specialisation.** ↘ ITEMS 316 FF.

↘ CHART 45
Composition of demand and relative prices



1 – Classification according to Boppart (2014). Material goods include the following uses according to the classification of uses of individual consumption (COICOP): Food and non-alcoholic beverages; Alcoholic beverages, tobacco and narcotics; Clothing and footwear; Electricity, gas and other fuels; Household goods and routine household maintenance; Medical products and equipment; Purchase of vehicles; Telephone and telefax equipment; Audiovisual, photographic and dataprocessing equipment including accessories; Other major durables for leisure and culture; Other recreational equipment, garden equipment and pets; Newspapers, books and stationery; Personal care; Personal effects. 2 – Classification according to Boppart (2014). For tangible goods, see footnote 1; services include the following uses according to COICOP: Residential rents; Regular maintenance and repair of the dwelling; Water supply and regular services related to the dwelling; Outpatient medical services; Hospital services; Operation of private transport equipment; Transport services; Post and telecommunications; Telephone and fax services; Recreational and cultural services; Package holidays; Education; Restaurants and hotels; Social protection; Insurance; Financial services; Other services. 3 – Ratio of chained Fisher price indices of goods and services.

Sources: Eurostat, own calculations

1. Influence of structural change on potential growth

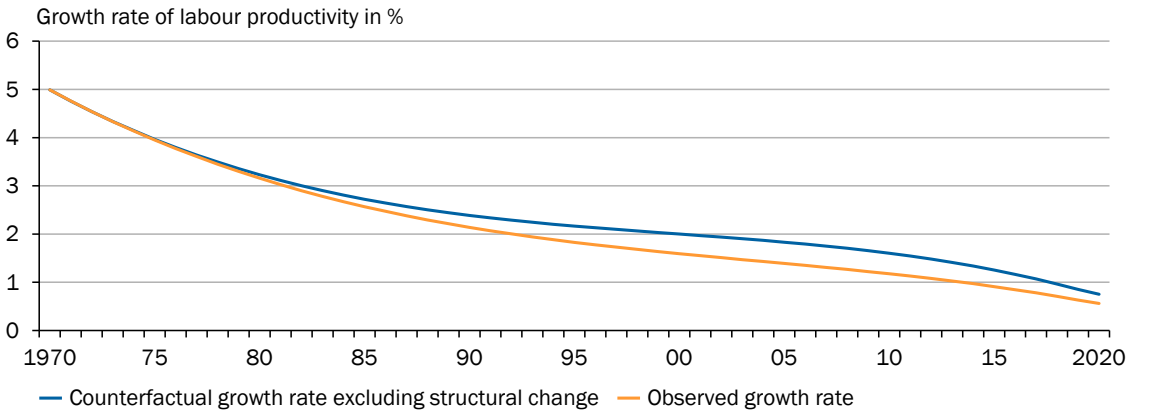
288. The structural change from the secondary to the tertiary sector slows down **the growth of potential output**, since the service sector has historically had lower productivity growth than the manufacturing sector (Ngai and Pissarides, 2007; Dürnecker et al., 2024). For example, Dürnecker and Sanchez-Martinez (2023) show that for European countries and the USA, (weighted) average productivity growth in the service sector was always lower than in manufacturing between 1970 and 2017. ↘ CHART 74 APPENDIX However, there are considerable differences within the service sector. The largest increases can be observed in transport, storage and communication, as well as in wholesale and retail trade. By contrast, growth in the largest service sector – business services – is low or even slightly negative (Dürnecker and Sanchez-Martinez, 2023).

289. A breakdown of productivity growth by the GCEE shows that, on average, 0.25 percentage points of the decline in labour productivity in Germany between 1970 and 2020 can be attributed to sectoral shifts in macroeconomic value-added. The sectoral value-added shares are kept constant, while labour productivity within

↘ CHART 46

Productivity growth in Germany

Contribution of structural change between the sectors



1 – Values smoothed using a polynomial.

Sources: Bontadini et al. (2023), EUKLEMS, own calculations

the sectors follows their actual development. This corresponds to a level difference of 11 %. ↘ CHART 46 ↘ BOX 26 APPENDIX In the USA, this effect has reduced productivity growth by 0.24 percentage points per year since the Second World War (Dürnecker et al., 2024) and in the EU by as much as 0.4 percentage points between 1970 and 2017 (Dürnecker and Sanchez-Martinez, 2023).

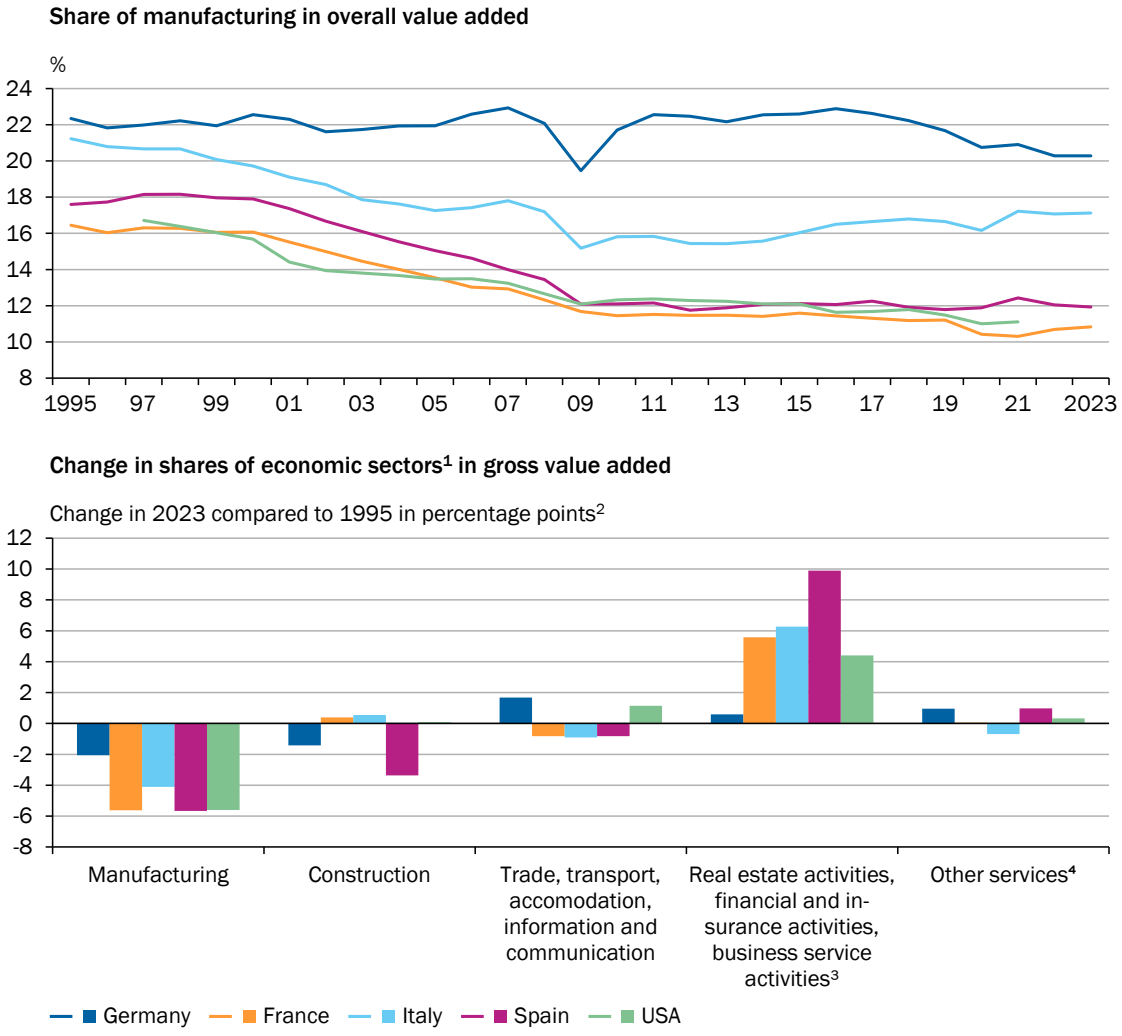
290. This **negative impact of structural change on potential growth** is expected to **continue**, because services that have experienced stagnating productivity growth to date, such as financial and business services, are likely to continue to gain in importance (Dürnecker and Sanchez-Martinez, 2023; Dürnecker et al., 2024). In the coming years, structural change could therefore reduce average productivity growth in Europe by a further 0.16 percentage points per year, in Germany by 0.15 percentage points. If productivity growth in the stagnating economic sectors of the service sector, especially business services, were to increase, for example through more effective use of AI, it would counteract this development (Dürnecker and Sanchez-Martinez, 2023). ↘ ITEM 322

291. **The extent to which productivity growth changes during structural change** depends very much on **how productively new technologies** are used in the service sector. Since the mid-1990s, productivity growth in the USA has been higher than in Germany and the eurozone (Lopez-Garcia and Szörfi, 2021; Bergeaud, 2024). One reason for this is likely to be the lower and less effective use of information and communication technologies (ICT) in Europe (van Ark et al., 2008; Gordon and Sayed, 2020). This gap is partly caused by limited resources and management skills (Bloom et al., 2012; Hsieh et al., 2019). In the USA, by contrast, investment in digital infrastructure and the reallocation of labour within and between industries has contributed to productivity growth (Dao and Platzer, 2024).

2. Structural change in Germany

292. Over the past three decades, **structural change in Germany has followed a different course than in many other developed economies**. While there was a shift among the shares of value added from the primary and secondary sectors to the tertiary sector up until the 1990s, the economic structure has hardly changed since then. At 20 %, the manufacturing sector's share of gross value added (GVA) remains high by international standards. ↘ ITEM 296

↘ CHART 47
An international comparison of structural change



1 – According to the Statistical Classification of Economic Aktivities in the European Community (NACE Rev. 2). 2 – For the USA: change in 2021 compared to 1997. 3 – Business service activities: professional, scientific and technical activities, administrative and support service activities. 4 – Public administration, defence, education, human health and social work activities, entertainment and recreation, other service activities, private households, extraterritorial organisations and bodies.

Sources: Eurostat, own calculations

Less structural change compared to other countries

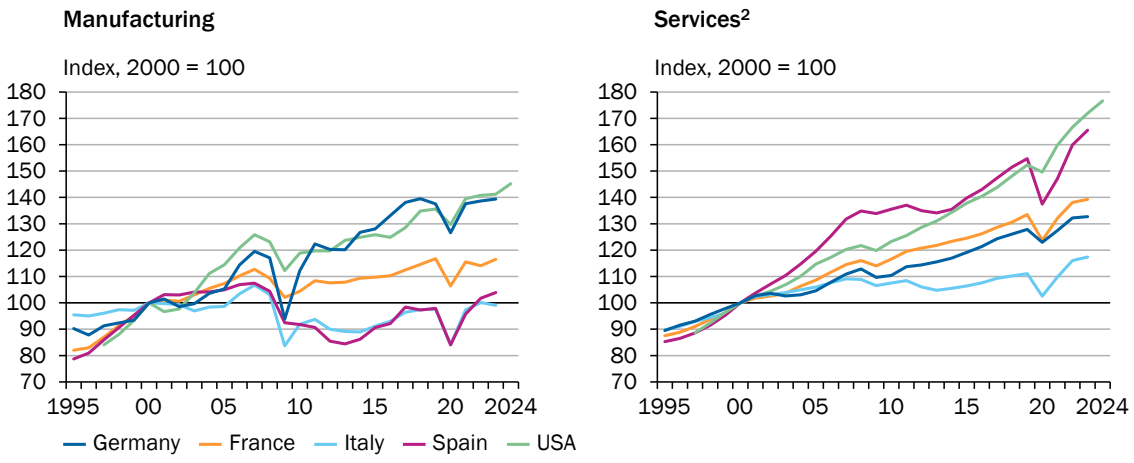
293. **Between 1995 and 2023, manufacturing's overall share of macroeconomic GVA fell on average in the EU**, as well as in the USA and the UK. ↘ CHART 47 TOP This decline was particularly pronounced up until the financial crisis of 2009. Since then, the manufacturing sector's share of GVA has stagnated at a lower level in the countries under review. **In Germany**, manufacturing's share of GVA initially fell only slightly and had almost returned to its pre-crisis level by 2016. Although it has been declining again since 2017, **in 2023** it was still significantly **higher** than in other countries **at around 20 %**. In 2021, the EU average was 16 %, while in the USA it was only 11 %. ↘ CHART 47 TOP

In this country comparison, however, **absolute GVA in the manufacturing sector is increasing** in most countries. Only in Spain and Italy has GVA in the manufacturing sector stagnated since the financial crisis. Real value added in the service sector is rising in all countries we consider. ↘ CHART 48

294. **A pronounced structural change cannot** be observed **within the sectors** in Germany over the past 30 years. **Although vehicle construction** has gained in importance in the manufacturing sector, the shifts in the share of value added are small. ↘ CHART 49 LEFT ↘ CHART 75 APPENDIX In services, the **share of public services** has risen slightly, but here, too, there have been no significant changes. ↘ CHART 49 RIGHT ↘ CHART 76 APPENDIX

295. **Knowledge-intensive service sectors** – such as the finance and insurance industry, real estate and business services – increased their shares of value-added in Spain, Italy, France and the USA between 1995 and 2023. The proportion of highly qualified employees is particularly high there. ↘ ITEM 311 By contrast, the

↘ CHART 48
International comparison[1] of gross value added



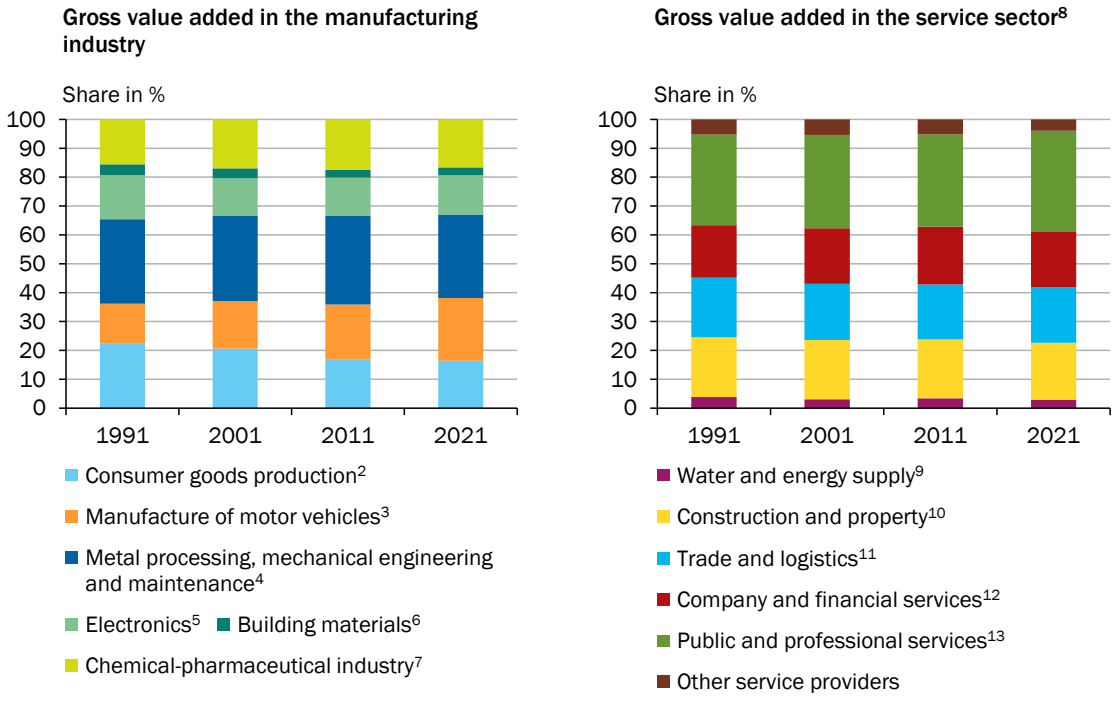
1 – According to the Statistical Classification of Economic Activities in the European Community (NACE Rev. 2) or for the USA according to BEA Industry and Commodity Codes. 2 – Comprises the economic sectors G to T or, for the USA, 42, 44RT, 48TW, 51 to 56, 61, 62, 71, 72, 81 and GLSG.

Sources: BEA, Eurostat, own calculations

share of low-skilled services such as trade, hospitality and tourism did not increase and even declined in some countries. In Germany, the value-added share of knowledge-intensive services also increased slightly, but to a much lesser extent. Low-skilled services remained at the same level as in 1995. ↘ CHART 47 BOTTOM

↘ CHART 49

Structural change in Germany within the economic sectors[1]



1 – According to the Classification Economic Activities, 2008 edition (WZ 2008). 2 – Manufacture (Manuf.) of food products, beverages and tobacco; Textiles and textile products; Manuf. of wood and cork products (except furniture); Manuf. of paper and paperboard; Manuf. of furniture and other articles; Manuf. of printed matter, reproduction of audio, video and data media. 3 – Manuf. of motor vehicles, trailers and semi-trailers; other transport equipment. 4 – Manuf. of basic metals, Manuf. of fabricated metal products, except machinery and equipment; Repair and installation of machinery and equipment. 5 – Manuf. of computer, electronic and optical products; Manuf. of electrical equipment. 6 – Manuf. of other non-metallic mineral products. 7 – Manuf. of coke and refined petroleum products; Manuf. of chemicals and chemical products; Manuf. of basic pharmaceutical products and pharmaceutical preparations; Manuf. of rubber and plastic products. 8 – In addition to the original service sectors, the economic sectors of energy supply, water supply and waste disposal as well as construction are also in the analysis. 9 – Electricity, gas, steam and air conditioning supply; Water supply; sewerage, waste management and remediation activities. 10 – Construction; Real estate activities. 11 – Wholesale and retail trade; repair of motor vehicles and motorcycles; Transportation and storage. 12 – Accommodation and food service activities; Information and communication; Financial and insurance activities; Administrative and support service activities. 13 – Professional, scientific and technical activities; Public administration and defence; compulsory social security; Education; Human health and social work activities.

Sources: Federal Statistical Office, own calculations

Path dependency of the economic structure due to high degree of specialisation in the manufacturing industry

296. The development in Germany can be attributed to several interlinked factors. First, Germany has **a strong industrial base** with many global market leaders in relatively small niches, high labour productivity and a **high level of innovation activity**, particularly in automotive manufacturing, mechanical engineering and the chemical industry. These industries have maintained their **international competitiveness** over decades **through a high level of research and development intensity** (Schwahn et al., 2018; Schiersch and Gulden, 2024). This has enabled them to continuously adapt to market changes without having to undergo far-reaching structural changes. Economic-policy measures aimed at maintaining the status quo and **a high level of employment stability** have slowed down structural change (ElFayoumi et al., 2018).

297. Germany's consistent **specialisation** has **created a strong path dependency**. The existing infrastructure, specialised human capital and established markets favour the further development of existing industries and make it difficult to enter new sectors, for example in high-tech sectors ↘ CHARTS 77 AND 78 APPENDIX such as ICT or biotechnology (Acemoglu, 2023). It is only with the challenges of decarbonisation, external crises and growing international competition for high-quality (capital) goods that the structural weaknesses of this path dependency are becoming apparent (Puls, 2024).

298. The **comparatively low profitability** of **high-tech sectors in Europe** relative to medium-tech industries like the automotive industry has also contributed to low economic dynamism. The relatively high profitability of high-tech in the USA compared to medium-tech industries is at least partly due to the skimming off of monopoly profits (Fuest et al., 2024). The high profitability of medium-tech industries in the EU explains why the incentives in Europe to expand high-tech industries have been lower by comparison (Fuest et al., 2024).

Despite Germany's high level of **research and development (R&D) expenditure**, this is largely limited to medium-tech sectors (Schiersch and Gulden, 2024), and **innovation activity is** often **focused on established technologies** (Acemoglu, 2023). This is reinforced by the market structures of high-tech sectors, which are often characterised by high barriers to market entry, e.g. due to technological barriers and network effects (Demary et al., 2024; Dietrich et al., 2024).

299. Between 2014 and 2023, **rising regulatory hurdles slowed the growth of innovative knowledge-intensive services** in Germany by international comparison (OECD, 2025a). In many professional fields that are relevant to multiple sectors – such as auditors, notaries, lawyers and business consultants – there are access restrictions, fixed scales of fees, and restrictive professional regulations in Germany (Bundesregierung, 1959, 1961a, 1961b, 2004, 2013). This hampers the dynamic development of business-related services. By contrast, countries such as the United Kingdom and the USA have more flexible regulations (OECD, 2025b).

High **regulatory hurdles for ICT and digital services** are also **problematic**. European and national regulations like the General Data Protection Regulation (GDPR) can create barriers to market entry and high compliance costs for start-ups and innovative established companies. Compared to the USA or China, but also to Europe, German companies are often subject to extensive bureaucratic requirements. ↘ BOX 11 **The manufacturing sector** is **also affected** by this, as modern industrial companies are dependent on efficient financing, logistics and technology services. ↘ ITEMS 301 F. OECD countries with less restrictive regulation in the services sector record higher value-added growth, productivity gains and export growth in industries that rely heavily on services (Barone and Cingano, 2011).

Trend towards tertiarisation in the manufacturing industry

300. There is a **trend towards tertiarisation** within the economic sectors. In the secondary sector in particular, the demand for service-oriented activities is increasing (Vandermerwe and Rada, 1988; Baines et al., 2009; Khanra et al., 2021; Lehmann et al., 2025). This makes it difficult to precisely allocate GVA and employees to the secondary and tertiary sectors. ↘ BACKGROUND INFO 11 Between 1995 and 2011**, services increased their share of value added in the field of industrial products in Europe** by ten percentage points, for example by providing additional services such as maintenance work or R&D (Stehrer et al., 2015; Crozet and Milet, 2017; Ludwig et al., 2011).

↘ BACKGROUND INFO 11

Classification of companies and GVA under services or goods production

Services provided within a manufacturing company, such as repair, assembly and contract-processing work, ↘ GLOSSARY but also internal business services such as accounting or R&D, are included under manufacturing value added if the company's focus is on industrial production. In this case, the company is recorded in the statistical business register as part of the manufacturing sector. If the same activities are purchased from external service companies, they are assigned to the service sector. It is therefore not always possible to clearly allocate the shares of gross value added to the service sector or to industrial production.

301. Furthermore, **German industry** is closely **interlinked with the service sector**. The share of composite value added ↘ GLOSSARY from industry's demand for services represents between 8.8 % and 11.5 % of total economic value added (Hüther et al., 2023). Yet these services do not replace industrial activity, but are complementary (Stehrer et al., 2015; Lehmann et al., 2025). Structural change leads to an increase in the contribution of services within industrial value chains (Stehrer et al., 2015). The interdependence of services and manufacturing is higher in Europe than in the USA or Japan (Nordwall et al., 2016; Lang and Lichtblau, 2021).

The **proportion of employees with service-related tasks** in manufacturing companies in Germany **increased** by 5 percentage points between 1975 and 2017

(Boddin and Kroeger, 2024), a trend that is also evident internationally (Dürnecker and Herrendorf, 2022). Across the two sectors of manufacturing and services, the number of people employed in service occupations increased by 56 % in this period, of which 27.8 percentage points can be attributed to structural change (i.e. different employment growth in the sectors) and 12.5 percentage points to tertiarisation (Boddin and Kroeger, 2024).

302. **The tertiarisation** of the manufacturing industry is also partly due to the **transformation of companies into service companies**. Bernard et al. (2017) show for Denmark that a significant part of the decline in employment in industry is not due to company closures or job cuts, but rather to companies switching to the service sector (reclassification). However, companies are not reclassified until the majority of value added is provided as a service, ↘ BACKGROUND INFO 11 so that there is not necessarily a significant loss of value added in manufacturing.

303. The increasing interdependence of the manufacturing and service sectors is accompanied by **growing wage inequality within companies**, which particularly affects low-paid employees (Boddin and Kroeger, 2022). Between 1994 and 2017, this trend accounts for around 7 % of the increase in wage inequality in the manufacturing sector, where the effects are particularly pronounced. For example, if service occupations within a company take up a share of employment that is one standard deviation higher, the wages of low-skilled employees fall by up to 11 %. By contrast, the wages of highly qualified production employees are only 3 % lower.

3. Regional differences in the economic structure

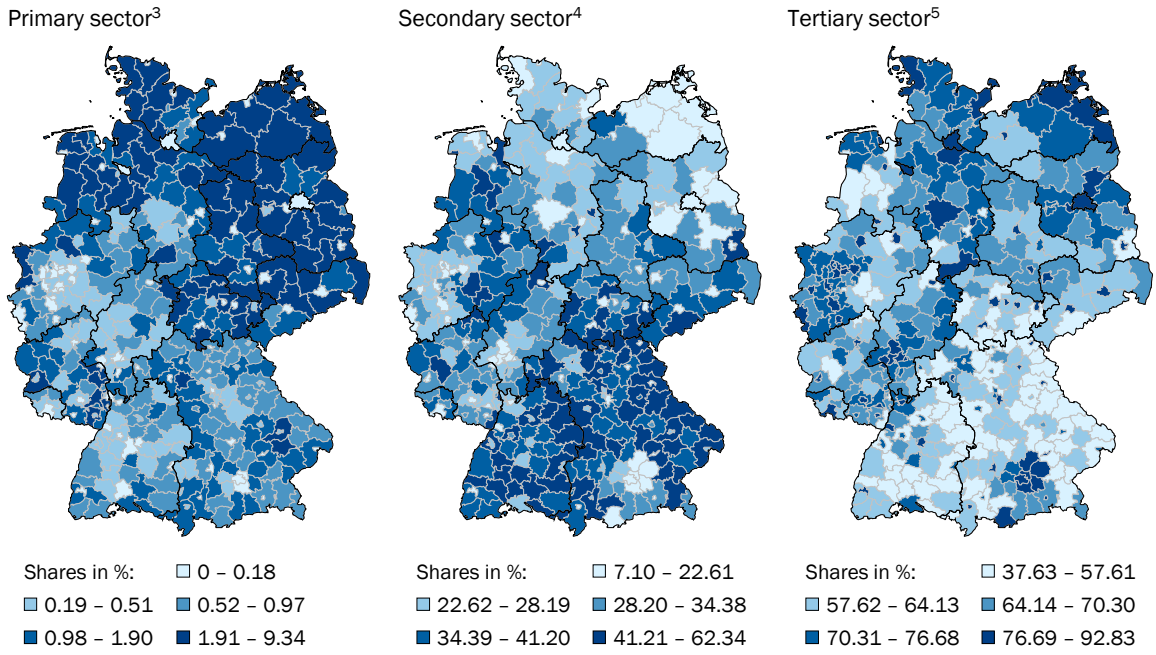
304. If a country's economic structure is **regionally heterogeneous**, it is to be expected that **structural change and its effects** will also vary from region to region. This applies in particular if individual sectors of the economy are regionally concentrated, so that structural changes in the demand for labour have different regional effects. For this reason, regional differences in economic structure and development are examined below.

305. In many countries, there are marked **differences in the economic growth of individual regions**. In Germany, regions such as the Rhine-Main area, Berlin and Munich have flourished in recent years (Ewald et al., 2024). A look at employment in the individual sectors clearly reveals the regional differences. The **primary sector** is still relatively important **in rural areas**, particularly in the north and east. ↘ CHART 50 TOP LEFT The **secondary sector** is strongly represented **in the southern and western industrial centres**, ↘ CHART 50 TOP MIDDLE while the **tertiary sector** is scattered nationwide, but has especially high employment shares **in urban areas** with a high population density. ↘ CHART 50 TOP RIGHT

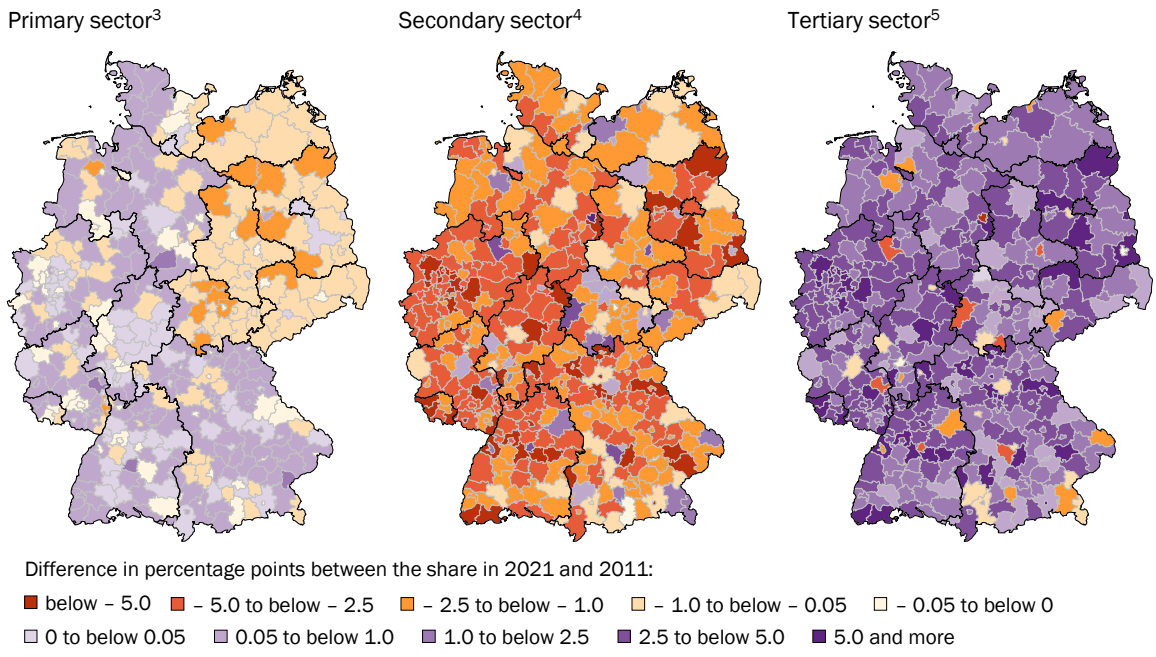
↘ CHART 50

Regional economic structure[1]

Quintiles of the share employees subject to social insurance contributions[2] in 2021



Change in the share of employees subject to social insurance contributions[2] between 2011 and 2021



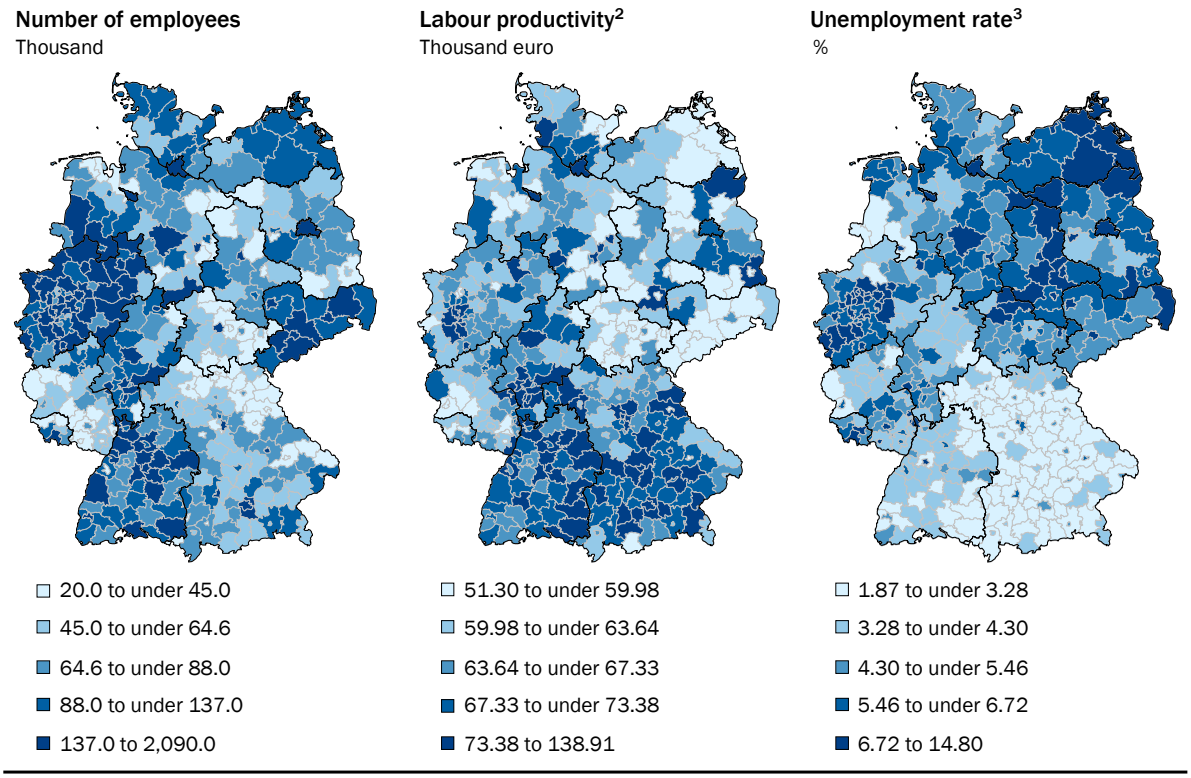
1 – Breakdown of economic sectors according to the Classification of Economic Activities, 2008 edition (WZ 2008). Own calculations or estimates for missing values for individual districts or independent cities in the primary and secondary sectors. 2 – Employees subject to social insurance contributions are blue-collar workers, white-collar workers and persons in vocational training who are subject to mandatory statutory pension, health and/or unemployment insurance schemes. Civil servants, self-employed persons, family members helping out or marginally employed persons are not included here. 3 – Agriculture, forestry and fishing. 4 – Manufacturing and construction industry. 5 – Services, other economic sectors.

Sources: BBSR (2024), Federal Agency for Cartography and Geodesy, own calculation

306. The **heterogeneous geographical distribution** of value creation and labour **results from the combination of agglomeration effects**, unequal levels of human-capital endowment and **historical development paths** (Redding and Rossi-Hansberg, 2017). Metropolitan areas benefit from positive external effects, for example due to good infrastructure and a high density of qualified workers. This favours the establishment of new companies in new economic sectors. Regions in close proximity to research institutions and universities are favourable locations for strongly innovation-driven industries with high levels of R&D expenditure, e.g. the pharmaceutical industry (EFI, 2024). ↘ ITEM 309 Regions that specialise in traditional industries benefit from networks and a specialised workforce. However, this can also create a lock-in effect if the companies in these industries are not very dynamic and the qualifications of the employees do not match the companies' future requirements (Redding et al., 2011). ↘ ITEMS 339 FF.

307. The **number of employees** is highest in the metropolitan areas. ↘ CHART 51 LEFT There is a south-north and west-east divide when it comes to **labour productivity**. Labour productivity is particularly high in Bavaria and Baden-Württemberg (automotive manufacturing, mechanical engineering and high-tech industries) and in major cities and metropolitan regions such as Frankfurt (financial sector), Hamburg (logistics) and Munich (technology and services). ↘ CHART 51 MIDDLE The highest **unemployment rates** are found in disadvantaged regions such as parts of Mecklenburg-Western Pomerania, Saxony-Anhalt and the northern Ruhr region. ↘ CHART 51 RIGHT

↘ CHART 51
Regional differences in economic indicators[1]



1 – Values for 2021, divided into quintiles for the individual indicators. 2 – Gross value added per employed person. 3 – Share of unemployed in the labour force.

Sources: BBSR (2024), Federal Agency for Cartography and Geodesy

308. The structural change between 2011 and 2021 is reflected in the changes in the rates of employment in the individual sectors. Rates of employment in the **primary sector** fell particularly in the eastern German regions. ↘ CHART 50 BOTTOM LEFT The **rate of employment in the secondary sector decreased** significantly in most regions, with the exception of some areas of southern Germany, for example. ↘ CHART 50 BOTTOM MIDDLE There is **a strong increase in the share of employment** across the board in the **tertiary sector**. Exceptions are regions in which the secondary sector is developing particularly strongly, such as Rostock or Gütersloh. ↘ CHART 50 BOTTOM RIGHT

Regional concentration in the secondary sector

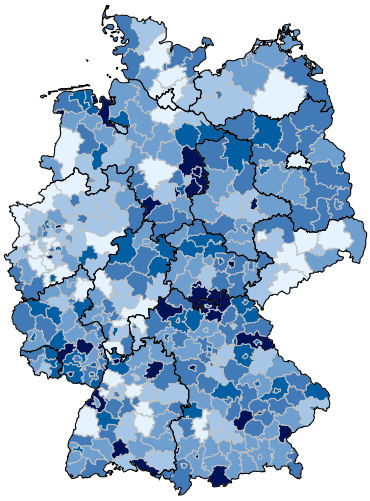
309. **The concentration of industry** is particularly high in southern Germany, especially in Bavaria. However, the regions with the highest industrial concentration are spread across many federal states, generally in western Germany. ↘ CHART 52 TOP LEFT Of the **four largest economic sectors in manufacturing**, ↘ ITEMS 296 FF. ↘ ITEM 317 measured in terms of gross value added, the automotive industry, the chemical industry and the pharmaceutical industry are concentrated in a few regions, while companies manufacturing electrical equipment are relatively evenly spread across Germany. ↘ CHART 52

Regions with a high concentration of individual economic sectors are less adaptable in the event of a rapid and supra-regional shock, such as rising energy prices, as there are **fewer alternative options for employees** in the particularly hard-hit sectors (Diamond and Simon, 1990; Kalemli-Özcan et al., 2003). A historical example of this is the structural change in the coal regions. ↘ BOX 20 This increases the risk of structural unemployment in the affected regions (Dörr et al., 2024). ↘ ITEM 306

↘ CHART 52

Regional economic structure: concentration and industrial clusters

Industrial concentration by district[1] in 2020

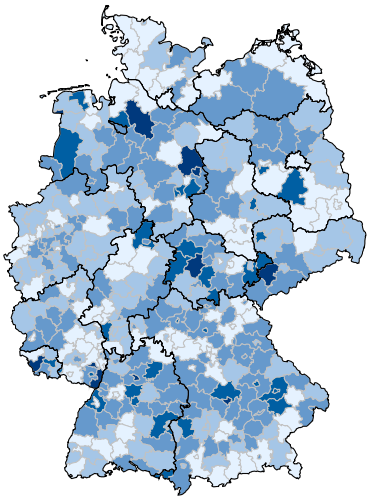


Herfindahl-Hirschman Index[1]:

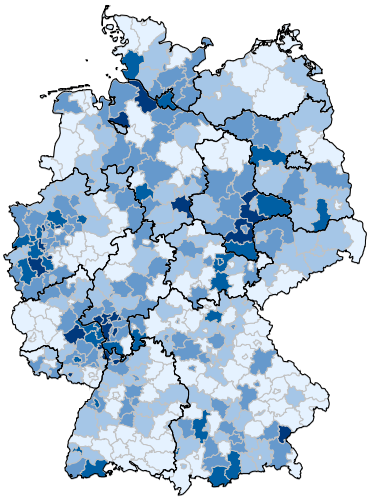
- least concentrated decile (157.20 to below 193.55)
- 10th to below 25th percentile (193.55 to below 222.65)
- 25th to below 50th percentile (222.65 to below 260.96)
- 50th to below 75th percentile (260.96 to below 307.96)
- 75th to below 90th percentile (307.96 to below 374.97)
- most concentrated decile (374.97 to 1,150.30)

Regional clusters of selected economic sectors[2] in 2023[3]

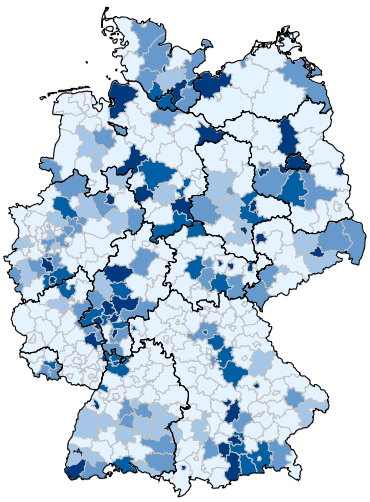
Manufacture of motor vehicles, trailers and semi-trailers



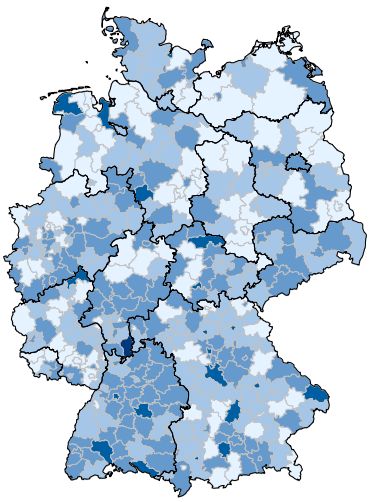
Manufacture of chemicals and chemical products



Manufacture of basic pharmaceutical products and pharmaceutical preparations



Manufacture of electrical equipment



Indicator for regional specialisation[4]:

- 0 to below 0.5
- 0.5 to below 1
- 1 to below 2
- 2 to below 3
- 3 and more

1 – The industrial concentration in Germany's administrative districts and independent cities is represented by the Herfindahl-Hirschman Index (HHI) of employees subject to social insurance contributions. The index measures the relative concentration of economic sectors within a district, with higher values indicating a greater concentration (it lies between 0 and 10,000). Rounded values in the legend for presentation purposes. 2 – According to the Classification of Economic Activities, 2008 edition (WZ 2008). 3 – As at 30 September 2023. 4 – Regional specialisation is shown as the ratio of the number of companies in the respective economic sector to the number of all manufacturing companies in a district to this proportion at national level.

Sources: Federal Agency for Cartography and Geodesy, Federal Employment Agency, Statistical Offices of the Federation and the Länder, own calculations

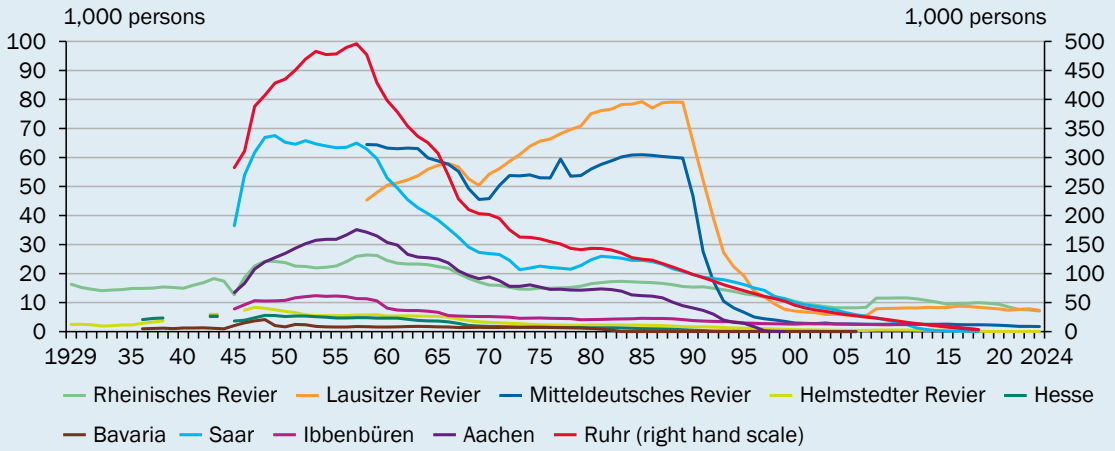
↘ BOX 20

Background: Structural change in the coal regions

Coal has been essential for Germany's energy supply ever since industrialisation. While hard coal from the Ruhr region dominated as an energy source in the Federal Republic, the GDR relied entirely on lignite. From the 1960s onwards, the importance of hard-coal production declined due to cheap imports (Henke, 2022), while lignite, which cannot be traded over long distances because its transportation costs are too high relative to its calorific value, did not peak until the 1980s. ↘ CHART 53 Structural change in the Ruhr region began in 1957 with the coal crisis and continues to this day (Farrenkopf, 2013; Röhl, 2019; Mai, 2022). After the 1980s, coal mining was only maintained by state subsidies (Röhl, 2019); in 2018 it was permanently discontinued. In the 1980s, the GDR produced around 30 % of the world's lignite (Henke, 2022). In 2023, lignite could still be produced without subsidies (BMWK, 2025a) and contributed 17.3 % to Germany's electricity generation (BNetzA, 2025).

↘ CHART 53

Employment in the coal industry fell rapidly[1]



1 – 2008 and 2016 are not comparable with the previous year due to restructuring of the companies.

Sources: Coal industry statistics, own calculations
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Mining and processing are highly concentrated regionally (Brachert et al., 2023). The lignite regions in eastern Germany experienced an initial phase of structural change after reunification between 1990 and 1995, during which there was a considerable reduction in employment (Gatzweiler and Heusgen, 1994). ↘ CHART 53 The planned coal phase-out by 2038 will lead to a new, far-reaching structural change that will significantly alter the employment structure (Brachert et al., 2023). This will affect the approximately 16,000 people still directly employed in the lignite sector and thousands more in related industries and service sectors (Frondel et al., 2018; Statistik der Kohlenwirtschaft, 2025). The German government's 'Structural Strengthening Act for Coal Regions' (StStG) aims to build a diversified and innovation-oriented economy by 2038 by investing in infrastructure, education, research and business relocation (Brachert et al., 2023). ↘ ITEM 370 ↘ BOX 27 APPENDIX

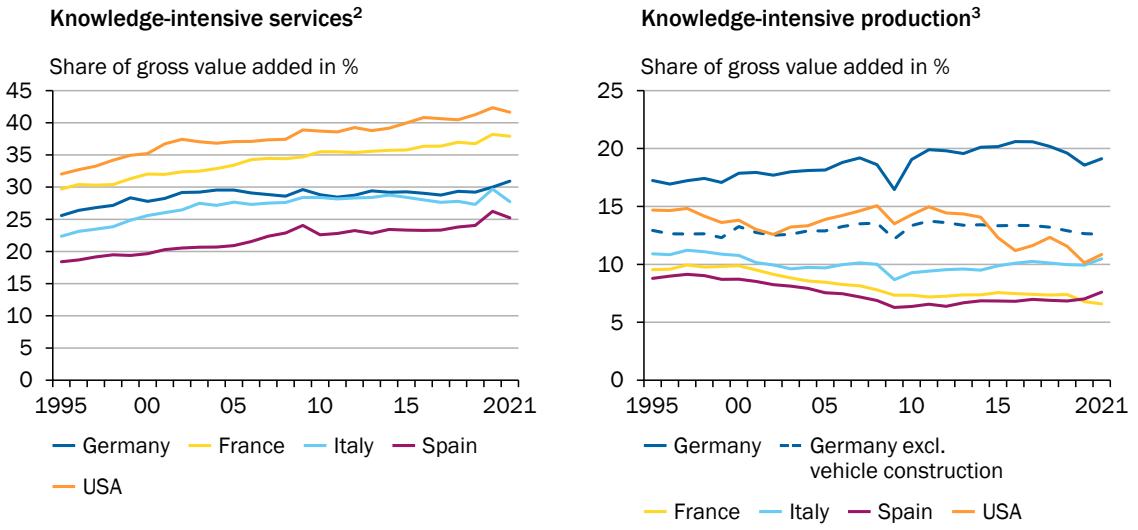
Importance of knowledge-intensive industries

310. The importance of **knowledge-intensive industries** increased between 1970 and 2023. ↘ ITEMS 295 AND 312 An economic sector is classified as knowledge-intensive if more than 33 % of employees have a tertiary education. ↘ CHART 77 APPENDIX In an international comparison, such economic sectors make up a relatively large share of the economy in Germany, mainly due to the considerable importance of **knowledge-intensive goods production** (in the automotive, pharmaceutical and chemical industries). ↘ CHART 54 RIGHT However, their international competitiveness has declined in recent years, particularly compared to countries outside the eurozone. ↘ ITEM 317

By contrast, the development of **knowledge-intensive services**, such as the financial and insurance sector or ICT, is **lagging behind that in other countries**. While the share of employment and value added in knowledge-intensive services rose continuously in all developed economies, the increase between 1995 and 2021 was particularly high in the USA, rising by 10 percentage points to a level of 42 %. In Germany, the share of value-added only rose by 5.5 percentage points during this period. ↘ CHART 54 LEFT

311. **Productivity in knowledge-intensive services** in Germany **fell** by 10 % between 2000 and 2020 (Schiersch and Gulden, 2023; Schiersch et al., 2025). ↘ ITEMS 296 FF. Business-related services accounted for a large proportion of this decline. Labour productivity in this sector fell by around 40 % between 1995 and 2015, mainly due to a higher input ratio with no change in employment (Kritikos et al., 2021) and a very low number of start-ups compared to other countries

↘ CHART 54
Value-added components of knowledge-intensive economic sectors[1]



1 – According to the Statistical Classification Economic Activities in the European Community (NACE Rev. 2). The shares of the respective economic sectors in all economic sectors except sections L, O, P, Q, T and U are shown. 2 – Information and communication, financial and insurance services as well as business services. 3 – Mining, manufacture of coke and refined petroleum products, chemical and pharmaceutical industry, manufacture of electrical and optical equipment, mechanical engineering and vehicle construction.

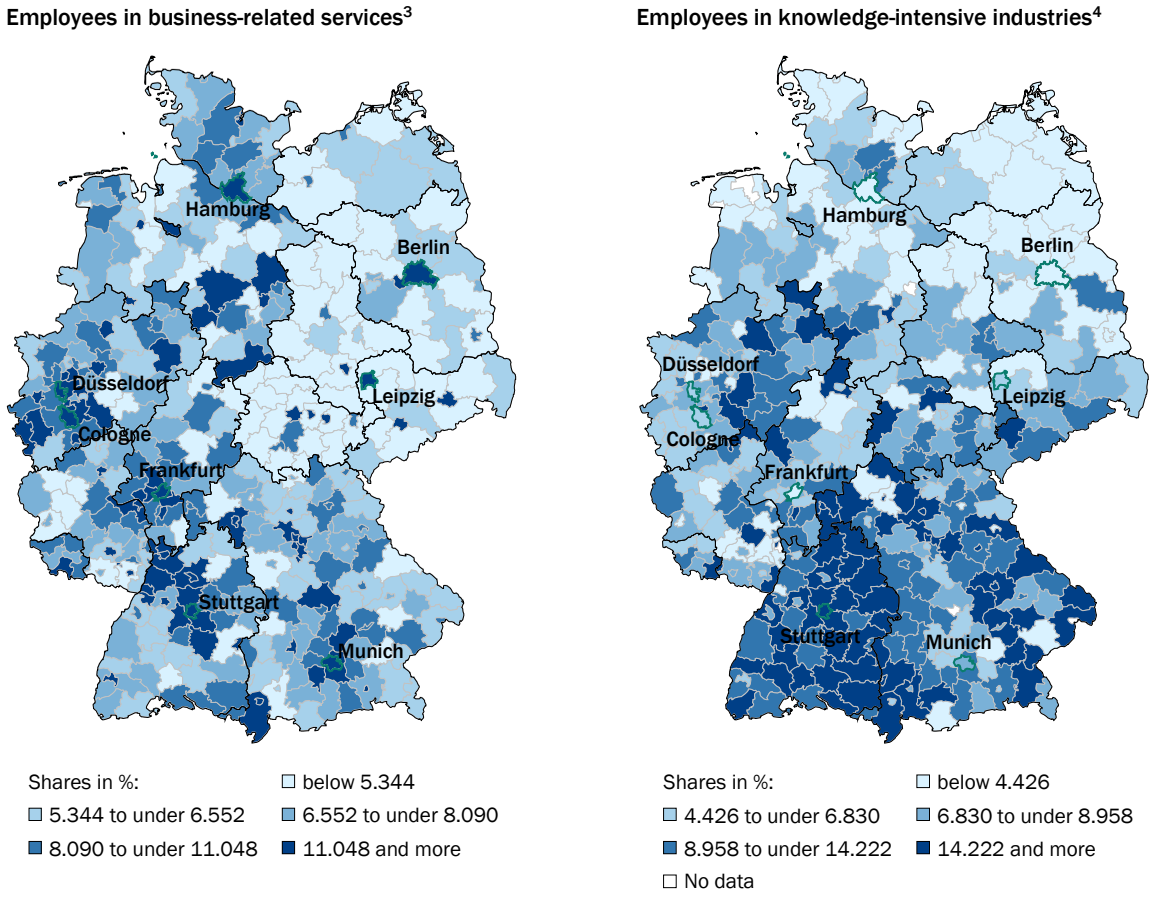
Sources: Bontadini et al. (2023), EUKLEMS, own calculations

(GCEE Annual Report 2019 items 181 ff.; GCEE Annual Report 2020 items 518 ff.; GCEE Annual Report 2021 items 406 ff.).

312. **Positive agglomeration externalities** such as dense labour markets, well-developed public services, transport infrastructure and knowledge spillovers **are particularly pronounced in cities** (Duranton and Puga, 2000). This makes cities attractive for companies and employees and favours the relocation of service companies (Eckert et al., 2022; Chen et al., 2023). The **importance of cities in the regional distribution of value creation** has grown in recent years (Glaeser, 2011; Moretti, 2012). Cities are growing faster than rural regions (Glaeser et al., 1992; Duranton and Puga, 2014; Gaubert, 2018; GCEE Annual Report 2024 items 326 ff.). Labour productivity is also higher in metropolitan areas, as more companies from the knowledge-intensive service sectors locate there (Martin et al., 2018). ↘ CHART 55 LEFT The production of knowledge-intensive goods is more widely distributed regionally, with the focus on south-western Germany. ↘ CHART 55 RIGHT

↘ CHART 55

Regional distribution[1] of employees in knowledge-intensive sectors[2] in 2022

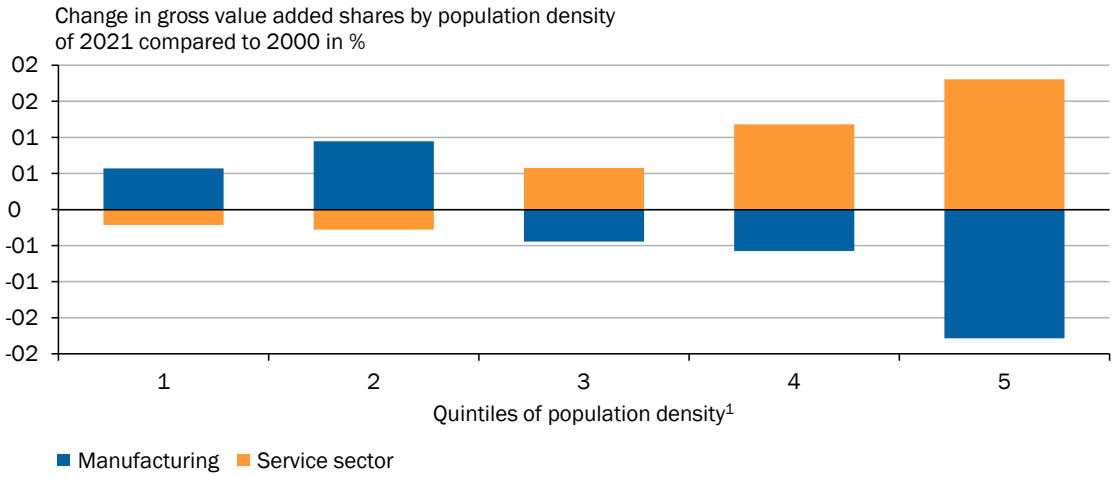


1 – Quintiles of the distribution. 2 – According to the Classification of Economic Activities, 2008 edition (WZ 2008). 3 – Share of employees subject to social insurance contributions at the place of work in knowledge-intensive business-related service sectors as a proportion of total employees subject to social insurance contributions. Knowledge-intensive business-related services are the following divisions: 62 – 64, 66, 69 –74; for details see chart 77 Appendix. 4 – Share of employees subject to social insurance contributions at the place of work in knowledge and research-intensive industries as a proportion of total employees subject to social insurance contributions. Knowledge- and research-intensive industries are the following departments: 20, 21, 26 –30; for details see chart 78 Appendix.

Sources: BBSR (2024), Federal Agency for Cartography and Geodesy

↘ CHART 56

Growth in the tertiary sector driven by the cities



1 – Population density as quintiles of total population per district. (The first quintile corresponds to the bottom 20 % of all districts ranked by population in 2000).

Sources: BBSR (2024), own calculations
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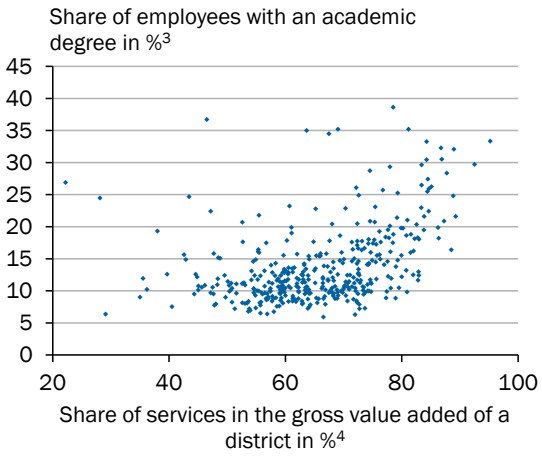
313. **Structural change has intensified the agglomeration trend towards urban areas** (Eckert et al., 2022; Chen et al., 2023), also in Germany. **The share of services** in macroeconomic value creation **is increasing, especially in metropolitan areas,** while the share of manufacturing is falling sharply there. In rural regions and smaller cities (1st and 2nd quintile of regions ranked by ascending population density), on the other hand, the share of industry continues to increase. ↘ CHART 56 The high level of complementarity between ICT and knowledge-intensive, tradeable services is causing the service sectors to grow faster in cities (Eckert et al., 2022). However, the productivity growth of companies in the service sectors with a growing share of GVA in Germany is markedly lower than in the USA. In some of these economic sectors, e.g. the financial sector, business services and education, it is negative (Dürnecker and Sanchez-Martinez, 2023; Schiersch and Gulden, 2023; Bergeaud, 2024). In the USA, digitalisation has driven labour productivity in the digital sector almost twice as strongly as in Germany or even France (Falck et al., 2024).

314. The increase in the value-added share of services in metropolitan areas leads to an increased **spatial segregation of the workforce according to qualification level**. Highly qualified workers benefit from the concentration of knowledge-intensive services in large cities, which offer access to specialised jobs and network effects. ↘ CHART 57 LEFT This is reflected in a disproportionately high share of employees with a university degree in these regions. ↘ CHART 57 RIGHT Low-skilled workers, on the other hand, are more likely to remain in peripheral or less diversified regions. Rising living costs in metropolitan areas reinforce this segregation (Diamond and Gaubert, 2022). In addition to the polarisation of the labour market, ↘ ITEM 339 this development means that the demand for lower-skilled workers in metropolitan areas is more difficult to meet. ↘ ITEMS 322 FF.

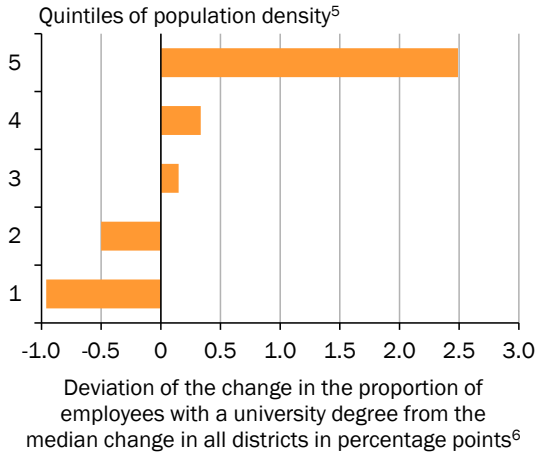
↘ CHART 57

More university graduates[1] in metropolitan areas and regions[2] with a high proportion of services

Strong positive correlation between the share of services and share of employees with a university degree in a district



Share of employees with a university degree is increasing, especially in urban centres



1 – Employees subject to social insurance contributions at the place of work with an academic degree. 2 – By districts and independent cities. 3 – As at 30 June 2021. 4 – In 2021. 5 – Population density as a quintile of the number of inhabitants per square metre per district. The 1st quintile corresponds to the bottom 20 % of all districts and independent cities ranked by population density as at 31 December 2012. 6 – Absolute change in 2021 compared to 2012. Median of the quintiles.

Sources: BBSR (2024), own calculations

III. STRUCTURAL CHANGE: DRIVERS AND REGIONAL DEVELOPMENT

315. Due to the **regional differences in economic structures** described above, the **degree** to which individual regions are affected by **structural change varies** depending on which economic sectors are affected by individual drivers. The four currently dominant trends and their effects are discussed below (cf. Dörr et al., 2024).

1. International trade

316. **International trade has been an important driver of structural change in recent decades**. As globalisation has progressed, the international division of labour has increased. In the past, the specialisation of countries was especially pronounced within the manufacturing sector. German companies focused on technologically high-quality and capital-intensive products such as automobiles and mechanical engineering. ↘ BOX 21 ↘ ITEMS 296 FF. Labour-intensive products such as textiles, consumer goods and electronics, on the other hand, were increasingly sourced from countries with lower labour costs in Asia or Eastern Europe (Dauth et al., 2014; GCEE Annual Report 2017 items 665 ff.). As a result, the level of employment in these sectors has fallen in Germany. Regions with a strong focus on these sectors have been particularly affected, for example in eastern Germany (Yi et al., 2024).

In macroeconomic terms, this trade led to gains in prosperity (Felbermayr et al., 2017). **However, individual industries, regions and employment groups in Germany recorded negative employment effects** (c.f. Dauth et al., 2014; GCEE Annual Report 2017 items 665 ff.). For example, employees with lower qualification levels and in manual jobs were more affected by the negative effects than others (Traiberman, 2019; Keller and Utar, 2023; Kruse et al., 2024). ↘ ITEM 320

317. In the meantime, **countries** hitherto specialising primarily in labour-intensive export goods are now **catching up technologically**, partly thanks to targeted industrial policy (Bickenbach et al., 2024). This applies in particular to China, but also to India and Southeast Asia (Hsieh and Ossa, 2016; Mao et al., 2021). ↘ CHART 79 APPENDIX This increases the **competitive pressure on German companies** whose business model is based on technology-related comparative advantages in capital goods and their intermediate products (Stamer, 2023). In Germany, although the **revealed comparative advantages** ↘ GLOSSARY for various product groups increased as a result of innovations in the period from 1996 to 2022, ↘ CHART 58 ↘ CHART 80 APPENDIX the revealed comparative advantages in some once-strong export-product groups have declined, while China's economy has been able to improve its comparative advantages in these areas. This can also be seen in the trade flows. China's revealed comparative advantage in motor vehicles as a whole and, since 2017, also in battery electric vehicles is not increasing more

than that of Germany. However, the increase in China's exports in this area is higher than that of Germany. ↘ CHART 79 APPENDIX

318. The tense geo-economic situation and the currently erratic US trade policy are increasing uncertainty in international trade (Gopinath, 2023; Clausing and Obstfeld, 2024; Gopinath et al., 2025). ↘ ITEM 12 The tariffs on German exports to the USA and the increasing competition from other countries seeking new sales markets as a result of US tariffs will **reduce** the **international competitiveness of German companies** in the foreseeable future. **This is likely to intensify trade-related structural change** (Saussay, 2024).

On the other hand, rising trade uncertainty can also lead to companies **increasingly bringing** their **production back to Germany** (reshoring). Up to now, however, this has only happened if production can be sufficiently automated, for example using industrial robots (Faber et al., 2025). Import-intensive regions in particular could benefit from such reshoring. ↘ CHART 59 RIGHT ↘ ITEM 322

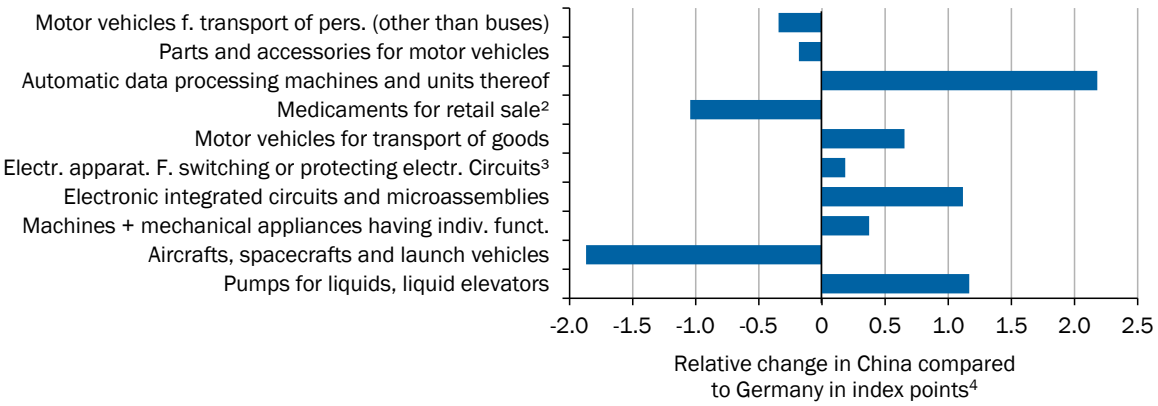
319. **Regions** whose companies experience a **decline in their previous comparative advantage are threatened** with a loss of jobs or (real) wage cuts (Amiti and Davis, 2012; Basco et al., 2025). ↘ CHART 59 LEFT **Regions** with a **strong export economy, for example in the north of Baden-Württemberg**, have been able to **more than compensate for** such **negative effects** in the past. Whether this will also be possible in the future is uncertain.

320. Even if export industries increase employment overall, the **impact on individual occupational groups** may vary (Dauth et al., 2021a; Autor et al., 2025). A study by Kruse et al. (2024) shows that Germany's export value-added has increasingly concentrated on mechanical engineering and the automotive industry,

↘ CHART 58

Shift in revealed comparative advantages (RCA)[1]

China's comparative advantage over Germany is increasing



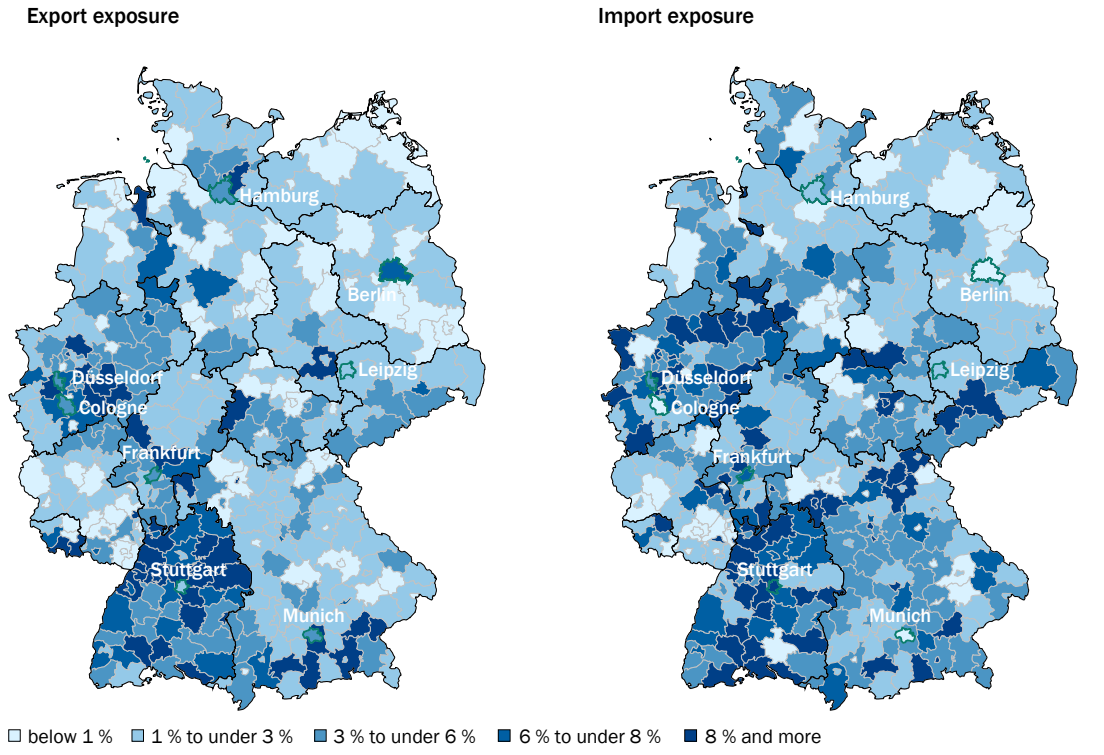
1 – Product groups (4-digit) with the highest export share in Germany. Revealed comparative advantage (RCA) is calculated as the ratio of the export share of a product group in the total exports of a country and the export share of the product group in total world trade. 2 – Consisting of mixed or unmixed products for therapeutic or prophylactic purposes, dosed or in packages. 3 – Or for manufacturing connections to or in electrical circuits. 4 – Change in China's RCA in 2022 compared to 1996 minus the change in Germany's RCA over the same period.

Sources: BACI database CEPPI, own calculations

and that within these industries there has been a specialisation towards knowledge-intensive occupations such as engineering and management and other service occupations. ↘ CHART 60 Globalisation is thus also contributing to an increasing polarisation of skills in the workforce (Cravino and Sotelo, 2019). ↘ ITEM 339 By **switching from manufacturing to services**, employees can avoid the threat of job loss. Depending on the skill requirements, however, this can involve reductions in wages (Boddin and Kroeger, 2021; Dauth et al., 2021a; Keller and Utar, 2023; Bloom et al., 2024; Yi et al., 2024).

321. The loss of comparative advantages and the increasing competition from China and other emerging countries pose **new challenges** for **companies in formerly export-oriented industries**. Export value added will increasingly focus on knowledge-intensive professions. Whether export growth to countries such as India (Sultan, 2025) can prevent the negative effects of these changes is uncertain. **Employees with lower qualifications** and **regions with a high degree of specialisation in previously export-intensive sectors** – e.g. south-western Germany and southern North Rhine-Westphalia – **are likely to be particularly hard hit**. ↘ CHART 59 LEFT Regions that have previously imported many intermediate products could be positively affected by reshoring, but they could also be negatively affected by increased imports of higher-quality intermediate products, ↘ CHART 59 RIGHT if the **offshoring of intermediate products expands** due to

↘ CHART 59
Change in trade exposure to Asian countries between 1999 and 2022[1]

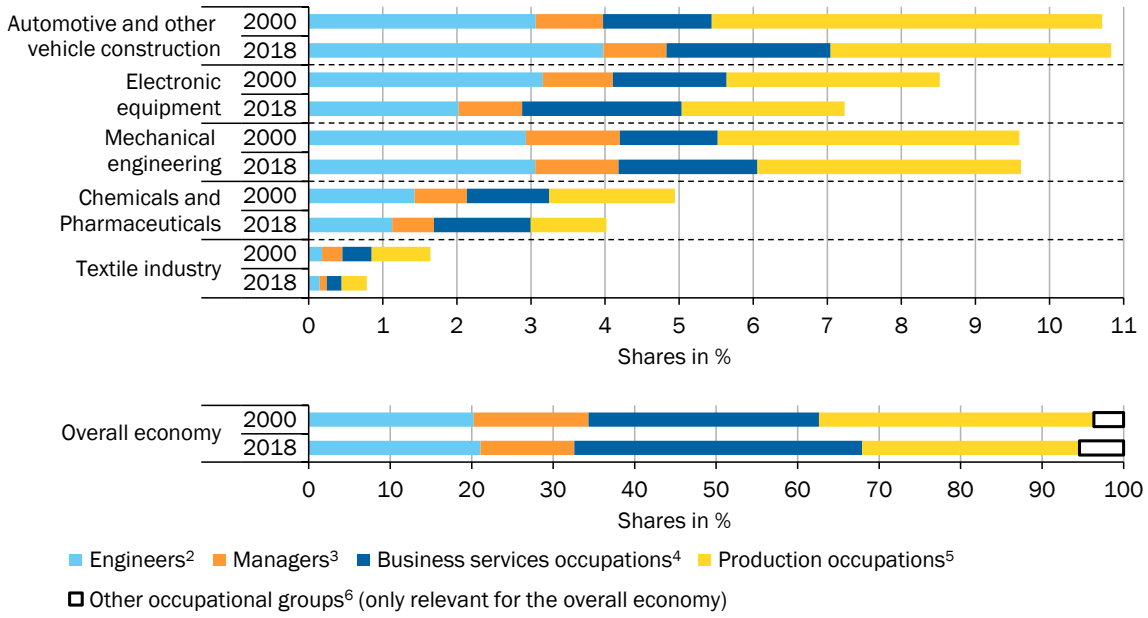


1 – The change in exports and imports to the Republic of Korea, China, Japan, India, Cambodia, Laos, Vietnam, Myanmar, Thailand, Malaysia, Brunei, Timor-Leste, Indonesia, the Philippines and Singapore is shown. The change in trade exposure is calculated using a shift-share approach: The respective exposure of a region calculated as the weighted sum of the change in imports from or exports to the countries under consideration for each economic sector between the years 1999 and 2022, weighted by the regional employment share in this industry in 1999.

Sources: BACI Database CEPII, Federal Agency for Cartography and Geodesy, own calculations

↘ CHART 60

Occupational shares in exports[1]



1 – The chart shows the value-added share of the occupational groups of the respective industries in Germany's total value-added exports. Occupations according to the International Standard Classification of Occupations (ISCO-88 COM). It replicates Chart 1 and Appendix 1.1 for Germany from Kruse et al. (2024). 2 – Engineers include ISCO codes 21 and 31. 3 – Managers include ISCO codes 12–13. 4 – Business service occupations include ISCO codes 24, 34, 41, 42, 52, 911. 5 – Production occupations include ISCO codes 60–61, 71–74, 81–83, 92–93. 6 – Other occupational groups are health professions, pedagogical professions and education, professions in public administration and soldiers.

Sources: Kruse et al. (2024), Reijnders and de Vries (2018)

the improving quality of foreign products (Egger et al., 2024; Gu et al., 2024). Higher-skilled employees in particular will benefit from possible positive effects due to the necessary automation.

2. Automation, digitalisation & artificial intelligence

322. Structural change can be intensified and accelerated by the **automation of production processes**. However, the effects of automation on the macroeconomic demand for labour are unclear ex-ante. ↘ BACKGROUND INFO 12 Apart from the consequences of a greater use of industrial robots and software, the main topic of discussion is currently the effects of an increased use of artificial intelligence (AI).

↘ BACKGROUND INFO 12

Mechanisms: automation and labour demand

The impact of automation on the macroeconomic demand for labour depends on the interplay of various factors. Acemoglu and Restrepo (2019) distinguish between the displacement effect, the productivity effect and the reinstatement effect. The **displacement effect** describes the reduction in labour demand due to the automation of activities. The **productivity effect** describes the fact that automation can increase the demand for labour if complementary non-automated activities are in

greater demand due to increased productivity. **The reinstatement effect** encompasses the emergence of new activities. The impact of automation on the macroeconomic demand for labour therefore depends on which of these effects predominate. Even if the effects on labour demand are positive in the long term, there may be a temporary decline in labour demand if the displacement effect dominates in the short term until possible productivity and reinstatement effects set in.

323. **In Germany, no decline in macroeconomic employment has been observed** in the past **as a result of automation** (Lehmer and Matthes, 2017; Arntz et al., 2018). Particular attention was given to the effects of using industrial robots in the manufacturing sector. Although these are only used by a few companies, they are mainly used by companies with a large number of employees (Deng et al., 2024b). Dauth et al. (2021a) show that this displaced jobs in manufacturing between 1994 and 2014. At the same time, new jobs were created in business services, so that macroeconomic employment as a whole did not fall. The displacement effect was stronger in regions with a low proportion of unionised employees. Deng et al. (2024a) also show that the use of industrial robots did not reduce employment. They document that employment increases primarily in non-routine activities, and that young employees benefit from the reinstatement effect through newly created activities.

324. **Although the use of AI** in companies is rising in Germany**, it is still low** (Federal Statistical Office, 2024). Depending on the survey, the proportion of companies using AI ranges from 12 % (Rammer, 2024) to 20 % (Federal Statistical Office, 2024) and 27 % (ifo Institute, 2024). AI is primarily used in the information and communication sector and generally in industries with a high proportion of services. Use also increases significantly with the size of the company (Federal Statistical Office, 2024). **Companies in peripheral regions** use AI much less than companies in metropolitan areas (Rammer, 2024), especially in the service sector – less so in the industrial sector. The regional differences can be attributed on the one hand to the different economic structures and, on the other hand, to differences in IT infrastructure (Rammer, 2024).

325. Unlike previous automation technologies, **AI** is likely to **increasingly replace non-routine activities in highly skilled occupations**. The potential for automation through AI varies from region to region, although a high potential for automation does not necessarily imply a future decline in labour demand. ↘ BACKGROUND INFO 12 Particularly in **knowledge-intensive services**, AI can **ensure increased productivity growth** and thus employment growth (Czarnitzki et al., 2023; Filippucci et al., 2024; McElheran et al., 2024; GCEE Annual Report 2023 item 126) or mitigate the demographically induced shortage in the supply of highly skilled workers. ↘ ITEM 335

326. Current international studies indicate that lower-skilled and less experienced employees have so far benefited most from the use of AI (Brynjolfsson et al., 2023; Dell'Acqua et al., 2023; Noy and Zhang, 2023; Peng et al., 2023). In the longer term, however, their activities could be replaced by AI (Kinder et al., 2024). Which professions will be affected in the future can be assessed with the aid of the overlap of activities with the fields of AI application (Brynjolfsson et al., 2018; Felten et

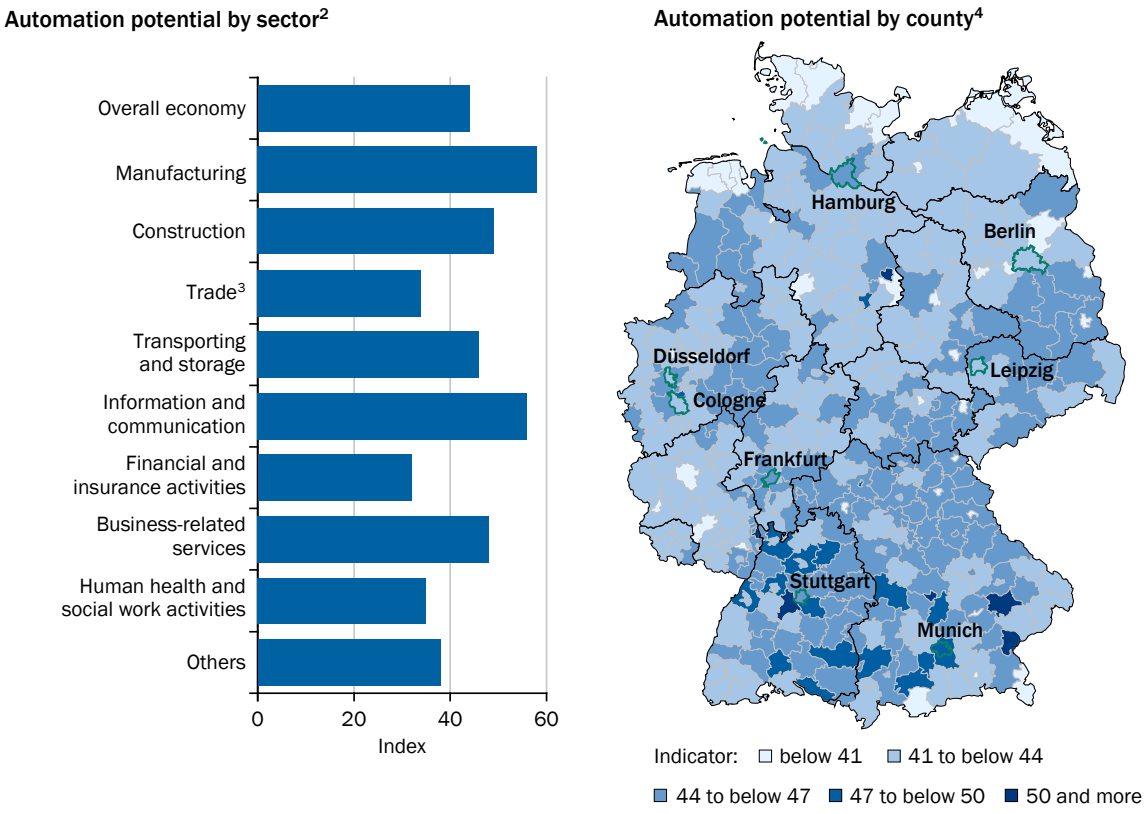
al., 2019; Webb, 2020). Webb (2020) uses job descriptions and descriptions of AI patents for this purpose. Applied to German labour market data, it can be seen that the **automation potential** is **highest in manufacturing and ICT,** but **very low in commerce, healthcare and social work** (Fregin et al., 2023).

↘ CHART 61 LEFT

327. In general, the **automation potential** of an activity through AI **increases with the qualification level** of the employees. Based on AI's current state of development, the **highest automation potential** in Germany can be found **in economically strong counties**, ↘ CHART 61 RIGHT which often have a high proportion of employment in the manufacturing sector, such as the automotive or chemical industry. However, it is uncertain whether this potential will actually be exploited and whether demand for labour will decline as a result. Should AI develop into so-called Artificial General Intelligence and thus be able to learn any cognitive task that a human being can perform – as some expect – there may be major, currently unforeseeable disruptions in the labour market (Nordhaus, 2021; Trammell and Korinek, 2023).

↘ CHART 61

Automation potential through artificial intelligence (AI)[1]



1 – The automation potentials are a transfer of Webb's classification (2020) to the German occupational classification. The indicator measures the correspondence between the job descriptions of individual occupations and fields of application of AI from patent texts on a scale of 1 to 100. 2 – According to the Classification of Economic Activities, 2008 edition (WZ 2008). Calculated for the average employment structure for the years 2012 to 2019 using the Integrated Employment Biographies sample. 3 – Wholesale and retail trade; repair of motor vehicles and motorcycles. 4 – The indicator shows the employment-weighted automation potential through AI at the level of counties and independent cities. In the case of ambiguous matches, the median of the automation potential was assumed. The employment structure is based on the data of the 2-digit economic sectors and the requirement levels of employment subject to social insurance contributions in 2023.

Sources: Federal Agency for Cartography and Geodesy, Federal Employment Agency, IAB, Webb (2020), own calculations

3. Decarbonisation

328. **Climate policy** influences the international competitiveness of countries (Böhringer and Alexeeva-Talebi, 2013; Carbone and Rivers, 2017) and therefore also international trade flows. ↘ ITEM 316 It also alters which goods and services are in demand (Creutzig et al., 2022). **The targeted decarbonisation is therefore another important driver of structural change**.

329. Decarbonisation is likely to increase – at least temporarily – the **production costs for products** whose value chain is emissions-intensive (Cooper et al., 2024; Glenk et al., 2024). ↘ BACKGROUND INFO 13 For example, the costs of some upstream products such as steel, cement, industrial gases and fertilisers could rise in Germany by around 10 % (Cooper et al., 2024). As the manufacturing industry is significantly more emissions-intensive than the services sector, the structural change towards services is likely to be accelerated.

↘ BACKGROUND INFO 13

Emissions intensity of the German manufacturing industry

The German manufacturing industry is responsible for around 200 million tonnes of CO_2 equivalents (CO_2e) annually. Over two thirds of this is attributable to the combustion of fuels (UBA, 2024), the remainder to industrial processes that are limited to relatively few products, particularly in the basic materials industry (production of iron, steel and aluminium, cement, glass, ammonia, etc.). **On average, emissions of 0.1 kg CO_2e are generated per euro of turnover**, leading to **average CO_2 avoidance costs of one cent per euro of turnover**. However, **emission intensity is highly heterogeneous between economic sectors** ↘ CHART 63 LEFT **and thus also between regions**. According to the business census data from 2017 to 2020, about 50 % of companies emit less than 0.007 kg CO_2e and 75 % less than 0.02 kg CO_2e per euro of turnover. In some sectors of the economy, there are often no direct emissions at all, as all the energy used is purchased in the form of electricity and district heating. For example, more than half of the manufacturing industry in Brandenburg has no direct emissions (from fuel combustion).

330. At the same time, the increase in production costs has an impact on Germany's international competitiveness and thus also on structural change, as no comparable cost increase is expected in non-European countries in the coming years due to a relatively lenient climate policy. Although the European **carbon border adjustment mechanism** (CBAM) introduces emission pricing for imports of some upstream products, thereby partially decoupling the domestic market from international differences in CO2 prices, CBAM's coverage of imports is incomplete (Dechezleprêtre et al., 2025). Furthermore, exporters continue to be **burdened by unilateral decarbonisation costs**. While there is little evidence to date of negative effects from carbon pricing in Germany (Dechezleprêtre et al., 2023; Colmer et al., 2024; Deutsche Bundesbank, 2024a), emissions-intensive companies that sell a large proportion of their production outside the EU are likely to be negatively affected in the long term (Schotten et al., 2021). Avoiding carbon taxation stemming from the CBA mechanism by relocating production steps abroad

would also have a negative impact on domestic industry (Garnadt et al., 2021). However, even if all countries were to apply the same stringent pricing system, Germany would still be at a disadvantage in terms of the cost of green energy compared to many countries with better potential for renewable energy (Verpoort et al., 2024). This is likely to trigger a relocation of some of the most energy-intensive production steps.

The fact that German industry has a **high level of technological expertise** in many relevant decarbonisation fields could alleviate some of the negative effects (Dahlström et al., 2025; GCEE Annual Report 2020 item 361). This offers an opportunity for German industry to established itself as one of the **leading providers of climate-neutral applications and products**, both in Germany and abroad.

331. It is not only the **direct emission intensity** of the individual economic sectors that will determine **decarbonisation-related structural change**. The **change in product demand**, for example the shift in demand from combustion engines to electromobility, also has consequences, for example for employment in the automotive industry. On the one hand, the production of electric motors is less employment-intensive. On the other, electric cars from China have been cheaper than German models in certain vehicle classes since at least 2021 (IEA, 2024). ↘ ITEMS 316 FF. Both of these factors suggest that employment in vehicle manufacturing in Germany will decline. ↘ BOX 21

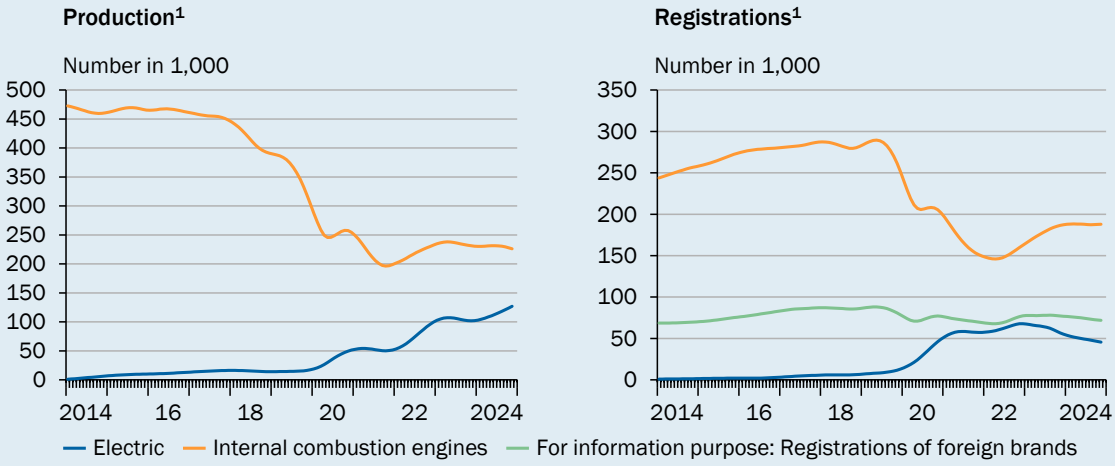
↘ BOX 21

Background: Structural change in the automotive industry

In 2022, companies in the automotive industry contributed just under 3 % to Germany's gross value added and are significant employers with comparatively high wages in many regions. In 2022, around 830,700 people were employed in the manufacture of motor vehicles and motor vehicle parts. In 2024, the automotive industry generated about 17 % of total German exports. **The transformation to electromobility** ↘ CHART 62 **is significantly reducing demand for traditional vehicle components** such as combustion engines and gearboxes. At the same time, demand for batteries, electric motors and power electronics is increasing. Compared to combustion engines, electric motors contain significantly fewer moving parts and are mechanically less complex (Bauer et al., 2018), so that **fewer employees are needed for production**.

↘ CHART 62

Production of cars and new car registrations in Germany



1 – Hendrick-Prescott-Filter applied to seasonally adjusted original values.

Sources: VDA/KBA, own calculations
© Sachverständigenrat | 25-014-03

The expected job cuts at manufacturers and suppliers will not be fully offset by the demographically induced decline in the number of skilled workers (Czernich et al., 2021). At the same time, **employees' qualifications** must **be reoriented** away from traditional professions such as metalworking and mechanics towards improved skills in battery technology, software development and IT systems analysis (Bauer et al., 2018; Hoch et al., 2024). A positive example of this is the transformation of Volkswagen AG's Zwickau plant towards electromobility, during which around 3,000 employees have undergone extensive retraining measures (Volkswagen, 2022). The change in the required qualification profile has been apparent in the companies' job offers since 2019 (Fackler et al., 2024).

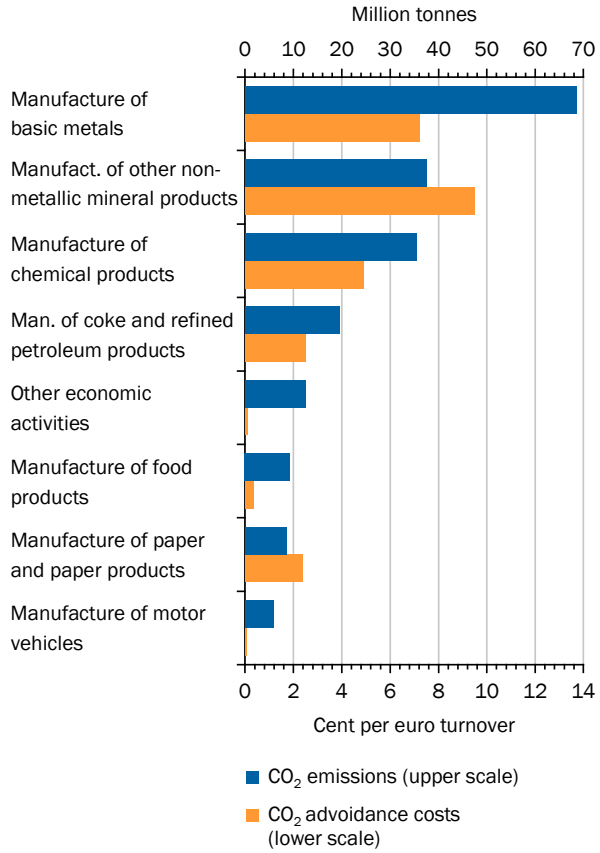
332. Individual regions are likely to **be disproportionately affected by the decarbonisation-related adjustments**, as the **production of energy- and emissions-intensive products** is highly concentrated regionally. ↘ ITEMS 309 F. Historically, the location of certain economic sectors has been based on the availability of fossil fuels, such as coal for smelting, and raw materials such as iron ore. The most emission-intensive economic sectors also tend to have particularly high CO2 abatement costs. This reinforces the effect that individual regions will be directly affected by decarbonisation, while others will hardly feel any effects. ↘ CHART 63 RIGHT For example, the Ruhr region, especially the Duisburg, Gelsenkirchen and Dortmund area, is likely to face particularly high decarbonisation costs compared to turnover. At the same time, the direct decarbonisation costs in large parts of Upper and Middle Franconia may be negligible. Many industries indirectly affected by decarbonisation, such as car manufacturing, are also clustered

↘ CHART 63

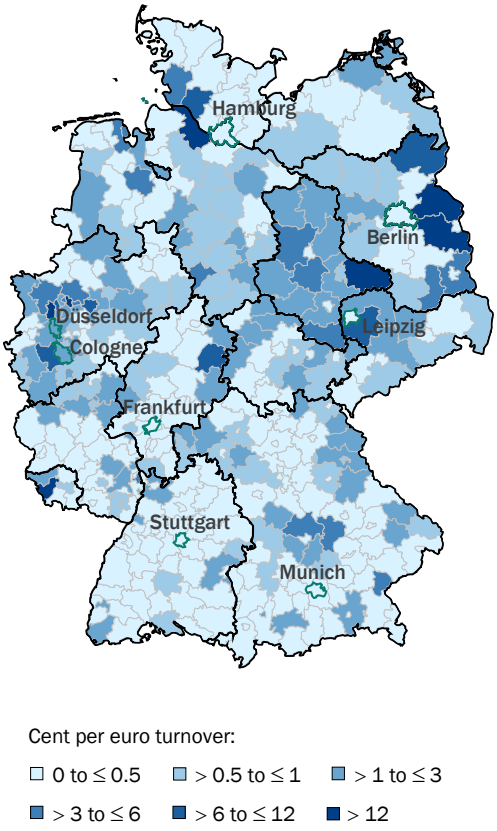
Differences in potential decarbonisation costs in the manufacturing sector[1]

Average values for the period 2017 to 2020

Average CO_2 avoidance costs and CO_2 emissions by economic sectors



Average CO_2 avoidance costs by districts and independent cities



1 – The CO_2 emissions are approximated on the basis of the energy sources in individual companies (with more than 20 employees) contained in the official company data for Germany. Non-energy-related emissions for economic sectors „Manufacture of chemical products“, „Manufacture of non-metallic mineral products“, „Manufacture of basic metals“ are added on flat-rate basis. Industry-specific values from the literature are assumed for CO_2 emissions costs. Avoidance costs of 50 euros per tonne were assumed for the economic sectors with the missing values. Economic sectors according to the Classification of Economic Activities, 2008 edition (WZ 2008).

Sources: Federal Agency for Cartography and Geodesy, RDC of the Federal Statistical Office and the Statistical Offices of the Länder, DOI: (10.21242/42111.2021.00.01.1.1.0), (10.21242/43531.2021.00.03.1.1.0), own calculations

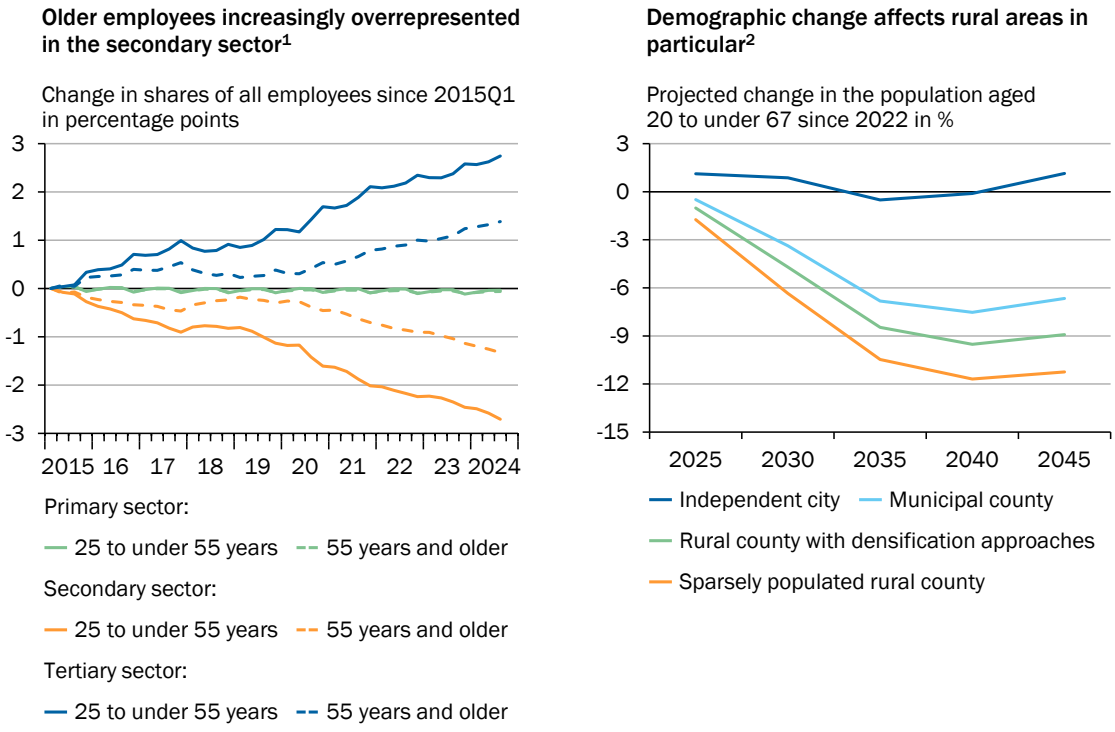
regionally. ↘ ITEM 309 Since geographically concentrated, abrupt adjustments often lead to regional upheavals, particularly in the labour market, decarbonisation can significantly increase the impact of structural change in individual regions.

4. Demographic change

333. **Demographic change** will reduce the **supply of labour** in the coming years. Baby boomers, most of whom will retire from the labour market by 2035, are more likely to be employed in industry than younger workers. ↘ CHART 64 LEFT It will probably be difficult for these employees to change sectors or occupations during their relatively short remaining working lives, especially as their occupational, company- or industry-specific skills can only be transferred to a limited extent when changing companies or sectors (Neal, 1995; Sullivan, 2010).

334. As a general rule, **older employees are less likely to change their occupation** and, when they do, they tend to focus on occupations with a similar job profile (Gathmann and Schönberg, 2010; Lamo et al., 2011). **The sectoral shift in employment** towards services is largely **due to new labour-market entries or re-entries** and less to job changes between the industrial and service sectors (Dauth et al., 2017, 2021b; Hobijn and Schoellman, 2017; Porzio et al., 2022). ↘ ITEM 323 If the demand for labour falls as a result of structural change in parallel

↘ CHART 64
Changing sectoral and regional employment structure



1 – According to the Classification of Economic Activities, 2008 edition (WZ 2008). 2 – BBSR population forecast 2045/ROP based on the 2022 census for the age group 20 to under 67 years. Settlement-structure county types according to the BBSR categorisation.

Sources: BBSR, Federal Employment Agency, own calculations

with demographic change, the potential impact on the labour market, such as serious labour shortages or higher unemployment, should therefore be limited.

335. **Demographic change could slow down structural change** if emerging economic sectors cannot find enough suitably qualified workers. ↘ ITEMS 339 F. However, labour shortages may also occur in economic sectors negatively affected by structural change if the demand for labour declines more slowly than workers leave the labour market (Maier et al., 2024). Due to the age structure, this could be the case in rural regions in particular (Bossler and Popp, 2023; Buch et al., 2024). ↘ CHART 64 RIGHT If, on the other hand, the demand for labour falls faster, older employees in particular could be at risk of unemployment. ↘ ITEM 334

336. Demographic change can therefore cushion the possible **negative labour-market effects of structural change**. Nevertheless, it may be necessary for **employees** to **change** jobs within a sector or across sectors and also to adapt their activities. Younger employees are likely to find such a change easier.

IV. CHALLENGES FOR THE REGIONS AND THE LABOUR MARKET

337. The drivers of **structural change** affect different **sectors, occupational groups and regions with varying degrees of intensity**. Export-oriented industries are particularly affected by changes in comparative advantages and growing competition from emerging markets. ↘ ITEMS 316 FF. Automation is also increasingly affecting highly qualified activities as a result of AI – with potentially positive productivity effects in knowledge-intensive services. ↘ ITEMS 322 FF. Decarbonisation generates pressure to adapt, especially in emission-intensive industries. ↘ ITEMS 331 FF. In certain circumstances, **demographic change** may be able to cushion declining demand for labour in the course of structural change. ↘ ITEMS 334 FF. The extent to which adaptation to these changes succeeds is influenced not only by the sectoral and occupational mobility of employees but also by their spatial mobility. The **heterogeneous effects of the individual trends** in the various regions **can overlap** and reinforce or **weaken** each other.

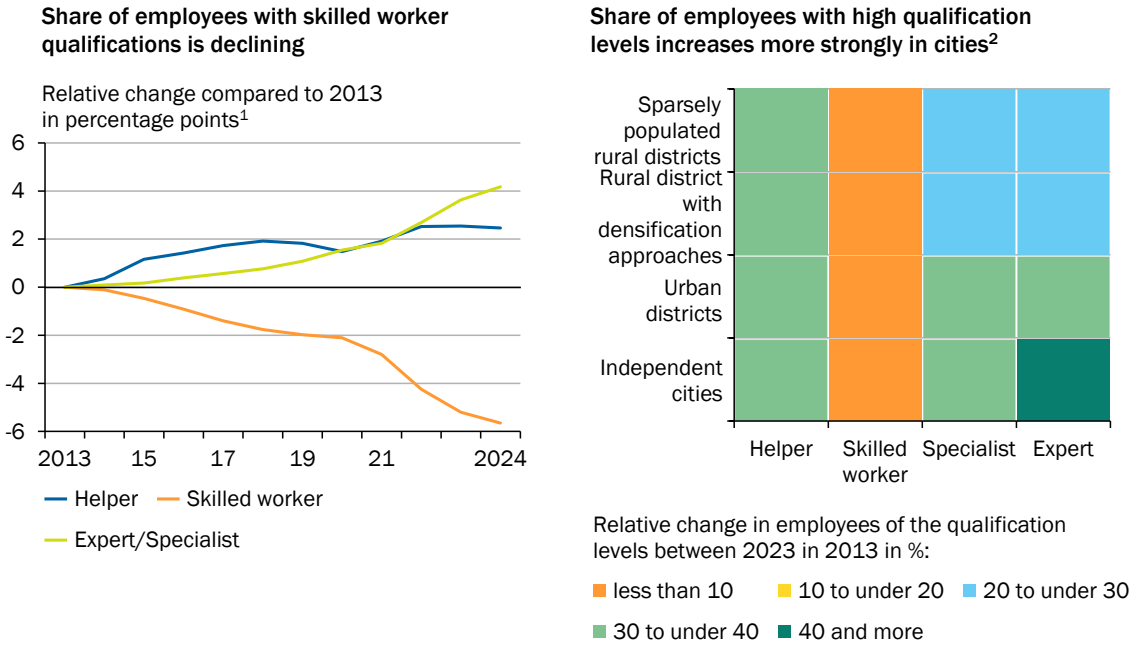
338. **The extent to which the individual regions** are **affected by the individual trends** is classified below. Regions that are already in a process of transition are likely to continue to be affected in the future. However, it is becoming apparent that the current developments will also probably affect regions in the future that have previously enjoyed comparatively strong economic development due to their knowledge-based and export-oriented industries. ↘ ITEM 346

1. Polarisation and skill mismatch

339. Structural change leads to a **polarisation** of the labour market. The **demand for both high- and low-skilled workers is increasing**, while it is **declining**

↘ CHART 65

Polarisation in the German labour market



1 – Change in the share of the respective requirement level in all employees subject to social security contributions.
2 – Settlement structure district types according to the BBSR categorisation.

Sources: Federal Employment Agency, own calculations

for occupational profiles with **medium qualification requirements** ('skilled workers') (Autor et al., 2003; Buera et al., 2022; Porzio et al., 2022; Boddin and Kroeger, 2024). ↘ CHART 65 LEFT Above all, this affects the major cities, where the proportion of highly qualified employees has increased the most. ↘ CHART 65 RIGHT ↘ ITEM 314

Polarisation is **accelerated by globalisation** ↘ ITEM 320 and **automation**, with the use of new technologies that replace routine tasks ↘ ITEMS 322 FF. (Autor et al., 2003; Boddin and Kroeger, 2024; Hobijn and Kaplan, 2024). However, non-routine activities could also be increasingly affected in the future by the further development and increasing use of AI. ↘ ITEM 325

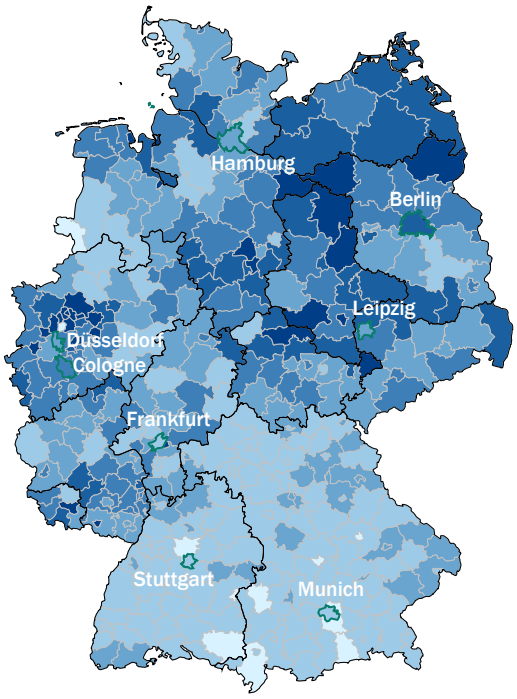
340. **Shifts in demand for certain occupations and** changing **qualification requirements** can lead to **matching problems** between demand and supply on the labour market (skill mismatch). These become a problem above all if they change quickly, if new employees do not anticipate them well enough when making their training decisions, and if employees do not receive further training in time. ↘ ITEM 339 In 2023, the matching problems on the labour market were particularly pronounced in the Ruhr region, in the northern regions of Bremerhaven and Wilhelmshaven and in large areas of eastern Germany. ↘ CHART 66 LEFT By 2023, the skills mismatch had declined particularly sharply in eastern Germany, but remains pronounced in some of these regions. ↘ CHART 66 RIGHT This is probably largely due to the pronounced demographic change in these regions, which has reduced the oversupply of unsuitably qualified workers. In the Ruhr region and in

the affected regions in northern Germany, on the other hand, the matching problems have remained virtually unchanged or even increased over time.

341. The ongoing **polarisation of the labour market** could **further exacerbate existing matching problems**. In large cities with a growing service sector, skilled workers could find it increasingly difficult to find suitable jobs in industries negatively affected by structural change. In rural, structurally weak regions, on the other hand, this level of qualification is in demand due to demographic change. In order to adapt to these shifts, these skilled workers may need to be more mobile in future. By retraining to avoid relocation, employees would lose

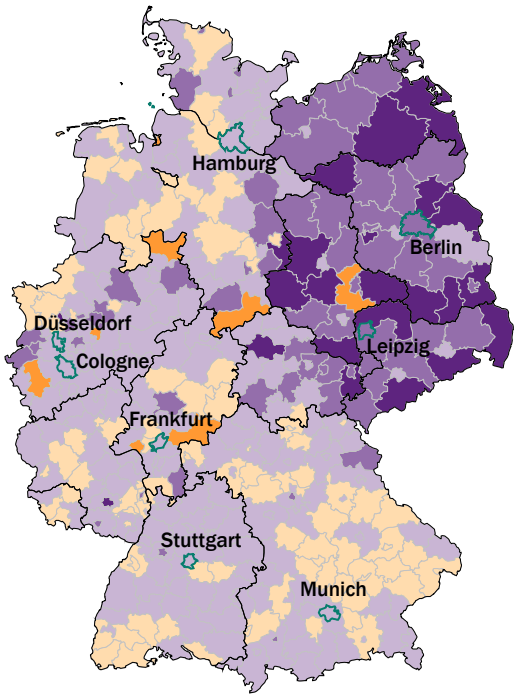
↘ CHART 66
Regional skill mismatch[1]

Skill mismatch in 2023 particularly pronounced in the Ruhr region and in large parts of eastern Germany



Skill mismatch indicator[2] in 2023:
- 0 to below 0.01
- 0.01 to below 0.02
- 0.02 to below 0.03
- 0.03 to below 0.04
- 0.04 to below 0.05
- 0.05 and more

Skill mismatch declining in eastern Germany between 2013 and 2023



Development of the skill mismatch indicator[2] between 2013 and 2023:
- below – 0.02
- – 0.02 to below – 0.01
- – 0.01 to below 0
- 0 to below 0.01
- 0.01 to below 0.02

1 – Skill mismatch: Deviation of supply from demand within an occupational and qualification group, normalised to an interval between 0 and 1. 2 – The skill mismatch indicator considers the absolute difference between the share of labour supply of an occupational and qualification level and the share of labour demand of a district and is defined between 0 and 1, with 1 indicating a particularly high mismatch. The labour supply is defined as the sum of employees subject to social security funds and unemployed persons and the labour demand as the sum of employees subject to social security funds and registered vacancies. The 2-digit level and the qualification level according to the Classification of Occupations (KldB), 2010 edition, of the Federal Employment Agency (BA) are considered as the occupational group. If authorised municipal agencies provide incomplete or incorrect data, the BA cannot estimate all characteristics. In such cases, values for the number of unemployed persons at district and qualification level are missing in some cases. In order to close these gaps, missing values were estimated using the average from the previous and following year. If there was no previous or subsequent year, the corresponding other value was assumed.

Sources: Federal Agency for Cartography and Geodesy, Federal Employment Agency, own calculations

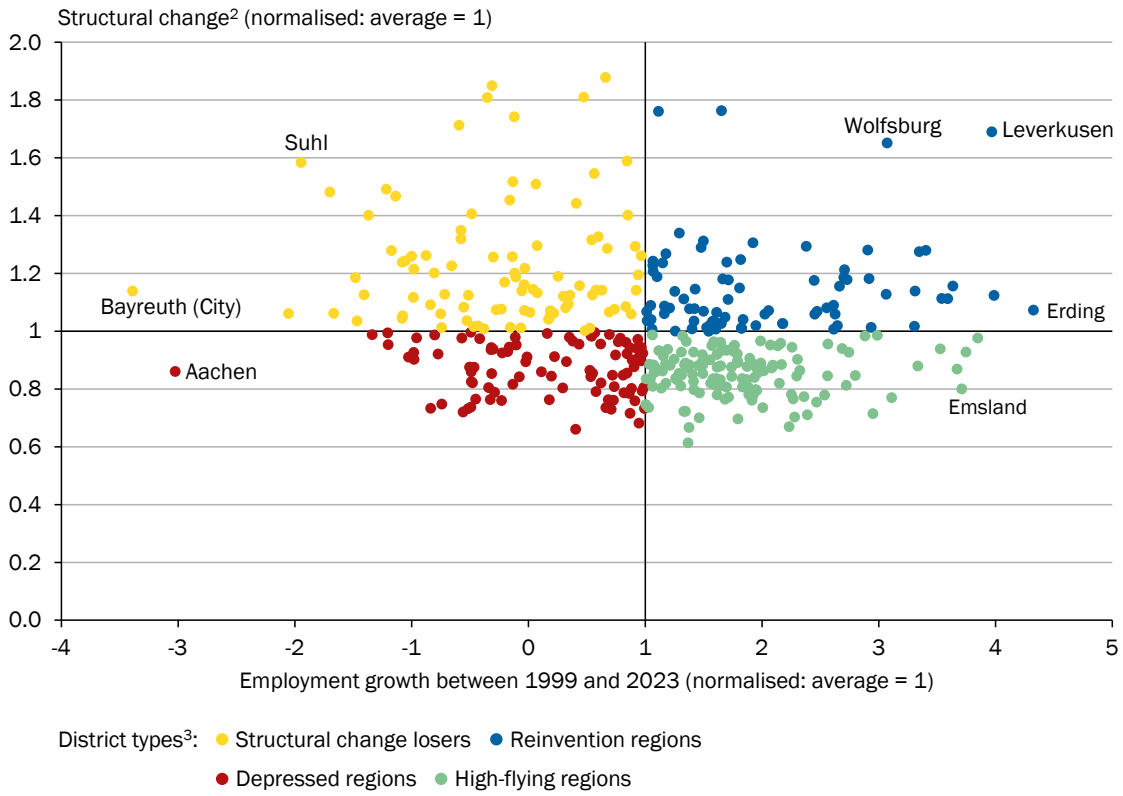
occupational and industry-specific human capital ↘ ITEM 334 and move to jobs that are less well paid.

2. Characteristics of the regions – challenges for adaptation

342. In this section, the GCEE **first classifies the regions in Germany retrospectively** on the basis of two criteria: (1) **How much structural change have the regions exhibited** to date relative to the average for all regions in Germany, measured as a shift in the employment shares of economic sectors. (2) How strongly has employment grown in the regions **relative to the average**. The methodology follows Findeisen and Südekum (2008), who examine the interaction of past local economic growth and structural change up to now. Regional employment data for the period 1999 to 2023 serves as a basis; it is combined with information on the sector's structure, the qualification level of the workforce and exposure to trade and digitalisation.

↘ CHART 67

Regional growth and structural change[1]



1 – Data basis: Number of employees subject to social security contributions by economic sector (3-digit), according to the Classification of Economic Activities, 2008 edition (WZ 2008), per district or independent city and year (1999 to 2023). 2 – Rate of change in economic structure measured as average annual excess churning rate. This rate measures the change in the composition of economic sectors in a region, measured by the employment structure, relative to the change in total employment in this region. 3 – District types according to Findeisen and Südekum (2008).

Sources: Federal Employment Agency, own calculations

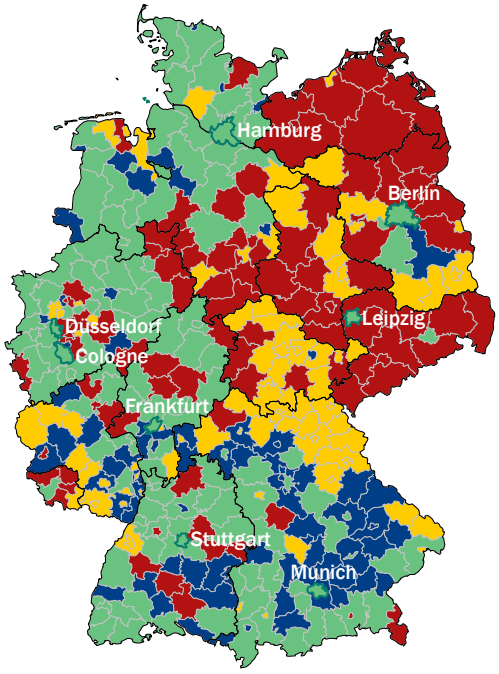
This results in **four types of region**: 'reinvention regions', which exhibit strong structural change and higher employment growth rates than the average; 'high-flying regions', with little structural change but high employment growth; 'depressed regions', which have not yet exhibited strong structural change but have low employment growth; and ' structural change losers', which experience strong structural change and at the same time have low or negative employment growth (Findeisen and Südekum, 2008). ↘ CHART 67

343. The **regional distribution of the four types of regions shows** that, compared to the average for all regions, little structural change is taking place, particularly in the eastern German regions. These regions also have relatively low employment growth. In the south-east, Saarland and western Rhineland-Palatinate,

↘ CHART 68

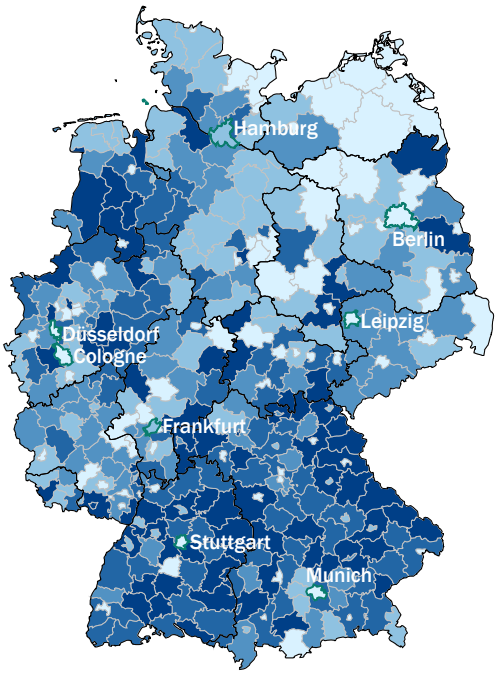
Regional structural change and his drivers

Structural change and employment growth[1]
for the years 1999 to 2023



- Reinventing regions: high structural change and high employment growth
- High-flying regions: little structural change, but high employment growth
- Depressed regions: little structural change and low employment growth
- Structural change losers: high structural change and low employment growth

Regional exposure to the drivers[2]



Quintiles:

- 0 to ≤ 20
- > 20 to ≤ 40
- > 40 to ≤ 60
- > 60 to ≤ 80
- > 80

1 – The map shows district types according to Findeisen and Südekum (2008) in relation to their employment growth and the rate of change in the industry composition measured as the average annual excess churning rate. This rate measures the change in the composition of economic sectors in a region, measured by the employment structure, relative to the change in total employment in that region. Employment growth can also be negative. Data basis: Number of employees subject to social insurance contributions by economic sector (3-digit), according to the Classification of Economic Activities, 2008 edition (WZ 2008), per district or independent city and year (1999 to 2023). 2 – The map shows the exposure to all drivers, measured as the sum of standardised indicators, in quintile groups.

Sources: BA, BACI database CEPII, Federal Agency for Cartography and Geodesy, Frey and Osborne (2013), Webb (2020), own calculations

there are regions with strong structural change but also low employment growth. In the south, there are more regions with marked structural change and relatively strong employment growth. Finally, there are regions with little structural change but above-average employment growth. These are predominantly found in the western German states, while they are the exception in the eastern German states. ↘ CHART 68 LEFT

344. In a second step, the above-discussed drivers are aggregated into an indicator to illustrate how strongly the regions **will be affected by structural change in the future**. The extent to which a region is affected is measured as the sum of the standardised indicators of the four drivers. ↘ CHART 68 RIGHT A comparison with the types of regions shows that **regions that have already** been identified a**s 'losers in structural change'** in the previous analysis will be severely affected in the future. These regions are exposed to increased automation potential by ICT (but not AI) and industrial robots. In addition, **'reinvention regions'** that have flourished up to now in structural change will **also** be affected. These regions have a relatively high potential for automation, including through AI. However, they are less in need of decarbonisation than the other types of regions. The drivers are likely to have **the least impact in regions that have been economically successful with stable industry compositions to date**. ↘ TABLE 19 COLUMN 4 On average, their exposure to any driver is neither relatively strong nor relatively weak. However, there are individual regions that have had stable industry compositions and have been economically successful to date, but will be more strongly affected in the future. These include, for example, some regions in Baden-Württemberg around Stuttgart, which are likely to be particularly exposed to international trade.

Other **regions in the south** (and increasingly in the south-east) and south-east of the Ruhr area (Märkischer Kreis, Oberbergischer Kreis, Kreis Olpe) are **likely to be severely affected by many or even all drivers**. Regions in Western Pomerania and the Mainz-Trier area are likely to be the least affected by the drivers overall. ↘ CHART 68 RIGHT

345. A heterogeneous level of impact is evident across all regions and also within the region types. In order to understand this better, the GCEE estimates how various economic indicators correlate with the degree to which a region is affected. This analysis shows that rural regions and areas in the south and west are particularly severely affected. These are regions that tend to be economically strong (Bundesregierung, 2024a). Regions with a **higher proportion of employees in the manufacturing sector** are particularly hard hit, especially areas where the **proportion of knowledge-intensive sectors of** the manufacturing industry **is high**. This applies in particular to the two types of regions that are likely to be more affected by structural change: 'structural change losers' and 'reinvention regions'. By contrast, **regions with a high proportion of knowledge-intensive services** and regions with a high proportion of employment in occupations with a high skill level or a **high level of training** and large **numbers of younger people in a region** are less affected. ↘ TABLE 19

↘ TABLE 19

Regional drivers and economic indicators

Regression coefficients[1]

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable: Impact on the region, measured as the sum of the standardised indicators of the four drivers discussed						
City	−0.72 *	−0.72 **	−0.13	−0.26	0.55	0.82 **
	(0.424)	(0.314)	(0.336)	(0.393)	(0.363)	(0.338)
GDP (regional; logarithmised)	0.14	0.09	0.01	0.79 **	2.26 ***	2.19 ***
	(0.251)	(0.215)	(0.209)	(0.309)	(0.289)	(0.275)
Unemployment rate	−0.32 ***	−0.12 *	−0.08	−0.56 ***	−0.49 ***	−0.45 ***
	(0.094)	(0.068)	(0.067)	(0.085)	(0.068)	(0.064)
North	−1.49 ***					
	(0.544)					
West	−0.50					
	(0.473)					
East	−2.30 ***					
	(0.552)					
Share of employees in manufacturing		0.22 ***				
		(0.015)				
Industry concentration (HHI[2])		0.00 ***			0.01 ***	0.01 ***
		(0.001)			(0.002)	(0.002)
Share of employees in knowledge-intensive services			−0.16 ***			
			(0.030)			
Share of employees in less-knowledge-intensive services			−0.08 **			
			(0.038)			
Share of employees in knowledge-intensive manufacturing			0.17 ***			
			(0.036)			
Share of employees in less-knowledge-intensive manufacturing			0.07 **			
			(0.034)			
District type according to Findeisen and Südekum (2008); relative to depressed regions:						
High-flying regions				−0.23		
				(0.485)		
Reinvention regions				1.04 **		
				(0.526)		
Structural change losers				1.66 ***		
				(0.518)		
Share of employees with qualification level specialist or expert					−0.40 ***	
					(0.058)	
Share of employees with qualification level skilled worker					−0.07	
					(0.075)	
Share of employees in IT and scientific service professions						0.35 ***
						(0.093)
Share of employees with academic professional qualification						−0.45 ***
						(0.037)
Share of population aged from 18 to under 30 years						−0.12 **
						(0.058)
R^2	0.15	0.44	0.47	0.14	0.33	0.41
Observations	400	400	400	400	400	400

1 – Significance levels: * p-value < 0.1; ** p-value < 0.05; *** p-value < 0.01. 2 – Herfindahl-Hirschmann Index.

Sources: BACI database CEPII, BBSR (2024), Federal Employment Agency, own calculations, Webb (2020), own calculations

This suggests that knowledge-intensive services are proving to be more resilient in the current structural change than knowledge-intensive manufacturing.

346. Regional economic growth does not inevitably have to be associated with specialisation in sectors that are growing in the economy as a whole or necessarily involve structural change (Findeisen and Südekum, 2008; Dauth and Südekum, 2016). In part, this can be explained by the fact that there are traditional but locally competitive industries in the areas (Dauth and Südekum, 2016).

V. FIELDS OF ACTION

347. **Structural change** in Germany is likely to **further reduce** the already weak productivity growth of the German economy (GCEE Annual Report 2019 items 140 ff.; GCEE Annual Report 2023 items 74 ff.) ↘ ITEM 73 **in the coming decades**. ↘ ITEM 289 These declines are likely to vary from region to region as a result of structural change. ↘ ITEMS 315 FF. However, the more expansive the macroeconomic environment is, the more scope there is for economic policy to support regions that are particularly negatively affected by structural change and to open up future prospects for them.

In recent years, the GCEE has regularly shown how **macroeconomic growth** can be **increased**: for example, by investing in human capital (GCEE Annual Report 2021 items 342 ff.), in fixed assets and in new cross-cutting technologies such as AI (GCEE Annual Report 2023 items 77, 158 ff. and 167 ff.) and by strengthening capital markets (GCEE Annual Report 2023 items 190 ff.). The diversification of global value chains can also boost resilience (GCEE Annual Report 2022 items 511 f. and 517; GCEE Annual Report 2023 item 175). In particular, skilled immigration and stronger employment incentives, as well as the substitution of labour by new capital goods, can mitigate the growth-dampening effects of the declining volume of labour (GCEE Annual Report 2022 items 358 ff.; GCEE Annual Report 2023 items 163 ff.). More comprehensive reforms to reduce the costs of bureaucracy and modernise the administration would also have a positive impact on economic growth. ↘ ITEMS 196 AND 204 The fiscal package opens up scope for accompanying structural change with, for example, infrastructure measures. ↘ ITEMS 84 AND 94 ↘ BOX 22

348. In this chapter, the German Council of Economic Experts focuses on discussing measures that can be used to address the **specific and regionally heterogeneous challenges of structural change**, reduce frictions and promote growth momentum. To this end, economic policy can **draw on various policy measures, particularly industrial policy**, ↘ ITEMS 350 FF. **regional and structural policy** ↘ ITEMS 363 FF. **and labour market policy**. ↘ ITEMS 375 FF.

Economic policy should aim to **support the structural change** triggered by the drivers to promote growth, **not to stop it**. For example, **measures** can be taken to **strengthen productivity growth**, particularly in view of the low

productivity growth in the growing service sector. ↘ ITEM 311 Furthermore, specific regional frictions can be addressed by regional support measures, especially if there is a risk of high and entrenched structural unemployment in individual, particularly affected regions.

↘ BOX 22

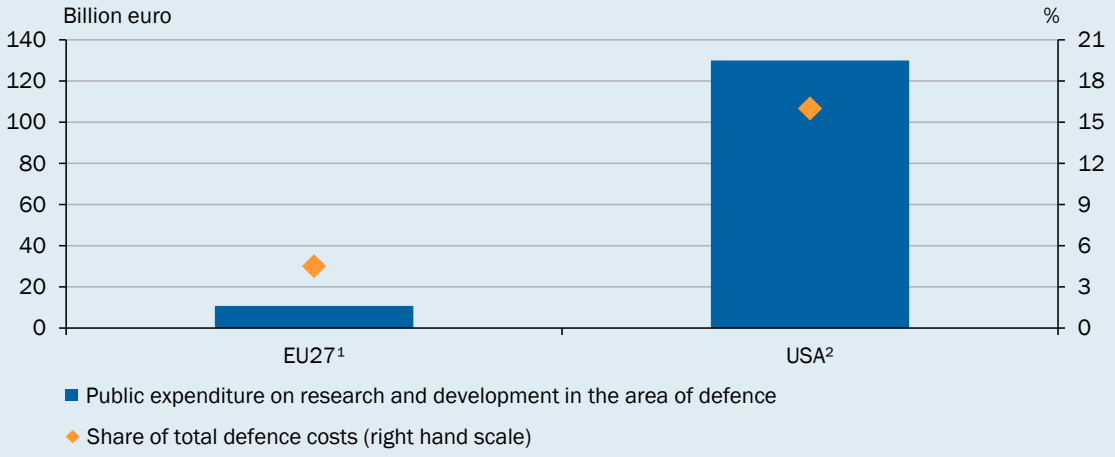
Implication of the fiscal package for structural-policy measures

The reform of the debt brake in the German Basic Law (constitution) provides financial leeway to accompany the upcoming structural change with the necessary infrastructure measures.

In particular, investment is needed in horizontal transformation measures, for example in digital infrastructure, e.g. computing capacity for AI. Investment in human capital, such as the training of teachers, is also necessary to ensure that the workforce required for structural change is available. In order to support regions that are still especially badly hit by structural change, funds from the joint Federal Government/Länder scheme for the 'Improvement of Regional Economic Structures (GRW)' should flow specifically into infrastructure funding for structurally weak regions. ↘ BOX 24 Regions that will be affected by the current drivers of structural change should also be considered here in order to counteract particularly negative developments at an early stage. ↘ ITEM 346

↘ CHART 69

Higher R&D spending on defence in the USA compared to Europe



1 – European Union (27 member states). Data for the year 2022. 2 – Data for the year 2023.

Source: Draghi (2024a)
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In addition to expenditure on infrastructure, defence spending is also likely to rise sharply as part of the fiscal package. This additional expenditure can have positive technological spillover effects on other sectors and lead to productivity gains – especially if it is spent on new systems that require R&D in technology-intensive sectors (Moretti et al., 2025). At present, Europe spends much less on defence R&D than the USA. ↘ CHART 69 The establishment of a European equivalent to DARPA (Defence Advanced Research Projects Agency) could pool European resources and achieve economies of scale (GCEE Annual Report 2019 item 298). In addition, the intended increase in defence spending could partially compensate for the expected decline in demand for workers in the automotive industry, as long as these funds are spent in Germany.

The strategic relocation of production capacity can improve the economic situation of 'left-behind' workers. Garin (2025) documents this in the context of the USA using the example of the relocation of production facilities during the Second World War, and compares the results

with today's programmes. Unlike in the historical context, modern industrial relocation programmes or subsidies for business investments do not always have the desired effect; this is because, although new jobs are created, the workers who are left behind often do not benefit directly if there are no targeted measures to retrain them (Garin, 2025). Long-term infrastructure and industry-cluster developments have much more sustainable effects than short-term subsidies (Incoronato and Lattanzio, 2024; Garin, 2025).

1. Strengthening growth momentum in structural change

349. **Structural change has a dampening effect on macroeconomic productivity growth** if – as can be observed in the secular trend – it leads to a shift in economic activity from sectors with high productivity growth to sectors with lower growth. ↘ BOX 19 Furthermore, the current **drivers** of structural change **are hampering economic development** in various sectors of the **manufacturing industry**. Companies that used to be strong exporters are coming under increasing pressure from trade-policy tensions and growing competition from China. ↘ ITEM 316 Decarbonisation can weaken the growth of sectoral production potential in the short and medium term as a result of the necessary conversion investments and the devaluation of know-how when new production processes are introduced (GCEE Annual Report 2023 items 109 ff.). ↘ ITEM 331

Do not slow down structural change; accompany it with economic policy

350. Growth-stimulating **framework conditions** are needed to **promote growth momentum during structural change**. These include, in particular, the provision of digital and physical infrastructure (GCEE Annual Report 2023 items 254 ff.), efficiently designed energy markets and a growth-promoting tax policy. The use of vertical industrial-policy measures should be limited to the temporary promotion of new, future-oriented economic activities that can reduce technological backlogs, strengthen technological sovereignty and ensure resilience. ↘ BOX 23

351. **Measures aimed at preserving structures should be avoided**. One principle of economic policy should be to avoid the state rescue of companies that do not have the resources to make them viable in the long term – in other words, to implement the principle of 'letting losers go'. In the past, this principle has not always been heeded in order to preserve jobs (Baldwin and Robert-Nicoud, 2007). One example of this is Opel: despite temporary state aid measures in Germany in 2009, the car manufacturer has been unable to restore its competitiveness in the long term (GCEE Annual Report 2009 items 324 ff.).

352. An **example** of **successful structural change** can be found in Finland. After Nokia's demise, the majority of its former employees found new employment (Ali-Yrkkö et al., 2023). Many continued to work in Finland's ICT sector and promoted innovation via start-ups (Ruggiero et al., 2020; Simonen et al., 2020, p. 202).

Start-ups by employees were supported both by Nokia itself and by the state innovation agency, Business Finland (Ali-Yrkkö et al., 2023). Similarly, the Eindhoven region in the Netherlands became a successful high-tech location after the demise of Philips through consistent restructuring – today, companies like ASML are based there (De Kinderen, 2018; Bronneberg et al., 2023). These experiences underline the fact that it makes more sense in terms of economic policy to focus on market-based renewal processes and innovation rather than preserving internationally uncompetitive structures with subsidies. One example of the provision of infrastructure is the NOI Techpark in South Tyrol, which links start-ups and research institutions in the fields of green tech, digitalisation, food technology and automation.

353. Above all, these examples suggest that it can be useful to promote the **existing skills of employees** who will be affected by shocks like company closures. In the areas mentioned here, these were well-trained specialists in fields that remain technologically dynamic, who were able to use their expertise via start-ups or other new high-tech companies. ↘ ITEM 365 In order to offset negative developments under structural change with positive momentum, it makes sense to focus on the **further qualification of the region's existing workforce potential**. Retraining and other qualification measures should therefore be offered and designed attractively.

↘ BOX 23

Background: Industrial policy – definition and design criteria

Over the decades, the term industrial policy has been used in different ways by different schools of economic thought. In the debate on economic policy, it is often unclear which policy measures it covers. In the following, **industrial policy** is understood as **direct or indirect** interventions in market processes or the **state's framework conditions** and **policy measures** to ensure an efficient economic location and to **overcome major societal challenges** that cannot be achieved purely by the market economy due to **externalities or coordination problems** (Juhász et al., 2024; Juhász and Steinwender, 2024; Scott Morton, 2024; EFI, 2025; GCEE Annual Report 2019 item 248). The English term 'industrial policy' is not sectorally limited, but encompasses all 'industries', i.e. all sectors, including the service sector in particular. Unlike an industrial policy that focuses on national champions, a pro-competitive industrial policy aims to overcome market failures and develop functioning competitive markets (Scott Morton, 2024).

Horizontal industrial policy is cross-sectoral and aims at creating generally favourable framework conditions. This includes measures to improve infrastructure, designing the tax and legal system and promoting research and innovation. The aim is to create a stable and efficient regulatory framework, enable functioning competition and eliminate market failures. The boundaries to traditional regulatory policy are therefore fluid. One example of a horizontal industrial policy is the creation of the European Single Market (EFI, 2025). By contrast, **vertical industrial policy** involves targeted interventions in individual sectors or industries, for example through subsidies, tax concessions or state intervention in specific markets. Examples include support for the semiconductor industry or subsidies for the coal and steel sectors. Selecting sectors to be supported harbours risks such as mismanagement, inefficient subsidies and protectionist distortions (GCEE Annual Report 2019 items 267 ff. and 318 f.). Therefore, there is a particular need for justification in the case of these measures specifying the exact externalities that are to be overcome. **Integrated industrial policy** combines horizontal and vertical

measures and takes into account the interaction with other policy areas such as R&D policy (EFI, 2025). One example of a successful integrated industrial policy is the Silicon Saxony network in Saxony, founded in 2000, where vertical funding programmes such as the Important Projects of Common European Interest (IPCEI) for microelectronics and communication technologies are used in addition to the horizontally oriented ERDF fund. The integrated industrial policy overlaps with the mission-oriented approach, which aims to tackle major societal challenges such as climate neutrality or digital sovereignty in a cross-sector way (EFI, 2025, Table A 3-1; GCEE Annual Report 2019 items 275 ff.).

In the EU and Germany, various instruments of horizontal and vertical industrial policy have been used in the past (GCEE Annual Report 2019 item 249). The empirical evidence on their impact is not unequivocal. The consensus is that industrial policy should be used as efficiently as possible and with as little distortion as possible, i.e. in principle it should be horizontal (EFI, 2025; GCEE Annual Report 2019 items 245 ff.). This means **creating** specific **framework conditions** for entrepreneurial activity and dynamic structural change in order to **remedy market failures and strengthen competition**. In the event of sector-specific market failure, vertical measures tailored to individual sectors or technologies can used to support horizontal industrial-policy measures. However, the misuse of vertical industrial policy by interest groups and its appropriation by market players to preserve the status quo should be avoided (Baldwin and Robert-Nicoud, 2007). In order to achieve this, the literature lists strict criteria towards which industrial policy should be geared (Rodrik, 2008; Juhász and Lane, 2024; EFI, 2025; GCEE Annual Report 2019 items 245 ff.): for example, the nature and extent of the market failure must be convincingly demonstrated, funds must be allocated via competitive procedures, and measures must be clearly limited in time from the outset (Juhász and Lane, 2024; Czernich and Falck, 2025). In view of incomplete information from legislators, industrial policy requires mechanisms for targeted information gathering. A structured exchange with the private sector can help to gather relevant market data and develop effective measures, but this involves the risk of strategic influence being exerted. Competitive tenders for feasibility studies represent a practicable approach (Rodrik, 2008). Continuous evaluation makes it possible to identify successful measures and to react flexibly to failures or changing conditions (Juhász and Lane, 2024).

Coordinate at the European level to avoid inefficiencies

354. The drivers considered here affect companies throughout Europe. If individual EU member states take national measures to make companies in their own country more competitive, this can have **repercussions for other member states** (Borck et al., 2012; Altomonte and Presidente, 2024; Brandão-Marques and Toprak, 2024). Although company-specific subsidies often have positive effects on the employment and turnover of the subsidised companies, they lead to negative spillover effects in their own country or in other member states. These effects significantly reduce macroeconomic effectiveness (Brandão-Marques and Toprak, 2024). Horizontal measures in one member state can also have an impact on the other states. For example, the German labour-market reforms of the early 2000s led to considerable competitive pressure in other eurozone member states (Fadinger et al., 2023).

It therefore makes sense to **coordinate funding policy at EU level** in order to strengthen the competitiveness of the EU as a whole, instead of competing with each other within Europe by promoting individual companies. For this reason

among others, state aid is therefore prohibited by the EU treaties to prevent inefficient distortions of competition (Art. 107 of the TFEU). The Draghi Report and the EU Commission's Competitiveness Compass that is based on it have led to increased coordination in political strategies, which must now be implemented (Draghi, 2024b; European Commission, 2025a).

355. Suitable **funding programmes such as the Important Projects of Common European Interest (IPCEIs)** (GCEE Annual Report 2020 items 458 f.; GCEE Annual Report 2022 item 498) can be used to **promote both European competitiveness** and **structurally weak regions**. However, IPCEIs also have weaknesses. For example, the application process is not transparent, and economically more powerful member states have an advantage as the funding is borne proportionally by the participating countries (Poitiers and Weil, 2022). IPCEIs should continue to be used strategically, but much more broadly in terms of sectors (Duso et al., 2025). Up until now, only projects in the fields of microelectronics, hydrogen and battery technology have been funded – plus health and pharmaceuticals since 2024 (European Commission, 2025b).

356. **Manufacturers outside the EU** sometimes **benefit** from extensive **subsidies**, enabling them to achieve international cost advantages quickly. This leads to **distorted competition on the global markets** (Bickenbach et al., 2024). In such cases, international WTO regulations permit protective tariffs to protect domestic companies from unfair competition (WTO, 1994). Such protective tariffs are controversial, since domestic companies that produce in the subsidising countries also benefit, and because the protective tariffs raise domestic prices. In addition, **WTO proceedings against unfair practices** are often lengthy and put a strain on international relations (Felbermayr et al., 2022).

357. In order to mitigate the effects of changes in international economic relations that reinforce structural change, consideration could be given to strengthening international trade relations, i.e. **access to new export markets** and suppliers of **intermediate products**, and to reducing trade costs. Especially European companies whose access to the USA market could be jeopardised should be supported (FGCEE, 2025). **New trade agreements** with third countries are suitable for this purpose (Flach, 2025; GCEE Annual Report 2022 items 511 ff. and 517; GCEE Annual Report 2023 items 175 f.). The EU-Mercosur Agreement is an important step in this direction (Bauer et al., 2023). Furthermore, instruments such as export credit guarantees and loans can be used to secure exports and imports in times of geopolitical uncertainty (Moser et al., 2008; Felbermayr and Yalcin, 2013; Kroeger, 2022; GCEE Annual Report 2023 items 514 ff.).

Secure the digital and energy infrastructure

358. Although the **EU is well positioned in AI research, it still lags** behind the USA **in AI development**. There is a lack not only of cloud computing infrastructures, which involve very high investment costs, but also of a dynamic ecosystem and receptive sales markets (Martens, 2024). Various proposals are being discussed to promote investment and innovation in AI (Renda, 2024). These include a European organisation for AI (similar to CERN; CAIRNE, 2025), an IT mission

as part of Horizon Europe (Renda, 2019), and the introduction of a European fund for digital infrastructure (Keller, 2023). It is also necessary to expand computing capacities and to provide the necessary energy supply. Finally, it might also be a good idea to set up an AI Security Institute, which already exists in the USA, the UK, France, Canada and Japan. These institutes advise governments on advanced AI and the associated security issues with a focus on the risks of AI for national security, e.g. AI-supported cyberattacks (Allen and Adamson, 2024; Leicht and Privitera, 2024). In order to play a leading role in AI, such major investments must be coordinated and the rules harmonised across Europe. This is the only way to achieve the necessary economies of scale and to reduce costs.

359. Without **investment in in-house digitalisation**, companies cannot **use AI** for automation and autonomisation (Engels, 2023). Broader use of AI and ICT in small and medium-sized enterprises (SMEs) can be stimulated by an adequate cloud infrastructure (GCEE Annual Report 2021 items 464 ff.). Technology pilots can help to present the 'best practice' examples from large companies via industrial associations to companies that have had little experience with them to date.

360. In addition to the coordination of public investment, the availability of private capital also plays a key role. **Start-ups are an important driver of innovation in the field of artificial intelligence –** but Europe has not yet been able to keep up with the level of financing provided in other regions of the world. Over 60 % of venture capital for AI has gone to start-ups in the USA, with only around 6 % going to the EU (Balland and Renda, 2023). Unless European capital markets are strengthened and private investors activated, the European AI scene will not be able to catch up (FGCEE, 2024; GCEE Annual Report 2023 items 255 ff.).

361. **The geopolitical uncertainty** concerning the **energy supply** and the **need for decarbonisation require a targeted adaptation of energy supply systems** to ensure a reliable supply and competitive energy prices for industry in the long term. In addition, grid-expansion planning should take greater account of sector coupling across member-state borders (Heussaff, 2024). Further integration of the European electricity markets should also be promoted (Zachmann et al., 2024; IMF, 2025a). These measures can lead to a reduction in grid charges and energy prices. ↘ ITEM 330

362. A working paper published by the European Commission in February 2025 presents two key initiatives – the **Clean Industrial Deal** and the **Competitiveness Compass** – to strengthen the **competitiveness of European industry** in the long term. The aim is to steer strategic investment into key technologies and to reduce regulatory hurdles for companies. In particular, these are intended to support the decarbonisation of energy-intensive sectors, the promotion of innovative industries and adaptation to global competition with the USA and China (European Commission, 2025a). In the past, the state-supported strategic development of industries has proved to be **especially successful** when it came to **quickly making up leeway in technology** (Goldberg et al., 2024). In the EU, this is only likely to be the case in a few sectors, such as AI development and the development of batteries and semiconductors. Targeting support towards individual companies runs the **risk of a dangerous policy of 'picking winners'** and

an inefficient subsidy race. At the same time, without an active industrial policy, there is a risk of losing technological leadership positions. Active promotion should therefore **always** be **geared towards promoting competition**, i.e. vertical measures should be used in a competitive process, e.g. through competitive tendering processes. The prerequisite for such measures must be a **clear justification** as to which sectors are considered key industries to be promoted and which strategic objective their promotion serves.

2. Moderating regional frictions of structural change through regional policy

363. **In the past, German structural policy was** often reactive, with a **focus on maintaining existing structures** for as long as possible. As a result, adjustment processes driven by long-term trends, such as phasing out coal mining, were unnecessarily delayed, which was inefficient and costly. ↘ BOX 27 APPENDIX Proactive measures, on the other hand, aim to support new growth opportunities before major distortions occur, for example with mission-oriented and open-technology approaches to decarbonisation (Aiginger and Bauer, 2016).

364. Several studies advocate **promoting people rather than regions**, arguing that this gives the people (and companies) the freedom to locate where it makes the most sense for them (Glaeser and Gottlieb, 2008; Kline and Moretti, 2014). However, **this does not take into account** frictions such as lock-in effects or important **externalities**, such as local spillovers from productive companies to other companies in less economically strong regions.

365. **Regional framework conditions** have an important **influence on the location decisions** of new companies. If these framework conditions change due to the drivers of structural change described above, company founders may decide differently than they would otherwise have done. For established companies, however, relocation is not a realistic option in most cases. Lock-in effects mean that they can no longer change their location without incurring high costs. For employees, too, relocation is often only possible at considerable social and financial cost, depending on age, family circumstances and the housing situation (GCEE Annual Report 2024 items 334 and 356 ff.). In such cases, it may make sense to use regional-policy measures to reduce adjustment frictions and develop new prospects for the affected location. Place-based policies are **economic-policy measures for the targeted promotion of economically weaker regions**. ↘ BOX 24 They aim to counteract possible **efficiency losses** at the regional level that can be caused by external effects. For example, place-based policies can compensate for underinvestment in public goods in economically weak regions (Fajgelbaum and Gaubert, 2025).

The targeted promotion of regions that have been weakened by structural change can therefore have **positive macroeconomic effects**, especially **if** they have other locational advantages such as **good infrastructure** and a **high level of qualifications** (Fajgelbaum et al., 2019; Fajgelbaum and Gaubert, 2020; Henkel et al., 2022).

366. **Investment in** local **infrastructure** and **transport links** can promote growth in two ways. If well aligned with existing location characteristics – such as labour-force potential, sales markets and local productivity levels – investment in the infrastructure increases local economic growth (Glaeser and Poterba, 2021; Grimes, 2021). Furthermore, investment in transport infrastructure can **connect economically weaker regions with productive regional centres**. This can boost the labour-force potential of the regional centre (Gibbons and Machin, 2005; Ahlfeldt and Wendland, 2011; GCEE Annual Report 2024 item 355). At the same time, there are potential spillover effects between the regions (Pütz and Schönfelder, 2018). In times of rising digitalisation and the increase in working from home, the expansion of digital infrastructure is also helpful in encouraging the establishment of knowledge-intensive service companies in less densely populated regions. At the same time, this helps to reduce congestion effects on the housing market in conurbations.

Regional structural policy in Germany

367. **Regional funding for the GRW** ('Joint Task for the Improvement of Regional Economic Structures') ↘ BOX 24 is one of the most important instruments of regional-policy funding in Germany. It aims to support economically underdeveloped regions in order to create equal living conditions throughout Germany. Various evaluations of GRW subsidies show that the overall effectiveness of the funding has been positive but heterogeneous. Investment subsidies for manufacturing companies in weak regions of eastern Germany in the funding period from 1996 to 2017 show a high level of effectiveness (Siegloch et al., 2025). A one-percentage-point fall in subsidies led to a 1 % decline in employment in the manufacturing sector, with negative spillover effects on the retail sector (–0.26 %) and the construction industry (–0.47 %). No distortions of wages, commuter flows or relocations of the workforce were observed. With costs of around €19,000 per job created, the authors consider GRW funding to be **relatively cost-effective** (Siegloch et al., 2025).

Further evaluations of the GRW for the periods 2000 to 2006 and 2009 to 2020 examine the effects on small and medium-sized enterprises in various sectors (Brachert et al., 2019, 2024). In subsidised companies, the employment of low-skilled workers in particular is increased. Median wages are also rose slightly. At the regional level, **GRW funding** is also making a moderate contribution to **increasing employment and income**. However, despite the targeted promotion of investment activity, no productivity effect could be demonstrated. Around half of the GRW funding tends to support sectors of the economy that are weak in R&D and lacking in knowledge, with an increasing trend over time (Brachert et al., 2024).

368. The expansion of the regions eligible for funding since 2022 and the standardisation of the funding criteria are to be welcomed. However, the large number of funding programmes can overwhelm companies, and they do not always reach the desired recipients in a targeted manner. There are also complaints about the **high level of bureaucracy involved** (Knoll, 2022). In order to strengthen regions

in the long term and achieve positive productivity effects, **funding** should focus more on research- and knowledge-intensive sectors of the economy.

369. The measures of the Pan-German Support System for Structurally Weak Regions often only come into play **when** the local **economic structure** is already **significantly weakened**. In the future, however, many regions that are currently economically strong will face considerable challenges that will require investment. ↘ ITEM 346 **Structural policy should therefore pursue proactive approaches** to prepare these regions for the pressures of the upcoming transformation. Südekum and Posch (2024) propose supplementing the GRW with an additional pillar that focuses on investments required for decarbonisation and can be used anywhere in Germany.

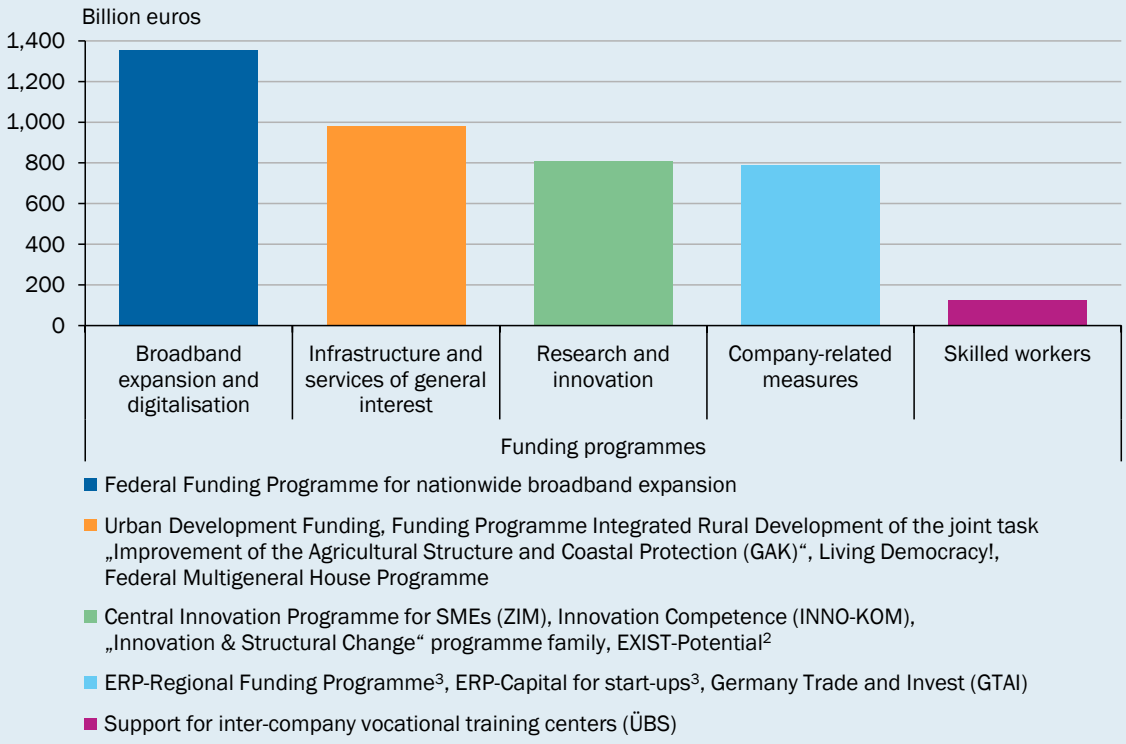
↘ BOX 24

Background: Regional structural policy in Germany

The **'Pan-German Support System for Structurally Weak Regions'** (GFS) comprises over 20 programmes to strengthen growth, innovation and infrastructure, and aims to help create equal living conditions throughout Germany. ↘ CHART 70 The funding programmes are now open to all structurally weak regions.

↘ CHART 70

Priorities of regional funding programmes in 2021 – Federal funds excluding GRW[1]



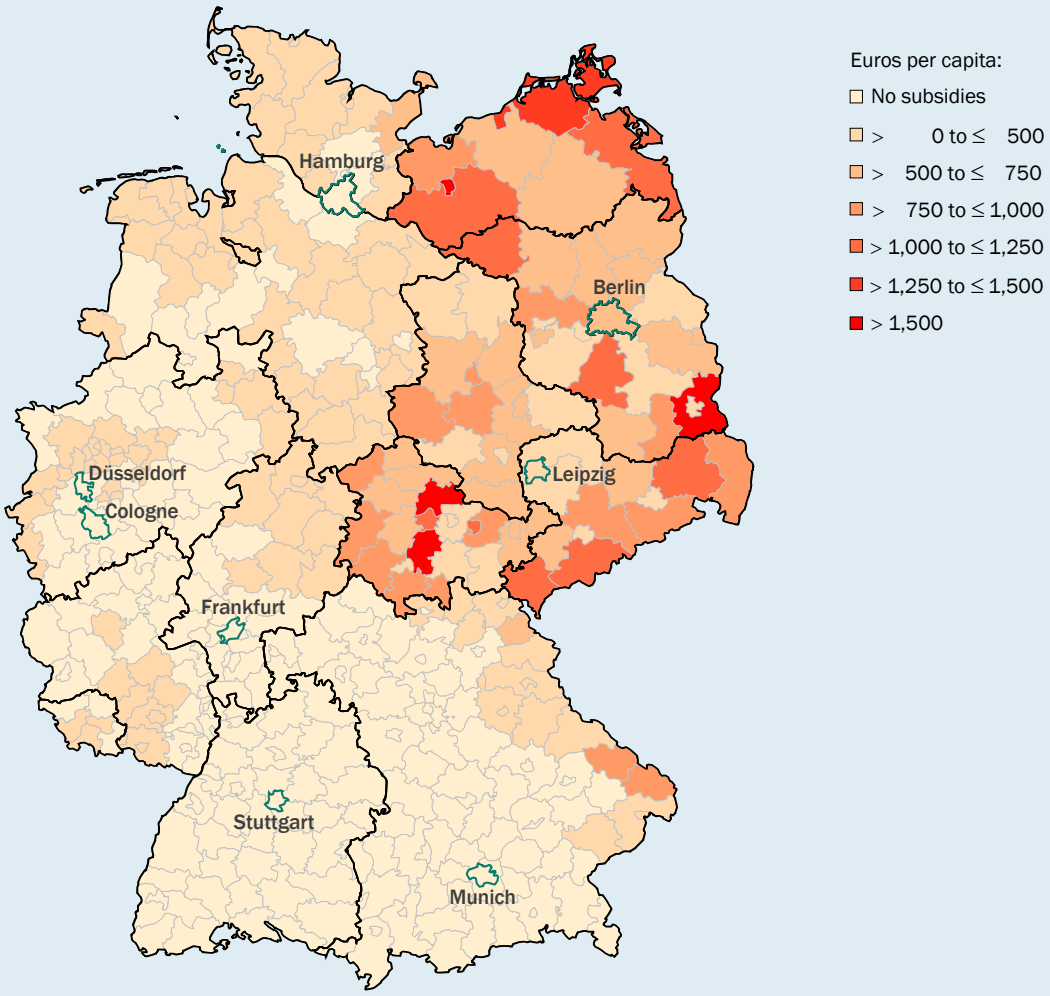
1 – Shows only those programmes that are still active in March 2025. GRW funds, the figures do not show the economic transformation of the coal regions and expenditure from European structural funds. 2 – Module of the „Start-ups from Science“ programme. 3 – ERP-European Recovery Programme.

Source: BMWi (2021)

The largest programme is the **'Joint Task for the Improvement of Regional Economic Structures' (GRW)**. Since 1969, it has supported private investment in structurally weak regions via various funding programmes with grants or low-interest loans of up to 45 % – up to 90 % for infrastructure measures. Structurally weak regions are classified on the basis of an indicator model that takes into account regional productivity, underemployment rates, demographic trends and infrastructure. Since reunification, the focus of regional funding has been on the new federal states. ↘ CHART 71

↘ CHART 71

GRW grants[1] approved for individual regional funding and infrastructure
in the period from 2011 to 2021



1 – Sum of the long-term grants from the joint Federation/Länder programme „Improvement of the Regional Economic Structure“ (GRW) to support structurally weak regions.

Sources: BBSR (2024), Federal Office for Cartography and Geodesy, own calculations
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All other GFS programmes also follow this classification. In addition to creating jobs, the GRW aims to reduce locational disadvantages, promote economic growth and advance the transformation to a sustainable economy. ↘ CHART 71 The focus is on strengthening regional value chains and promoting 'regional basic public services'. Subsidised companies must prove that they have collective wage agreements or wage increases based on the 'job-well-done' principle. The federal states decide on project funding and monitor compliance with the funding

regulations. A total of €8.5 billion in funding was approved between 2019 and 2023. €3.7 billion was spent on commercial investment, about 60 % of which was in the manufacturing sector. A further €4.8 billion was spent on business-related infrastructure (BMWK, 2024).

The **GRW special programme entitled 'Accelerating the transformation in the East German refinery locations and ports'** aims to ensure the security of supply of crude oil for the population and the economy with an additional volume of €750 million. It is financed equally by the Federal Government and the federal states affected (BMWK, 2022).

Independent of the GRW, the economic transformation of the coal regions is supported by specific programmes. ↘ BOX 27 APPENDIX In addition to the **Coal Regions Investment Act (InvKG)**, the **'Unternehmen Revier' model project**, for example, supports innovative projects for transforming coal regions. Individual projects can be funded with up to €200,000, while cooperation projects receive up to €800,000 (BMWK, 2025b).

In addition to the GRW, EU programmes play an important role in regional funding. In total, funds are allocated via five European Structural and Investment Funds (ESI Funds). The **European Regional Development Fund (ERDF)** supports regions that are lagging behind in terms of their development; it finances measures in the areas of innovation, digitalisation, SME promotion, sustainability and energy transition. Some ERDF funding goes to cross-border cooperation and regional networking projects. Around €200 billion is available for the 2021–2027 funding period. The **European Social Fund Plus (ESF+)** focuses on promoting labour-market integration and employment. In particular, disadvantaged groups, job entrants, start-ups and the self-employed are supported. The **Just Transition Fund (JTF)** is aimed at regions that are particularly affected by the transition to a climate-neutral economy and the associated social, economic and environmental problems. Funding is provided for investment in SMEs, research and innovation, digitalisation and further-training measures (BMWi, 2021). There is also the European Agricultural Fund for Rural Development (EAFRD) and the European Maritime and Fisheries Fund (EMFF). The level of funding depends on economic development of the respective region; it is determined on the basis of GDP per capita (Schwarz, 2024).

370. Furthermore, there are also **specific measures** to support structural change in the regions. The Federal Government passed the 'Coal Regions Structural Strengthening Act' (StStG) in 2020. This includes the Coal Regions Investment Act (InvKG), which is intended to support the regions affected by the coal phase-out with financial aid and other measures, such as locating federal authorities in the region (Bundesregiereung, 2022, 2024b). ↘ BOX 27 APPENDIX For example, it provides for the promotion of business-related infrastructure, education and R&D. The funds provided are passed on to the federal states, which develop and implement specific projects. One example is the 'Lusatia Programme 2038', a strategic concept of the Brandenburg state government to shape structural change in Lusatia following the planned phase-out of lignite-based power generation in 2038 at the latest (Stk Brandenburg, 2024).

Up to now, the outflow of funds has been small at just 7.2 % as of June 2024 (Brachert et al., 2024). Expenditure of funds is likely to accelerate as the programme progresses. To date, the **funds have predominantly been channelled into growth-promoting areas** such as accessibility, education, research and development, which is basically to be welcomed. In the future, there should be a greater focus on boosting the regional workforce potential (Brachert et al., 2024). Evaluations showing concrete causal effects are not yet possible, which makes an assessment difficult.

Weighing up efficiency and social aspects

371. **Funding measures** for infrastructure and companies should on principle always be used where they **generate the greatest economic benefit**. If the focus is purely on the growth effect, investments should primarily be made in infrastructure, digital networks, education and science in urban centres, as these have a high growth effect (Andersson and Lööf, 2011; Dauth et al., 2022; Gornig and Schiersch, 2024). In the eastern German states, by contrast, the measures enacted by the 'Treuhand' were aimed at safeguarding employment. One consequence of this is that workers were allocated inefficiently, and productivity is well below the national average (Akcigit et al., 2023). In the political process, however, not only efficiency but also **socio-economic aspects must be taken into account**. It may therefore make sense to specifically cushion structural change in particularly affected regions, and to provide support by investing in regional centres.

372. **The political effects** of unsuccessful **structural change** are particularly evident in regions where population decline, economic insecurity and infrastructural decay coincide (Fraile and Pardos-Prado, 2014; Diermeier et al., 2024). Despite some positive economic developments – such as falling unemployment or rising wages – the subjective perception of the economic situation remains negative in many places (Bundesregierung, 2024a). In eastern Germany especially, economic momentum is systematically underestimated (ibid.). The result is a profound erosion of confidence in the state's effectiveness, especially in areas where basic public services and the building infrastructure are increasingly showing a lack of investment. In such regions, the state is in danger of being perceived as incapable of acting – a situation that could jeopardise democratic structures in the medium to long term. ↘ BOX 28 APPENDIX

Regions that are deindustrialised, demographically weakened or affected by job losses are particularly susceptible to populist and extremist parties (Colantone and Stanig, 2019; Lewis-Beck and Stegmaier, 2019). Empirical findings show that economic insecurity and a lack of future prospects lead to greater support for right-wing populist parties, especially when public investment fails to materialise and narratives of cultural exclusion become entrenched (Colantone and Stanig, 2018, 2019; Dippel et al., 2022). **At the same time, targeted economic-support programmes –** for example through the European Regional Development Fund – can **measurably strengthen trust in democratic institutions** and approval of representative democracy (Gold and Lehr, 2024). Societal acceptance of structural change therefore depends crucially on whether it is possible not only to improve economic indicators, but also to create visible and tangible future prospects for disadvantaged regions.

EU regional-policy funding programmes

373. **At the European level,** the **European Regional Development Fund** (ERDF) supports investment in disadvantaged regions in order to strengthen economic, territorial and social cohesion within the EU. Funding focuses on measures to support innovation-driven economic change and the transformation towards a climate-neutral Europe (BMWK, 2025c). Particular attention is paid to

regions that suffer from severe, permanent natural or demographic disadvantages.

374. Although **EU cohesion policy**, which is aimed in particular at urban metropolitan regions, supported growth in assisted areas between 1980 and 2015, it **was unable to halt** the **growing regional inequality** between European regions. Agglomeration effects, rising real-estate prices and low levels of mobility reduce effectiveness, whereby in particular transfers to regions with a high level of education and efficient administration show positive effects (von Ehrlich and Overman, 2020). Although **convergence support** (Objective 1) within the EU Structural and Cohesion Funds (1989–2013) led to **short-term economic growth** in structurally weak regions, the **progress achieved often declined after the funding ended**. The positive effects were also weakened during the financial crisis (2007–2013) (Becker et al., 2018). The EU's **Just Transition Fund** aims in addition to support regions that are facing major socio-economic challenges due to the transition to a sustainable and climate-neutral economy. Here, the focus is on economic diversification and retraining (European Commission, 2024).

3. Enable and facilitate structural change in the labour market

375. **Structural change** gives rise to **new fields of activities and new occupations**, while other activities become less important. ↘ ITEM 339 Qualification requirements can also change within occupations. Increasing participation in **further training and retraining measures** is therefore **essential** in order to reduce adjustment frictions on the labour market and maintain the employability of employees. ↘ ITEMS 376 FF. If the skills structure does not match the dynamics of the regional economic structure, ↘ ITEM 340 it may be difficult to adapt within the region. In this case, it may make sense to use specific measures to promote the employees' labour-market mobility by removing barriers to changing jobs. ↘ ITEMS 383 F.

Increase participation in further training measures

376. In order to prevent structural change from causing major frictions on the labour market, affected **employees** should **adapt** their **qualifications** to the new fields of activity **at an early stage**. Participation in vocational further training varies greatly both regionally and between population groups (Martin et al., 2021). ↘ CHART 72 Low-skilled workers are significantly less likely to participate in further training than more highly skilled workers (Kruppe and Trepesch, 2017; Federal Statistical Office et al., 2024). In a survey conducted by the Institute for Employment Research (IAB) on **barriers to participation in further-training measures**, the most common reason cited by low-skilled workers was that they were **no longer used to learning**; the second most common reason was that they were **unsure about the financial return on further training** (Osiander and Stephan, 2018). For highly qualified people, on the other hand, **a lack**

of time and the assessment that **their own qualifications are sufficient** dominate as obstacles mentioned.

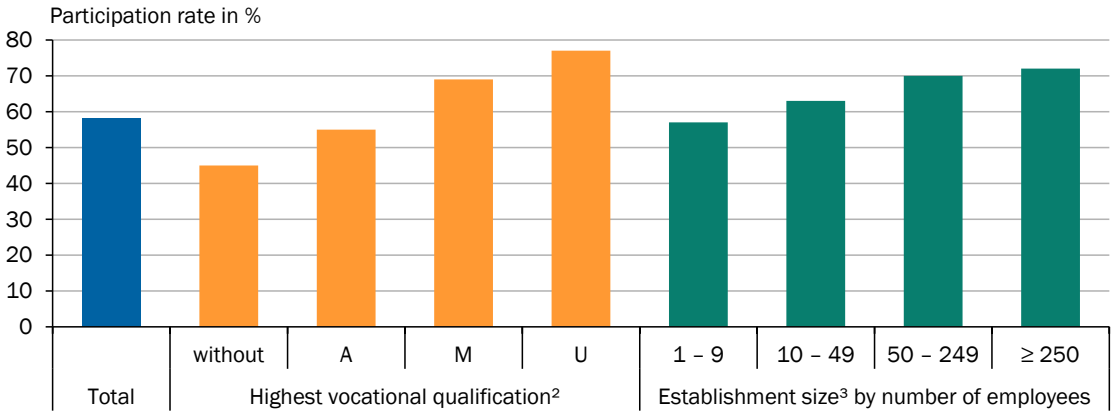
377. **Uncertainty about the benefits of further training**, especially among the low-skilled, could **be reduced by providing advisory services** (GCEE Annual Report 2022 item 392). In order to increase the low take-up of existing services (Osiander and Stephan, 2018), a **clear and comprehensive counselling structure** would be helpful. The national online portal for vocational further training 'mein NOW', published by the BA in 2024, provides information on further training centrally and attempts to offer low-threshold counselling and funding opportunities. However, the effectiveness of this online portal cannot yet be assessed.

Addressing employees directly at the workplace, e.g. with so-called **further-training mentors (WBM)**, is a promising idea. The mentors try to initiate **low-threshold discussions on equal terms** with employees **about further training measures at the workplace** to **break down barriers to further training** (Winkler and Calmez, 2024). According to the BMBF, there are currently only around 460 WBMs in about 170 companies and administrations across Germany (BMBF, 2025). With the help of a new funding guideline, further projects to establish WBMs are to be funded as from September 2025 (BMBF, 2024a).

378. Employees incur direct (e.g. participation fees) and indirect (e.g. lost wages) costs for further training, while the benefits of further training measures are usually only realised in the future. This can inhibit employees' willingness to undertake further training. In addition to comprehensive counselling, ↘ ITEM 377 **subsidizing further-training costs** can therefore also increase participation. Currently,

↘ CHART 72

Participation in further training by vocational qualification and establishment size in 2022[1]



1 – Participation in continuing further training in the past twelve months by people aged 18 to 64. Sample size: n = 9,163.
2 – A-Apprenticeship/vocational college, M-Master/technical college, U-(technical) University. Studies at a vocational academy are categorised as „(Fach-)Hochschule“. The categories „GDR technical school“ and „Training centre/school for educators“ introduced in the AES 2016 have since been assigned to the category „Master craftsperson/technical school“
3 – Participation in further training by dependent employees. Sample size: n = 5,351.

Sources: BMBF (2024b) based on the Adult Education Survey (AES 2022), own calculations

employees can receive financial support for retraining to acquire higher qualifications through the Upgrading Training Assistance Act (Aufstiegs-BAföG). Opening up the Aufstiegs-BAföG to further training courses at the same level could increase participation (GCEE Annual Report 2022 item 397).

In all federal states with the exception of Bavaria and Saxony, there is also an employer-paid educational leave of five days per year. However, this time is often not sufficient for more extensive retraining, which is why a **regulation for a longer paid training period** with high demands on the quality of the content would be a good idea (GCEE Annual Report 2022 item 398). Financing with the participation of the companies that would potentially benefit would be conceivable.

379. The **participation rate in further-training measures increases with the size of the company**. ↘ CHART 72 In a company survey, the most common obstacles to higher employee participation in further training were said to be **a lack of time for releasing employees from work** and **a lack of internal capacity for planning and organisation** (Seyda et al., 2024). When asked about desired support measures, financial support, individually tailored further-training offers, and the exchange of experience and networking with other companies were most frequently mentioned (Seyda et al., 2024).

Qualification networks for SMEs in particular could help them to identify skills that will be required in the future and to develop further-training courses. In such alliances, companies, associations and institutions come together to form regional networks in order to jointly develop further-training opportunities for employees (Dauser et al., 2022). The 53 **further-education networks** funded by the BMAS (Warnhoff et al., 2024) and the ESF-Plus programme called **'Zukunftszentren'** (BMAS, 2023) pursue a similar goal.

380. Funding for further training was simplified and expanded in 2024 to **ease the financial burden on companies for further-training measures**. Since then, companies have also been able to receive further-training funding for employees who are not directly affected by structural change or who work in shortage occupations. Certified further-training courses that comprise more than 120 hours and teach skills that go beyond job-related, short-term adaptation training are eligible for funding. Depending on their size, companies can receive subsidies towards wages and course costs for further training measures. Furthermore, a new funding instrument has been introduced in the form of a **qualification allowance** for companies affected by structural change. The prerequisite is that a not insignificant proportion of the workforce (at least 20 % of employees, 10 % in the case of smaller companies) needs training as a result of structural change, and this need has been documented in a corresponding company agreement or a company-related collective agreement. During a training measure, the BA pays compensation equal to the short-time working benefit, while the company pays the training costs. The aim is to ensure secure employment in the current company (BA, 2025).

By **opening up further-training funding** to all employees, companies and employees can react more easily and more flexibly to changing qualification requirements. However, a survey conducted by the IAB shows that **the funding**

opportunities are not sufficiently well known and the **application procedures are often considered too complex and challenging** (Biermeier et al., 2023). For example, SMEs often report that they are unable to cope with the loss of work for a minimum duration of 120 hours, while the range of certified further-training courses is too limited in rural areas. The regulations on funding further training could therefore be simplified and made more flexible.

381. Furthermore, **training curricula** (both for schools and universities and for vocational training) should **be regularly adapted to changing requirements** (Backes-Gellner and Lehnert, 2023). More general skills that are needed in many areas should be taught, and students trained in transferring these skills to changing specific applications (e.g. mathematics, IT and digital skills, social skills and languages) (Nägele and Stalder, 2017; Bunde et al., 2023).

382. Despite having more free time, employees on short-time work rarely take part in further-training measures. During the COVID-19 crisis, the training rate among employees on short-time work was just 5 % (Kruppe and Osiander, 2020). Short-time work is a suitable way of creating employment security for both employees and companies during periods of economic weakness. However, short-time work is not a suitable instrument for cushioning labour-market frictions caused by structural change, as it keeps employees in companies who have no long-term employment prospects – at high public cost. If this does not result in a reallocation of staff to more productive companies, it reduces macroeconomic productivity (Giupponi and Landais, 2023; GCEE Spring Report 2024 box 8). An **extension of the entitlement period for reduced working hours**, such as the temporary doubling of the maximum entitlement period introduced for 2025, should therefore always **be linked to the implementation of in-company further training measures** (Weber, 2025; GCEE Annual Report 2022 item 404). A further training bonus could also increase the incentives for employees to participate (Weber, 2021).

Facilitate changes of employment

383. **Changing employment between companies** can be **facilitated by** so-called **labour-market hubs (Arbeitsmarktdrehscheiben)**, which connect companies that are reducing employment with those that are looking for staff. Ideally, employees can find a follow-up job directly in this way without having to go through the unemployment process. Labour-market hubs often develop from qualification networks ↘ ITEM 379 and are managed by the BA (Herrmann, 2024). Examples include the Arbeitsmarktdrehscheibe Neckar-Alb and the Jobdrehscheibe North Rhine-Westphalia. The aim is to facilitate job transitions by exchanging anonymised applicant profiles, designating vacancies in the job search, and organising career fairs (DGB, 2024). The necessary further-training courses are evaluated in cooperation with the BA and, where possible, implemented on the premises of the current employer.

The concept of labour-market hubs could be made more attractive with a voluntary, time-limited, legally secure **trial phase with a new employer** before changing jobs (BDA, 2024; BMAS, 2024; DGB, 2024). This would enable all the

parties involved to check in advance whether participation makes sense and to better assess potential further-training requirements.

384. Structural change does not affect all labour-market regions in Germany to the same extent. ↘ ITEMS 304 FF. **Efficient allocation** therefore requires sufficient spatial **labour mobility**. However, this is made more difficult on the one hand by the increasing housing shortage and rising housing costs in conurbations (GCEE Annual Report 2024 item 348). On the other hand, social aspects such as the family situation play an important role when people choose where to live and work. Generally speaking, young and well-educated people in particular are geographically mobile (BIB, 2012).

For young people, the newly introduced **support** for **supra-regional vocational orientation internships** and the **mobility allowance** during the first year of training could increase occupational mobility (BA, 2024a, 2024b). For employees, **supra-regional labour-market hubs** could increase geographical mobility. The increasing prevalence of working from home offers an opportunity for a match of employees and employers despite geographical distance (GCEE Annual Report 2024 item 330). However, since many jobs still require regular on-site presence, a supra-regional switch to a new job will still usually require a move.

A differing opinion

385. One member of the German Council of Economic Experts, Veronika Grimm, is of the opinion that important options for action are not addressed in the chapter 'Structural change in Germany: regional aspects and effects on productivity growth and the labour market' and does not share the assessments of the Council majority with regard to various options for action mentioned.

386. The chapter focuses on two main topics: first, structural change in Germany, ↘ ITEMS 292 FF. AND 315 FF. and, second, regional differences in economic structure and the economic weakness of regions. ↘ ITEMS 304 FF. AND 337 FF. At the end of the chapter, ↘ ITEMS 347 FF. the Council majority discusses options for action which, in its view, are particularly suitable for countering structural change and addressing regional differences in the economic structure. These measures range from IPCEI projects ↘ ITEM 355 to trade agreements, ↘ ITEM 357 active state support for selected industries, ↘ ITEM 362 targeted support for regions weakened by structural change, ↘ ITEM 365 measures within the framework of the 'Joint Task for the Improvement of the Regional Economic Structure' (GRW) ↘ ITEM 367, measures within the framework of the ERDF ↘ ITEM 373 and state coordination of further training. ↘ ITEMS 375 FF.

387. The dissenting Council member is of the opinion that important **fundamental options for action are not discussed** which, however, in view of the extensive challenges of structural change, form the basis for the discretionary measures mentioned to be effective at all. The Council majority mentions, ↘ ITEM 347 that, in view of structural change, the economic scope for supporting particularly affected regions is increased by growth-enhancing measures – such as strengthening the capital markets, skilled immigration, greater incentives to work and investment in human capital, fixed assets and cross-sectional technologies – and by the financial package. Yet, if we relied solely on the options for action mentioned by the Council majority, we would not be able to address the challenges effectively and might possibly expand the measures to an extent that exceeds the financial and administrative capacities of the public sector. **This dissenting opinion** therefore successively **addresses the two challenges** (structural change and regional differences in economic structure) **and important options for action** that should be taken up before discretionary measures and support programmes are used – which can even largely replace them. The focus here is on the aim of enabling the affected regions and stakeholders to actively shape their own future opportunities. Reference is made to previous annual reports in which the German Council of Economic Experts has commented on various measures and presented analyses.

388. In order to **counter structural change**, first of all fundamental **structural reforms** are necessary, and these are not – or only marginally – addressed in the main text in the discussion on the options for action. They are an important prerequisite for ensuring that discretionary measures, which may be necessary in individual cases, can serve their purpose and remain affordable at the same time.

In some cases, reforms mean that **companies or citizens can address the challenges of structural change on their own,** or even **benefit from the opportunities of structural change**, so that further state intervention would not be necessary.

389. In order to address the regional differences in the economic structure, the Council majority discusses numerous funding systems for structurally weak regions (ERDF, GRW) and suggests extending them. However, the chapter **lacks a discussion of the role of federalism and the principle of subsidiarity, as well as the role of market mechanisms in adapting to ongoing structural change** and in overcoming the challenges. In this dissenting opinion, these important aspects are brought to the fore and, at the same time, some disadvantages of the various support programmes are discussed, which are not addressed by the Council majority.

1. Address structural change

390. Germany is experiencing a severe structural crisis, which has been looming since at least 2018 and was discussed by the GCEE both in the GCEE Annual Report 2019 and more recently in the GCEE Annual Report 2023 (GCEE Annual Report 2019; 2023; see also Feld et al., 2025). **Demographic trends** are not only **reducing production potential** (GCEE Annual Report 2023), the **traditional export model is** also **coming under pressure** from increasing competition, especially from Asia (Grimm et al., 2024; EFI, 2025). Investment is declining and productivity growth has also been too low for many years. **Technological progress is not sufficient** to offset the growth-dampening effects (GCEE Annual Report 2023).

391. At the same time, there is a **historically low level of capacity utilisation** in the economy, although it varies considerably from one economic sector to another: while capacity in industry and construction often remains unused, ↘ CHART 13 certain sectors – such as civil engineering – are less severely underutilised. ↘ ITEM 54 ↘ CHART 18 The service sector has almost fully recovered after the COVID-19 pandemic and is becoming increasingly important (see Feld et al., 2025). ↘ CHART 48 However, the rising value added and employment in Germany in this field is concentrated in healthcare and social services, and especially in the public sector – unlike in the USA, for example, where highly productive areas such as the tech sector are driving the dynamic growth of the service sector (Feld et al., 2025). ↘ ITEM 295

392. The Council majority does not use this difference in development as an opportunity to comprehensively outline the options for strengthening the growth of economic sectors with high productivity, in particular productive services in the technology sector; only in ↘ ITEM 347 are capital markets, qualified immigration, stronger employment incentives and investment in human capital, fixed assets and cross-sectional technologies briefly mentioned. Yet there would appear to be an urgent need for further measures to **steer structural change in Germany in a positive (growth-oriented) direction** in order to sustainably increase

growth potential. This is because, while the planned debt-financed infrastructure and defence spending is likely to trigger only a moderate increase in growth potential (Gemeinschaftsdiagnose, 2025; von Wangenheim et al., 2025), ↘ ITEM 71 structural reforms that entail private investment and innovation in growth sectors could have a significantly higher impact on the economy's growth potential. ↘ ITEMS 395 FF.

393. To enable a dynamic that leads to technological progress and productivity growth and thus reverses the current trend of a structural dampening of potential growth, two fields of action are crucial: first, it is important to **create framework conditions that make the entrepreneurial discovery process and investments** in future-oriented value-added fields in Germany and Europe **significantly more attractive**. Second, measures should be taken to **ensure the availability of qualified skilled workers** for high-growth companies and, at the same time, **open up attractive employment opportunities** in the course of structural change.

394. Small-scale state control cannot be effective here (GCEE Annual Report 2019). On the contrary, government intervention can even be a hindrance and jeopardise growth-oriented structural change in many areas (Feld et al., 2025). This is because **state actors are typically not in a position to identify promising business areas, unlike non-state actors**. Therefore, the additional scope created by growth should not be used to expand discretionary measures, as suggested by the Council majority. ↘ ITEM 347 After all, this is primarily about combining excellent research with entrepreneurial activity and taking high entrepreneurial risks in the process. It is an integral part of the economic process that numerous companies fail in their attempts to open up future fields – yet at the same time new opportunities are open to the actors in a dynamic economic environment.

Enable productivity growth

395. Measures to **improve location conditions** are most suitable for supporting adjustment processes that increase productivity in the course of structural change (GCEE Annual Report 2019). Above all, it is important to improve the general framework conditions for companies in order to make innovative business models possible (EFI, 2025; Feld et al., 2025).

396. This requires extensive **adaptation and, in some cases, the abolition of innovation-inhibiting regulation** (see also the comments in the dissenting opinion on the bureaucracy chapter, ↘ ITEMS 271 FF. AND 276 FF. or Georgieva (2024)). In particular, the **overstretching of the precautionary principle in the EU leads to high indirect costs**, as potential risks are overestimated and opportunities, for example for economic growth, are systematically underestimated or not taken into account (OECD, 2023; Draghi, 2024b; Nam, 2024). In practice, this often leads to new technologies – e.g. in the fields of genetic engineering, AI, pharmaceuticals, medical technology, nuclear technology, synthetic fuels or new materials – being approved much more slowly or being restricted from the outset by very strict requirements (OECD, 2023; Feld et al., 2025; Misch et al., 2025). In view of the highly dynamic global environment, the fixation on risk avoidance is

likely to increasingly become a competitive disadvantage on global markets without a systematic consideration of innovation potential in the design of legislation.

397. **Furthermore, the adaptability of the German economy is higher in a further developed European single market** (IMF, 2025b). Energy policy, climate policy, security and defence policy, as well as research and development should be (even) more closely integrated at the European level (Schlepper, 2024; Burilkov and Wolff, 2025; EFI, 2025; Monopolkomission, 2025). There are considerable economies of scale here, for example by coordinating capacities, competition and knowledge transfer. Moreover, research in the military field offers substantial spillover potential for civilian innovation (Fuest, 2025; Grimm, 2025; Ilzetzki, 2025). European collaborations in the field of energy and infrastructure policy can make additional efficiency gains possible (Grimm et al., 2024; Feld et al., 2025). More integrated capital markets could make it possible to finance start-ups and investments (GCEE Annual Report 2023). ↘ ITEM 347

398. Further key parameters for adjustment in Germany include **simplifying and lowering corporate taxation** (Feld et al., 2018, 2025; Dorn et al., 2021; BMF, 2024), **cutting non-wage labour costs** (e.g. through pension reforms or the 'citizen's income' (Bürgergeld), GCEE Annual Reports 2020, 2023) and **tax incentives for labour supply and investment** (Advisory Board to the BMF, 2023; Blömer et al., 2024, 2025; Deutsche Bundesbank, 2024b). ↘ ITEM 347 Employees and the labour market can also be better equipped to adapt to the effects of structural change. This might be achieved by increasing labour-market dynamics, e.g. by making labour-law regulations more flexible (Meier, 2018; IMF, 2025a; GCEE Annual Report 2019; GCEE Annual Report 2021) or easing rent regulation (MV in GCEE Annual Report 2024 items 413 ff.).

399. Last but not least, a **cost-efficient energy and climate policy** in Germany could structurally reduce energy costs (Grimm et al., 2024; EEM, 2025; Feld et al., 2025). A stronger focus on carbon pricing and the **reduction of regulatory barriers and bureaucratic burdens** – for example by withdrawing technology-specific instruments such as the EU taxonomy and redundant reporting obligations in the course of sustainability reporting ↘ ITEM 272 – can improve the basis for stronger entrepreneurial activity.

Ensure the availability of qualified skilled staff

400. The falling value added in manufacturing and the growing importance of less productive service sectors (close-contact services, public sector) dampens growth potential and also leads to a **relative increase in lower-paid jobs**. An increase in employment can also be seen in public administration, partly due to the increasing complexity of regulation ↘ ITEMS 260 FF. (see GCEE Annual Report 2024 chart 27). If productivity in the service sectors remains constant, demographic change could be expected to lead to an increase in personnel requirements, particularly in the healthcare and nursing-care sectors, thus limiting the skilled-labour potential available to other sectors.

401. The measures to strengthen the supply of labour widely discussed in the past and by the Council majority in the main text (on pensions: GCEE Annual Report 2020; GCEE Annual Report 2022; on the transfer system: GCEE Annual Report 2023; on spouse taxation: GCEE Annual Report 2023; on further training and retraining: GCEE Annual Report 2022) ↘ ITEM 375 are unlikely to be sufficient to make an adequate pool of skilled workers available for companies in highly productive sectors. Further important options are therefore digitalisation and automation in the field of close-contact services and public administration ↘ BOXES 9 AND 16 ↘ ITEMS 278 FF. AND 330 FF. (Kühn et al., 2018; McKinsey & Company, 2018; Bringmann, 2023). Although the potential for automation in the areas of healthcare and nursing care is currently estimated to be low (GCEE Annual Report 2023 items 135 ff.), progress has been made in other countries (Heise online, 2022; Healthcare Denmark, 2023). **Regulatory adjustments are likely to be necessary** for **automation in the areas of healthcare and nursing care**, but there are also **hurdles to overcome when it comes to the acceptance of adjustments**. The same applies to digitalisation and the use of AI in public administration. ↘ ITEMS 278 FF. The capacities required for administration can also be reduced by abolishing and simplifying regulations, and by carrying out a cost-benefit analysis when drafting laws, also with regard to the administrative effort required to enforce the regulations. This is likely to affect technology-specific regulations and subsidy programmes, e.g. in connection with the energy transition (for examples see Albuscheit et al., 2025).

402. In the long term, strengthening human capital in particular is crucial in order to be able to use structural change as an opportunity. **High-quality early childhood education, the nationwide expansion of all-day schooling** and **closer dovetailing of vocational and academic education** can improve the integration of disadvantaged groups in particular and leverage the potential of skilled workers (acatech et al., 2023; GCEE Annual Report 2017; GCEE Annual Report 2021). In particular, a cultural change is needed among companies and employees that **sees failure as part of innovation processes and recognises it not as a flaw but as a learning opportunity**. This perspective should be more strongly integrated into the education system.

2. Address regional differences

403. Without the fundamental reforms discussed under 2.), regional-policy measures cannot be effective. **The lack of trust in the state's ability to direct**, which is addressed in the main text, ↘ ITEM 371 **can** probably **not be restored** – as suggested by the Council majority – **by means of even more state control**. The linkage of jurisdictions proposed in the main text represents a particular problem because the electorate's mandate at the federal or state level is relativised and counteracted by the involvement of other levels. For this reason, the democratic principle of Art. 20 para. 1 and para. 2 of the Basic Law also contains a fundamental prohibition of overlapping administrations (BVerfG, 2014).

404. **Strengthening both federal structures and the subsidiarity principle** is therefore crucial for effective regional policy. In the federal system, the various

levels – federal, state and local – are able to develop regionally specific measures that are precisely tailored to the needs of the regions (Feld, 2007; Feld et al., 2018). This allows local **actors to respond to regional challenges in a targeted and flexible manner**, since they **have detailed knowledge and a high level of interest in the measures' chances of success**. Examples of this include setting up public authorities or educational institutions, as well as economic development by state or local authorities.

405. Such decentralised governance makes it possible to promote regional strengths and develop locally integrated_solutions. **Excessive centralisation by the Federal Government, on the other hand, can lead to overreach and a diffusion of responsibility**, which jeopardises local autonomy and the specific adaptability of the regions (BVerfG, 2014). It is therefore all the more important that the different levels in the federal system make efficient use of their respective competencies and resources, while maintaining strong local identification with regional successes and failures ('ownership').

406. However, **the amendments to the Basic Law** by the Bundestag and Bundesrat regarding the special fund for the infrastructure **contribute to a further undermining of federalism and the principle of subsidiarity** (Haupt, 2025). The centralised planning and evaluation of measures by the Federal Government increases the risk that the specific needs and circumstances of the individual regions are not sufficiently taken into account (Hüther and Vogel, 2021). This can lead to measures not being adequately tailored to local requirements, which could reduce their effectiveness and lead to the inefficient use of funds. A stronger influence of the Federal Government on the implementation and evaluation of projects could also weaken the willingness of local actors to take responsibility for their own actions.

407. **Municipal finances should be improved as part of structural reforms** to enable municipalities to meet the specific challenges of structural change. The stabilisation of municipal revenues, especially in view of the the fact that trade tax is susceptible to cyclical influences, requires a diversification of revenue sources and an adjustment of the financing system in order to provide municipalities with a broader and more stable financial basis (Riedel and Simmler, 2024; Gemeinschaftsdiagnose, 2025).

408. Numerous forms of social expenditure – e.g. for basic income support or integration assistance – are also de facto borne by the municipalities, although they are based on federal law (see also e.g. BVerfG, 2020), where clear limits are set for the transfer of tasks from the Federal Government to the municipalities). However, the associated costs are not always adequately compensated for by federal or state funding. As a result, the so-called connectivity principle is not adequately upheld, particularly in the field of social services (Riedel and Simmler, 2024). This leads to a structural financial overburdening of many municipalities, which are increasingly losing their financial room for manoeuvre. A more consistent application of the principle of connectivity would be necessary to ensure municipal efficiency – either by more financial involvement on the part of the Federal Government in tasks initiated by it, or through a withdrawal of the Federal Government

from regulatory areas in which it does not provide funding. In this case, **the federal states and local authorities would have to be able to decide for themselves whether and how they provide the corresponding services**. Such a reorganisation would not only provide more clarity in the distribution of tasks, but would also open up scope for structurally weak municipalities to make necessary investments and pursue an active structural policy.

409. The **federal states play a decisive role in managing structural change** by **coordinating regional development strategies**. They can strengthen the competitiveness of structurally weak regions by investing in infrastructure, education, targeted research programmes geared towards local needs, and by securing the supply of skilled workers. They can also launch various programmes that contribute to social cohesion and thus counteract the negative consequences of change. In close cooperation with the Federal Government and the EU, the federal states can ensure that funding is used efficiently and that the specific needs of their regions are taken into account. With these measures, the federal states can create the basis for successful and sustainable structural change.

410. In addition to the options for action that enable municipalities to better adapt to the demands of structural change, and the active involvement of the federal states in supporting this process, the programmes for managing structural change (such as ERDF, GRW, etc.) discussed in detail by the Council majority could play a role. However, **in view of the mixed evaluation results on the effectiveness of these programmes** (Asatryan et al., 2025), **it is questionable whether they should be expanded further** to enable more and more regions to cope with the increasing structural change. An expansion entails the risk that these programmes will become even less targeted and will distribute funds less accurately across the board, resulting in major deadweight effects. They would also become more cumbersome and inefficient, as they often involve strong central control. This would reduce their effectiveness and make less efficient use of public funds. In this case, confidence in the efficiency of state institutions would be at risk of dwindling even further.

411. Instead, it seems to make much more sense to optimise the programmes and make them more flexible in order to give the municipalities and federal states more scope for tailor-made solutions. A **rising dependence on centralised funding measures could** also **reduce local commitment and self accountability**, as already discussed above in the context of the growing influence of the Federal Government.

APPENDIX

↘ BOX 25

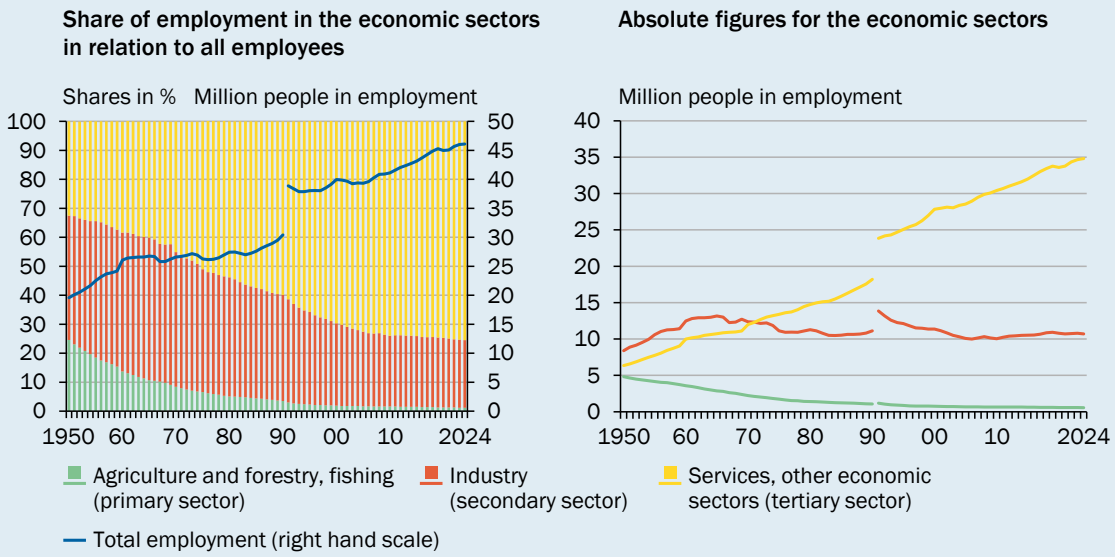
Background: Historical change in the distribution of employment due to structural change in advanced economies

With the exception of the last 20 years, **structural change in recent decades in most advanced economies has been similar to that in Germany**. Around 1870, for example, around 50 % of the workforce in Europe was employed in agriculture (Broadberry et al., 2007). As a result of technological innovations, particularly in the course of the Industrial Revolution, employment then shifted continuously to the secondary sector. As a result, in the 1950s, only 5 % of the UK workforce was employed in the agricultural sector. In France, by contrast, the figure was around 23 %, as the shift was less advanced due to the destruction caused by the Second World War. (Daudin et al., 2010). In the USA, the proportion of employment in the primary sector fell from a solid 54 % in 1870 to 13.5 % in 1950 (Lebergott, 1966).

The economic structure changed increasingly from the 1970s onwards, triggered by a commodity and energy crisis and the subsequent waves of globalisation. Rising oil prices and technological advances in information technology led to a shift of jobs to the tertiary sector (Nixon, 1973). Today, the service sector accounts for around 80 % of jobs in the USA, France and the UK, while the share in the primary sector has fallen to around 1 %.

↘ CHART 73

Domestic employment by economic sector[1] in Germany[2]



1 – 1950 to 1969: according to the Classification of Economic Activities, 1979 edition (WZ1979). 1970 to 1990: according to the Classification of Economic Activities, 2003 edition (WZ2003). From 1991 according to the Classification of Economic Activities, 2008 edition (WZ2008). 2 – Former federal territory up to 1990. The years 1950 to 1959 without Berlin and Saarland.

Sources: Federal Statistical Office, own calculations

In the period between 1945 and 1990, the **share of employment in the service sector** in **Germany rose** sharply, while the share in the secondary sector fell. ↘ CHART 73 LEFT However, the decline in the share of employment in the secondary sector, particularly in manufacturing, was not always accompanied by an absolute decline in employment in this sector. ↘ CHART 73 RIGHT

Although employment fell between 1991 and 2005, mainly due to reunification and the integration of Eastern Europe and China into the international division of labour (Schwahn et al., 2018), it increased again from 2005 onwards.

↘ BOX 26

GCEE analysis: The impact of structural change on productivity growth

Using the 2009 and 2023 versions of the EU-KLEMS database, the GCEE estimates the **contribution of structural change to the decline in labour-productivity growth rates in Germany** for the period from 1970 to 2020 based on Dürnecker and Sanchez-Martinez (2023). This is done by **breaking down** the decline in labour-productivity growth **into the decline within the economic sectors and** the effect **of the shift between the economic sectors**.

In the aggregate, **labour productivity** and its annual growth rate are strongly **correlated with TFP** and its growth rate (Kuntze and Kuckelkorn, 2021). Labour productivity is calculated as the ratio of real value added in an industry relative to labour input, measured in hours worked, in that industry per year. The EU KLEMS data contain, among other things, information on (real) value added and capital and labour input (in hours and as the number of employees). This makes it possible to create a long time series of labour-productivity growth rates. The 2009 version contains data for the period from 1970 to 2007, the 2023 version for the period from 1995 to 2020.

The **growth rate** of labour productivity (*LP*) is the sum of the growth rates of the economic sectors *i* weighted by their value-added shares:

$$\frac{LP_t - LP_{t-1}}{LP_{t-1}} = \sum_{i=1}^{N} \frac{\frac{VA_{it}}{VA_t} LP_{it} - \frac{VA_{it-1}}{VA_{t-1}} LP_{it-1}}{\frac{VA_{it-1}}{VA_{t-1}} LP_{it-1}}$$

The average annual growth rate in labour productivity over the years 1970 to 2020 is 2 %.

If the value-added shares of the economic sectors are kept constant over all years at the share in 1970, the macroeconomic growth rate of labour productivity can be broken down into the **effect of the shift between the sectors**, i.e. structural change, and the effect of the declining growth rate within the sectors. The growth rate of labour productivity, which excludes the share of structural change and continues to be based on the observed growth rates of labour productivity in the individual economic sectors, is calculated as:

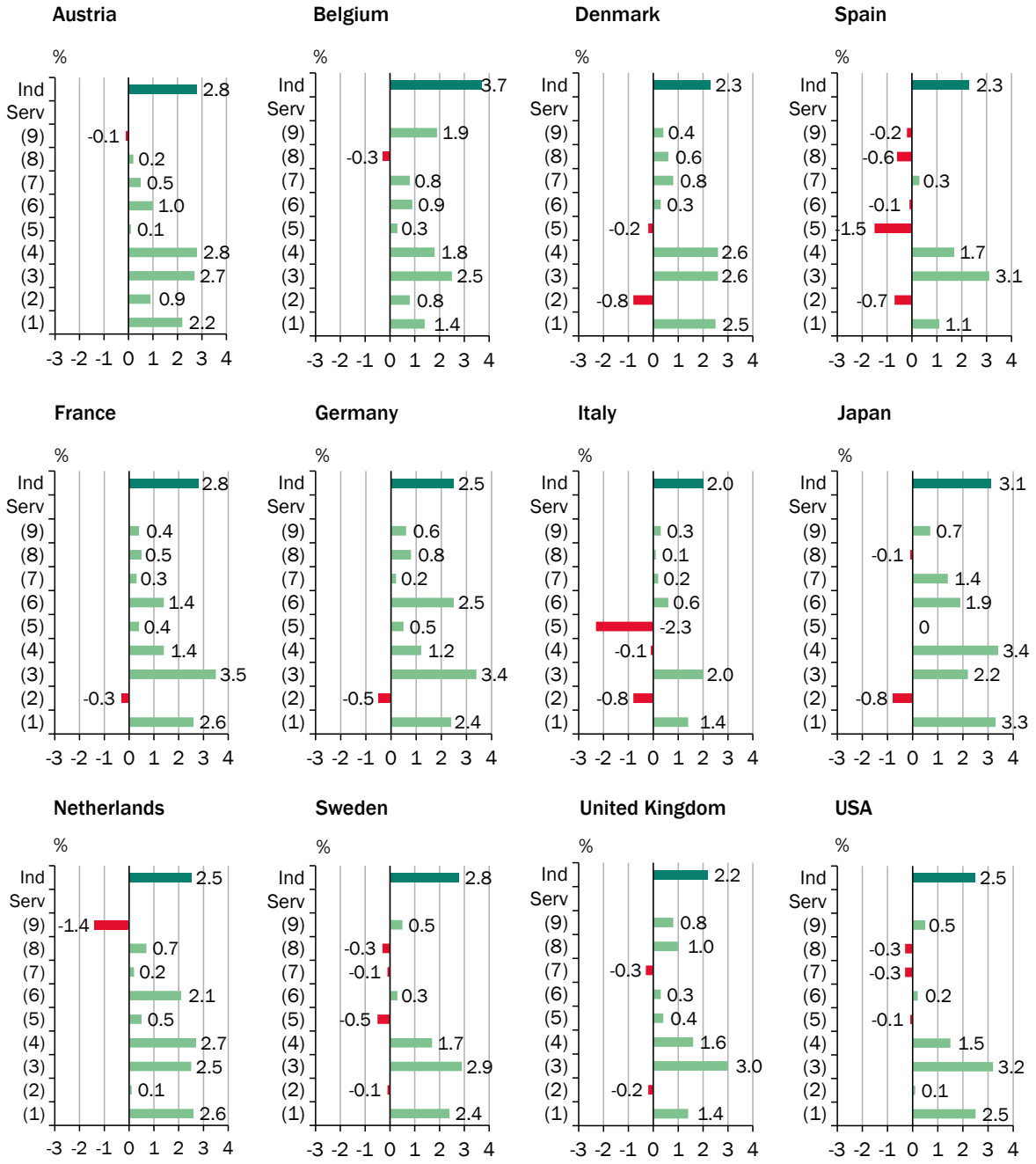
$$\left[\frac{LP_t - LP_{t-1}}{LP_{t-1}}\right]^{kontrafaktisch} = \sum_{i=1}^{N} \frac{LP_{it} - LP_{it-1}}{LP_{it-1}} \times \frac{VA_{i1970}}{VA_{1970}}$$

In this scenario, which only considers the observed dynamics of labour productivity within the sectors and thus excludes the effect of structural change, the average growth rate of labour productivity would have been 2.3 %. It should be borne in mind that in a counterfactual scenario in which structural change did not take place, the growth rates of labour productivity in the economic sectors would differ from those observed. Smoothing the annual growth rates with a third-degree polynomial shows that the effect of structural change on productivity growth occurred in particular up to the early 1990s. From 1995 onwards, there is a fairly constant gap between the observed and counterfactual growth rate – the so-called 'between effect': in the period from 1995 to 2010, this averaged 0.4 percentage points or 27.5 % of the growth rate. The average difference between the actual and counterfactual growth rate of labour productivity over the entire period under review is 0.25 percentage points or 11.7 %.

This means that structural change has contributed around 6 % to the productivity growth, which has been declining for years, both in terms of TFP (GCEE Annual Report 2023 items 99 ff.; GCEE Annual Report 2024 items 77 ff.) and labour productivity.

↘ CHART 74

Average productivity growth[1] from 1970 to 2017 for selected countries

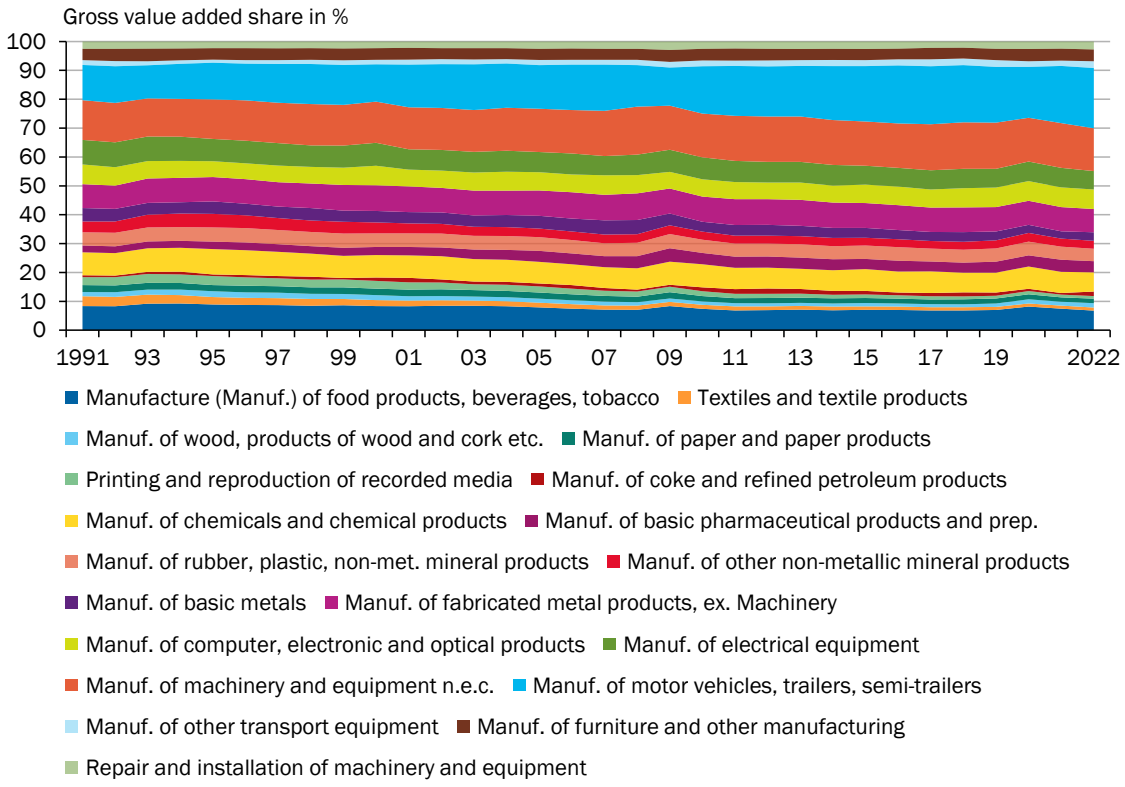


1 – Average annual growth rate of value added in constant prices per hour worked.

Source: Dürnecker and Sanchez-Martinez (2023)

↘ CHART 75

Structural change in the German manufacturing sector[1]



1 – According to the Classification of Economic Activities, 2008 edition (WZ 2008).

Sources: Federal Statistical Office, own calculations
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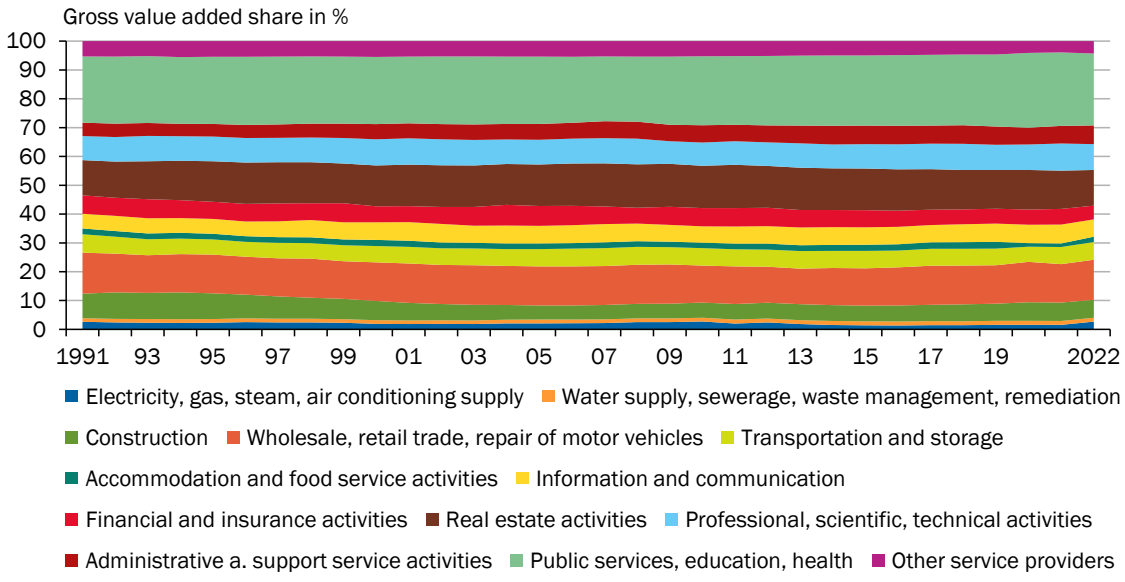
↘ CHART 76

Structural change in the German service sector[1]



1 – According to the Classification of Economic Activities, 2008 edition (WZ 2008). In addition to the original service sectors, the economic sectors of energy supply, water supply and waste disposal as well as construction are also included in the analysis.

Sources: Federal Statistical Office, own calculations
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↘ CHART 77

Classification of the service sector according to Eurostat

Knowledge-intensive services (KIS)[1]

Knowledge-intesive market services	High-tech knowledge-intensive services	Knowledge-intensive financial services	Other knowledge-intensive services
• (WZ 50/51) Water and air transport • (WZ 69) Legal and accounting activities • (WZ 70) Activities of head offices, management consultancy activities • (WZ 71) Architectural and engineering activities, technical testing and analysis • (WZ 73) Advertising and market research • (WZ 74) Other professional, scientific and technical activities • (WZ 78) Employment activities • (WZ 80) Security and investigation activities	• (WZ 72) Scientific research and development • (WZ 59) Motion picture, video and television programme production, sound recording and music publishing activities • (WZ 60) Programming and broadcasting activities • (WZ 61) Telecommunication • (WZ 62/63) Computer programming, consultancy and related activities; Information service activities	• (WZ 64) Financial service activities, except insurance and pension funding • (WZ 65) Insurance, reinsurance and pension funding, except compulsory social security • (WZ 66) Activities auxiliary to financial services and insurance activities	• (WZ 58) Publishing activities • (WZ 75) Veterinary activities • (WZ 84) Public administration and defence; compulsory social security • (WZ 85) Education • (WZ 86) Human health activities • (WZ 87) Residential care activities • (WZ 88) Social work activities without accomodation • (WZ 90) Creative, arts and entertainment activities • (WZ 91) Libraries, archives, museums and other cultural activities • (WZ 92) Gambling and betting activities • (WZ 93) Sports activities and amusement and recreation activities

Less knowledge-intensive services

Less knowledge-intensive market services	Other less knowledge-intensive services
• (WZ 46/47) Wholesale and retail trade • (WZ 45) Sale and repair of motor vehicles and motorcycles • (WZ 49) Land transport and transport via pipelines • (WZ 52) Warehousing and support activities for transportation • (WZ 55/56) Accomodation and food service activities • (WZ 68) Real estate activities • (WZ 77) Rental and leasing activities • (WZ 79) Travel agency, tour operator reservation service and related activities • (WZ 81) Services to buildings and landscape activities • (WZ 82) Office administrative, office support and other business support activitites • (WZ 95) Repair of computers and personal and household goods	• (WZ 53) Postal and courier activities • (WZ 94) Activities of membership organisation • (WZ 96) Other personal service activities • (WZ 97) Activities of households as employers of domestic personnel • (WZ 98) Undifferentiated goods- and service-producing activities of private households for own use • (WZ 99) Activities of extraterritorial organisations and bodies

1 – An economic sector is classified as knowledge-intensive, if more than 33 % of total employment in this sector is accounted for by people with a tertiary education.

Source: Eurostat

↘ CHART 78

Classification of the manufacturing industry according to Eurostat

Manufacturing by technology-intensity[1]		
High-technology	**Medium-high- and medium-low-technology**	**Low technology**
• (WZ 21) Manufacture of basic pharmaceutical products and pharmaceutical preparations • (WZ 26) Manufacture of computer, electronics and optical products	• (WZ 20) Manufacture of chemicals and chemical products • (WZ 27) Manufacture of electrical equipment • (WZ 28) Manufacture of machinery and equipment • (WZ 29) Manufacture of motor vehicles, trailers and semi-trailers • (WZ 30) Manufacture of other transport equipment • (WZ 19) Manufacture of coke and refined petroleum products • (WZ 22) Manufacture of rubber and plastic products • (WZ 23) Manufacture of non-metallic mineral products • (WZ 24) Manufacture of basic metals • (WZ 25) Manufacture of fabricated metal products, except machinery and equipment • (WZ 33) Repair and installation of machinery and equipment	• (WZ 10-18) Manufacture of food products, beverages, tobacco products, textile, wearing apparel, leather and related products, wood and of products of wood, paper and paper products, printing and reproduction of recorded media • (WZ 31) Manufacture of furniture • (WZ 32) Other manufacturing

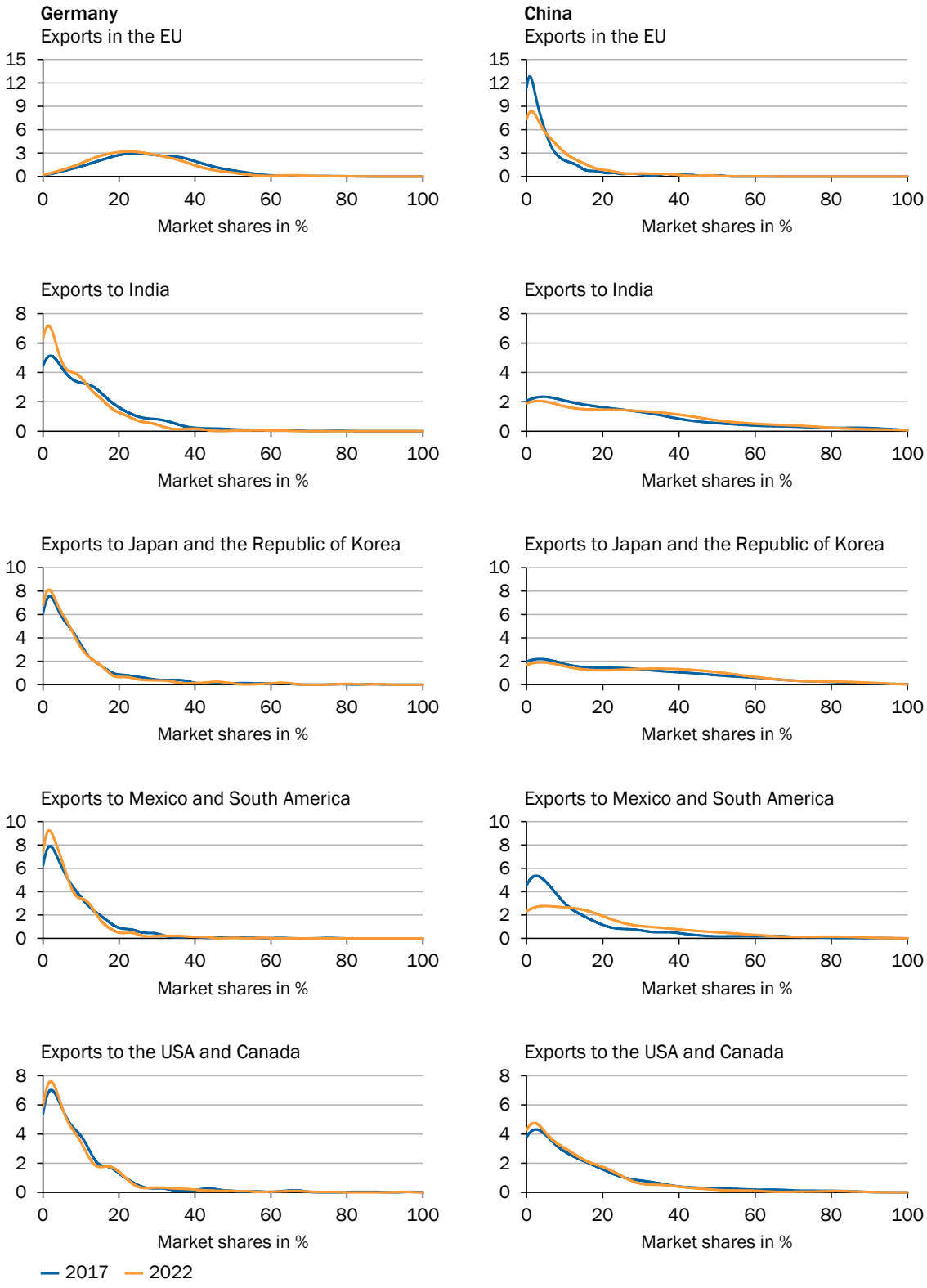
1 – Eurostat categorises the economic sectors in the manufacturing industry according to their level of technology-intensity, measured by R&D expenditure relative to value added.

Source: Eurostat

↘ CHART 79

Development of German and Chinese market shares in important German export markets

Approximated density function of market shares for the 500 most important German export goods[1]



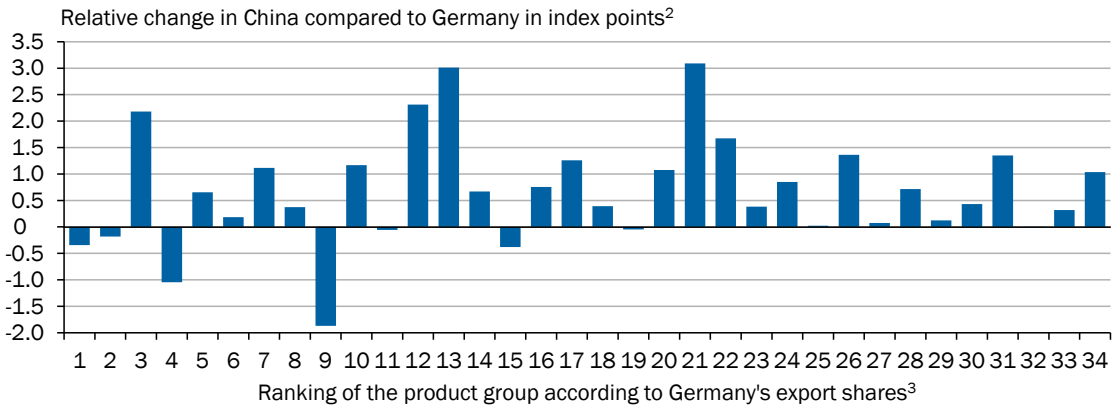
1 – Relevance of export goods measured by the total value of exports in 2017 and 2022; density function approximated by Kernel-density estimation over 5,000 points.

Sources: BACI database CEPII, own calculations

↘ CHART 80

Shift in revealed comparative advantages (RCA)[1]

China's comparative advantage over Germany is increasing



1 – Revealed comparative advantage (RCA) is calculated as the ratio of the export share of a product group in a country's total exports and the export share of the product group in total world trade. 2 – Change in China's RCA 2022 compared to 1996 minus the change in Germany's RCA in the same period. 3 – 4-digit product groups with an export share more than 0.5 %: 1-Motor vehicles principally designed for transport of persons (other than buses); 2-Parts and accessories of motor vehicles; 3-Automatic data processing machines and units thereof; 4-Medicaments consisting of mixed or unmixed products for therapeutic or prophylactic uses for retail sale; 5-Motor vehicles for transport of goods; 6-Electrical apparatus for switching or protecting electrical circuits, or for making connections to or in electrical circuits; 7-Electronic integrated circuits and microassemblies; 8-Machines and mechanical appliances having individual functions; 9-Other aircraft, spacecraft and suborbital and spacecraft launch vehicles; 10-Pumps for liquid, liquid elevators; 11-Tractors; 12-Electrical apparatus for line telephony or line telegraphy; 13-Printing machinery, including ink; 14-Dish washing machines, machinery for cleaning or drying bottles or other containers, machinery for filling, closing, sealing or labelling bottles, cans, boxes, bags or other containers; 15-Parts suitable for use solely or principally with internal combustion engines, 16-Taps, cocks, valves and similar appliances for pipes, boiler shells, tanks, vats or the like, including pressure; 17-Parts and accessories suitable for use solely or principally with automatic data processing machines; 18-Transmission shafts; 19-Instruments and appliances used in medical, surgical, dental or veterinary sciences; 20-Machinery for working rubber or plastics or for the manufacture of products from these materials; 21-Transmission apparatus for radio; 22-Synthetic organic colouring matter, preparations based on synthetic organic colouring matter; synthetic organic products of a kind used as fluorescent brightening; 23-Turbo; 24-Other plates, sheets, film, foil and strip, of plastics; 25-Air or vacuum pumps, air or other gas compressors and fans; ventilating or recycling hoods incorporating a fan; 26-Polyacetals, other polyethers and epoxide resins, in primary forms; polycarbonates, alkyd resins, polyallyl esters and other polyesters, in primary forms; 27-Centrifuges, including centrifugal dryers; filtering or purifying machinery and apparatus, for liquids or gases; 28-Other furniture and parts thereof; 29-Insulated wire, cable; 30-Paper and paperboard, coated on one or both sides with kaolin or other inorganic substances; 31-Prepared binders for foundry moulds or cores; chemical products and preparations of the chemical or allied industries; 32- Petroleum oils and oils obtained from bituminous minerals; 33-Compression; 34- Machinery, plant or laboratory equipment, whether or not electrically heated, for the treatment of materials by a process involving a change of temperature.

Sources: BACI database CEPII, own calculations

↘ BOX 27

Background: Structural-policy measures in the coal regions

Initially, structural policy in the Ruhr region was aimed at maintaining large-scale industrial structures, particularly those of the coal and steel industry. Investment in alternative sectors and future-oriented structures tended to be neglected. Instead, the focus was on increasing efficiency and improving the environmental compatibility of the coal industry. Programmes such as the 1978 'Economic Technology Programme' mainly promoted the existing structures of the

coal and steel sector. After the decline in oil prices in the 1980s, coal production could only be maintained by high subsidies until it was completely discontinued in 2018 (Röhl et al., 2018).

In order to manage structural change in the lignite regions in western and, above all, eastern Germany, ↘ BOX 20 the German government passed the **'Coal Regions Structural Strengthening Act'** (StStG) in 2020. This act **provides** the affected regions with **a total of around €41 billion** until 2038 to promote investment and create new economic prospects. Among other things, the funds are to be used to expand infrastructure, establish new industries and promote research and innovation. The aim is to gradually transition the regions from a coal-dependent economy to a more diversified and innovation-oriented structure. Brachert et al. (2023) document that only a small proportion of the funding provided has been used to date, as **many projects are still in the planning phase**. The delays were attributed, among other things, to the need to draw up guidelines for the allocation of funds. The authors emphasised the need to increase the transparency of the allocation of funds and to speed up the processes. The majority of the planned projects focus on the areas of accessibility, education, business locations and research and development. As early as 2019, the Federal Audit Office (Bundesrechnungshof 2019) expressed concerns regarding the **efficiency and transparency of the use of funds**. It recommended establishing clear criteria for the allocation of funds and ensuring strict control of expenditure.

In particular, **measures in the areas of transport links, education and research and development** are classified in the economic literature as **effective** in promoting regional growth, meaning that the majority of projects to date have been in growth-promoting areas. For example, the Federal Ministry of Education and Research established two major research centres in the coal regions with the initiative 'Knowledge creates prospects for the region!': the 'Center for the Transformation of Chemistry' in the Central German coalfields and the 'German Center for Astrophysics' in Lusatia in Saxony. These are intended to give the regions a scientific profile and attract and retain new companies (BMBF, 2020). Other projects include the electrification of rail sections and the development and introduction of autonomous buses to improve the accessibility of the regions (SMIL Saxony, 2025).

A central focus of this policy is the promotion of research and development as well as the **improved networking of universities with the regional economy**. There is a particular need for action in Lusatia, as the universities and research institutions have so far been comparatively poorly networked with the regional economy. In order to drive innovation and support the development of new industries, cooperation between science and industry will therefore need to be intensified (Brachert and Titze, 2024).

The **Ruhr** region has been undergoing profound economic change since the 1960s. Numerous projects were launched to promote the transition from an industrial region to a knowledge-based and diversified economic structure. Measures to achieve this included the **expansion of the higher-education landscape**, such as the founding of Ruhr University Bochum (1961) and a total of 21 other universities, as well as non-university research institutions such as Fraunhofer Institutes. The aim was to provide a qualified workforce and drive technological innovation. At the same time, massive investments were made in infrastructure, such as the **construction of transport routes and industrial estates**. Programmes such as the 'Integrated Structural Policy' and the 'Future Initiative for Coal and Steel Regions' focused on promoting technology, innovation and regional cooperation. One prominent example was the Ruhr Development Programme worth DM 17 billion, which was later expanded by the more comprehensive NRW programme in 1975 and provided with an investment volume of DM 31 billion.

Successes can be seen **in education and digitalisation** in particular (Röhl et al., 2018; Brachert and Titze, 2024). The region has made significant progress in increasing the number of graduates and in the spread of digital technologies. The **universities and research institutions** have become **important actors in structural change** and provide valuable **impetus for innova-**

tion and workforce training. Nevertheless, the success of many projects remains limited. Despite extensive government investment, economic momentum is still weak. The region suffers from persistently high unemployment, below-average economic output per capita, and is falling further behind other metropolitan regions (Röhl et al., 2018). However, the region has recovered significantly better than Detroit or Liverpool, for example, according to an international comparison. This is primarily due to the widespread availability of higher education (Gagliardi et al., 2023). ↘ ITEM 285

Only in recent years has the Ruhr Regional Association been given powers that enable **spatial planning across district boundaries** and thus **more efficient structural planning** (Röhl, 2019). This has already been taken into account in the economic policy of the lignite regions. Two initiatives – the 'Wirtschaftsregion Lausitz GmbH' and the 'European Metropolitan Region of Central Germany' – have been established to pursue a coordinated and joint regional policy (Deutscher Bundestag, 2020). The involvement of local stakeholders, companies and civil-society actors should strengthen acceptance and promote innovative solutions.

Inclusive and transparent planning that involves all stakeholders is also required in other regions in order to successfully shape change (Reitzenstein et al., 2022). While the Ruhr area, as a **densely populated metropolitan region**, offers comparatively favourable conditions due to its infrastructure, **rural regions** such as Lusatia face very different problems. They often lack diversified industries. ↘ ITEM 309 Such diversification is made even more difficult by the exodus of young and qualified workers. ↘ ITEM 334

↘ BOX 28

Perception of economic development

There is a large **discrepancy between the subjective and objective perception of economic development** in one's own region (Bundesregierung, 2024a; Diermeier et al., 2024). This is **particularly true for eastern Germany**. Between 2013 and 2023, almost all eastern German regions showed above-average development in terms of both unemployment and wage growth. Nevertheless, only 31 % of respondents are satisfied with the development of the labour market in their district or urban district over the last 10 years. This is a slightly more negative assessment than in western Germany, where 36 % of respondents are satisfied, although the development there was much more mixed: many regions had above-average and many below-average development. The majority of people in eastern Germany are clearly not aware of the positive development. The same can be seen in the assessment of the region's economic situation. For example, 70 % of eastern Germans rate their region as having below-average development, while only 62 % do so in west Germany (Diermeier et al., 2024), although development was above average in almost all east German regions.

One reason for this could be **demographic ageing**. This is a particular problem in many rural regions of eastern Germany. In the BBSR's population forecast (Maretzke et al., 2024), regions in western Germany are growing by an average of 3.3 %, while regions in eastern Germany are shrinking by an average of 9.8 % (excluding Berlin in each case). It transpires that pessimism is particularly high in regions with shrinking populations. Where the population shrank between 2013 and 2023, the underestimation of economic development is particularly high in both western and eastern Germany, although pessimism is greater in eastern Germany overall. One reason for this could be that, as the population declines, it is becoming increasingly difficult to maintain the provision of public services, such as local public transport and leisure facilities (Diermeier et al., 2024).

Fraile and Pardos-Prado (2014) identify four main reasons for the discrepancy between objective and subjectively perceived economic development. On the one hand, the **personal economic situation** plays a role in one's perception of economic development in the region. Anyone who has lost their job is more likely to be significantly more pessimistic about the economic development of their region than someone who has just received a pay rise. This can also be transferred to **the sector to which the person belongs**. Employees in a sector with a difficult economic situation transfer this to the economy as a whole. On the other hand, the **level of education and media consumption** are decisive for how well people are informed about – and assess – objective developments. People have different incentives to inform themselves about current macroeconomic developments – the self-employed, for example, are generally much more affected than employees. **Ideology and party affiliation** can also contribute to the distortion. People who identify with the governing party assess economic development much more positively than supporters of an opposition party, although it is unclear in which direction the causal relationship runs. This shows that high-income residents in particular react more sensitively to macroeconomic changes than low-income residents, as they are already in difficult economic circumstances before a crisis.

Balleer et al. (2024) also note a **distortion in the perception of the labour market**. On average, employees in Germany overestimate the likelihood of losing their job, and the unemployed overestimate the likelihood of finding a job. At the same time, it is evident here, too, that employees in eastern Germany are significantly more pessimistic than in western Germany and that this has an impact on real economic indicators. Pessimism leads to lower reservation wages and thus explains part of the wage gap between eastern and western Germany. Pessimism can also be observed on the part of employers, which manifests itself in a systematic underestimation of their own employment growth. It is also evident that employers are slow to learn and that pessimism also correlates with investment and R&D expenditure, so that an impact on real economic variables can again be observed. Here too, pessimism is higher in eastern Germany, although there is a relatively high degree of heterogeneity in general (Balleer et al., 2024). Economic assessments have a macroeconomic impact and explain a significant proportion of the variance in aggregate investment in the manufacturing sector (Bachmann and Zorn, 2020).

What is also interesting here is the **assessment of one's own economic situation compared to the assessment of the general economic situation**. While the assessment of one's own economic situation is very stable, the current economic situation in Germany is assessed as much more volatile. It is particularly interesting that the situation was assessed comparatively accurately from 2009 to 2018, and that there is a convergence with the assessment of the respondents' own economic situation, whereas, when the pandemic began, there was again a clear divergence and the economic situation in Germany was assessed very poorly. ↘ CHART 81

The Federal Government's Equivalence Report (Bundesregierung, 2024a) also identifies a certain **discrepancy between objective economic factors and subjective perceptions**. For example, the correlation between the median wage and the assessment of one's own economic situation in a region is only r=0.495. However, this discrepancy between objective factors and their perception is not limited to the economic situation. Other factors such as safety (r=0.313), air pollution (r=0.418) and regional accessibility of supermarkets (r=0.320) also show only a weak correlation between the objective situation or development and subjective assessment. The discrepancy between economic development and its perception is a global phenomenon that plays a major role, particularly in the USA (Frankel, 2024).

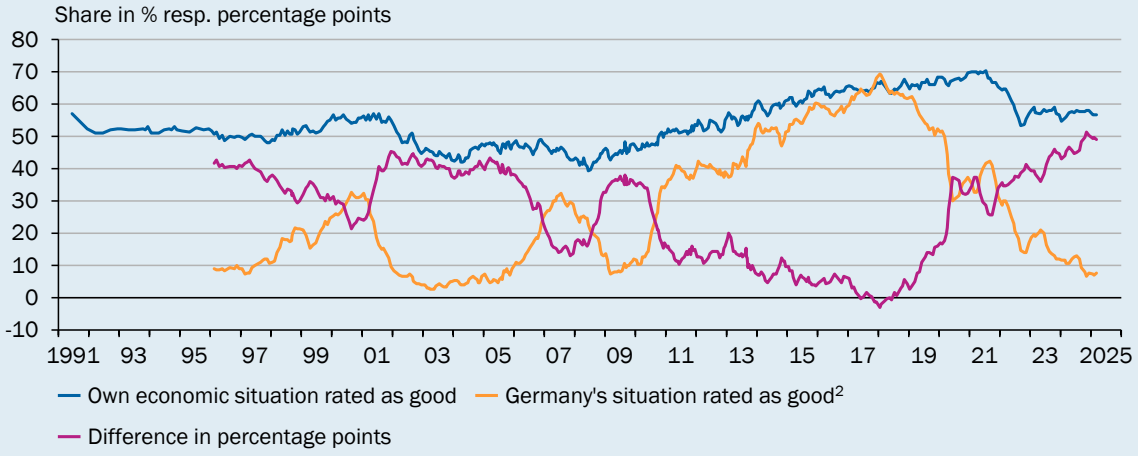
However, the question arises as to the extent to which extent economic indicators are suitable for assessing the future prospects of a region. The correlation between the assessment of a region's future prospects and the assessment of the region's economic future prospects is r=0.623. This shows that a region's **general future prospects** are closely linked to a region's perceived **economic future prospects**, although there are other factors that also play a role. For

example, greater demographic ageing also shows a higher correlation with future prospects (r=0.454).

Kawka and Sturm (2006) examine the development of quality of life in the period 1990 to 2004 and find a generally **lower level of life satisfaction** in the eastern German regions. Two factors in particular are seen as decisive for the perceived quality of life. Perceived life satisfaction correlates above all with **unemployment** and **net migration**. Dissatisfaction is particularly high in rapidly shrinking regions and regions with high unemployment.

↘ CHART 81

Increasing discrepancy between own perception and general economic situation[1]



1 – Perception of own and general economic situation; moving average with a lag and a lead. Survey period 25 January 1991 to 11 April 2025; surveys at irregular intervals. 2 – Data only collected from 1996 onwards.

Sources: Forschungsgruppe Wahlen: Politbarometer, own calculations

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