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2020 European Semester: Assessment of progress on structural reforms, prevention and correction of macroeconomic imbalances, and results of in-depth reviews under Regulation (EU) No 1176/2011

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EXECUTIVE SUMMARY

Sustained structural reforms and long-term investment can ensure the sustainability and inclusiveness of Germany's growth. In its tenth year of expansion, the German economy grew significantly below potential, affected by an interplay of transformations in industry and adverse external factors. At the same time, progress on reforms has been only moderate. On the positive side, the labour market remains very strong, with wages increasing despite the economic slowdown, and measures have been taken to improve incentives to work. However, significant challenges remain, including investment in education, sustainable transport, affordable housing, energy and digital infrastructure. In addition, regulatory and other incentive structures, including taxation, do not appear sufficient to boost inclusive and sustainable growth. While Germany's income inequality is average, its wealth inequality is high. Improving equality of opportunity, by reinforcing education and training, and addressing inter- and intra-generational fairness issues also through social security systems can contribute to more inclusive growth. ([1])

Domestic demand is the sole driver of a slowing economic expansion. The German economy, with its export-oriented manufacturing base, is challenged by persistent global uncertainty, trade tensions and weaker foreign demand for German goods, and by the need to make the transport sector less environmentally harmful. After a 1.5% increase in 2018, GDP grew by 0.6% in 2019. The contribution of net exports was negative as in the year before and growth was driven by domestic demand. Despite weakness in manufacturing, unemployment fell to a record low of 3.2% in 2019. Wage growth has been so far resilient to the economic slowdown. Inflation fell from 1.9% in 2018 to 1.4% in 2019, notably due to a strong decline in energy prices.

The general government budget surplus, while still considerable, is diminishing on the back of increased investment, and the public debt continues to fall. In 2018, the general government fiscal surplus reached a record 1.9% of GDP. In 2019, the surplus lowered to 1.5% and is expected to decline further in 2020, due to increased investment and other fiscal measures. For the first time since 2002, the gross debt-to-GDP ratio is expected to have fallen below the Treaty reference value of 60% of GDP. The public debt ratio might decline further as a result of the national debt brake becoming binding also for the *Länder* as of 2020. This will require them to make no new structural deficits, which further reduces sustainability risks.

Meeting sustainability goals and raising growth potential at the same time requires steady long-term investment efforts, in particular in network industries and in education, training, research and innovation. Stronger investment in sustainable transport and electricity infrastructure is crucial to meeting climate, energy and environmental targets. Despite the key incumbent player being largely state-controlled, Germany is still lagging behind in deploying very high-capacity broadband, which could improve productivity growth and boost convergence in regional living conditions. Higher investment in research and innovation can accelerate the pace of transition to a carbon-neutral and circular economy. Higher expenditure on education and skills could make the future labour force more productive and alleviate the impact of demographic ageing.

Overall, Germany has made limited ([2]) progress in addressing the 2019 country-specific recommendations.

There has been some progress in:

- achieving an upward trend in investment, including in research and innovation;
- strengthening conditions for wage growth, reducing disincentives to work more hours and reducing the high tax wedge.

Germany has made limited progress in:

([1]) This report assesses Germany's economy in light of the European Commission's Annual Sustainable Growth Strategy, published on 17 December 2019. In this document, Commission sets out a new strategy on how to address not only the short-term economic challenges but also the economy's longer-term challenges. This new economic agenda of competitive sustainability rests on four dimensions: environmental sustainability, productivity gains, fairness and macroeconomic stability.

([2]) Information on the level of progress and measures taken in response to the policy advice in each subpart of a country-specific recommendation is presented in the overview table in the Annex A.

- increasing expenditure in education and improving the educational outcomes and skills levels of disadvantaged groups;
- improving investment in digitalisation and very high-capacity broadband, in energy networks, sustainable transport and affordable housing;
- shifting taxes away from labour to sources of revenues the taxation of which would be more supportive to inclusive and sustainable growth, and reducing disincentives to work for second earners;
- reforming the pension system.

Germany has made no progress on:

- business services and regulated professions.

Germany continues to perform very well on the indicators of the Social Scoreboard supporting the European Pillar of Social Rights. It has one of the highest employment rates in the EU, low unemployment, including youth and long-term unemployment, and access to healthcare is good. Germany has one of the highest employment rates of women, but the gender gap in part-time employment is high. Educational outcomes differ considerably across regions.

Regarding progress in reaching the national targets under the Europe 2020 strategy, Germany is performing very well on the employment rate, on reducing poverty and on investment in R&D. In addition, Germany is close to its national target for early school leaving and share of renewable energy. However, despite the recently adopted Climate Package Germany is unlikely to reach its 2020 national energy efficiency and climate targets by 2020. Germany is not on track to reduce its emissions not covered by the EU Emissions Trading System as set in EU law.

With regard to Germany's progress towards the United Nations Sustainable Development Goals over the past 5 years, Germany shows a declining trend in reducing inequality, but has further improved its strong institutions and justice system. ([3])

The main findings of the in-depth review contained in this report and the related policy challenges are as follows:

- **The current account surplus declined from its peak in 2015.** The current account surplus declined from 8.6% of GDP in 2015 to 7.4% in 2018. In 2019, the downward adjustment paused and the overall current account surplus was 7.7% of GDP (according to preliminary data). Vis-à-vis the euro area it declined to 2.2%, from 2.7% in 2015. The domestic imbalance between savings and investment, which has been growing since 2008, reached a turning point in 2016. Since then, private sector net lending has been coming down, mainly reflecting the decline in the net lending position of non-financial corporations, but was partially offset by an increasing public surplus until 2018.
- **Private investment remains solid despite the economic slowdown, but still lags behind infrastructure and housing needs.** In 2018 and 2019, private investment increased by 3% in real terms (i.e. adjusted for inflation). Altogether, the private investment share of GDP increased from 18% in 2011-2017 to 19% in 2018-2019. The fastest growing components in recent years have been housing and investment in intellectual property. However, investment is still lagging behind infrastructure (e.g. energy and digital) and housing needs, and the need to adapt to tighter environmental requirements.
- **Public investment has continued increasing against the backdrop of a significant investment backlog.** Gross public investment increased by around 6% annually in 2015-2017, by close to 9% in 2018 and by close to

([3]) Within the scope of its legal basis, the European Semester can help drive national economic and employment policies towards the achievement of the United Nations Sustainable Development Goals (SDGs) by monitoring progress and ensuring closer coordination of national efforts. The present report contains reinforced analysis and monitoring on the SDGs. A new annex (Annex E) presents a statistical assessment of trends in relation to SDGs in Germany during the past 5 years, based on Eurostat's EU SDG indicator set.

7% in 2019 in nominal terms. In real terms, the increase averaged about 4% in 2015-2019 as price inflation for construction works accelerated in recent years. This brought the public investment rate from 2.1% of GDP in 2015 to 2.5% in 2019. Since 2017, total government net investment has turned positive, but it is still negative at municipal level, where the investment backlog remains high at 4% of GDP.

- **Higher public investment would generate positive domestic and cross-border spillovers.** Substantially increasing the public investment rate can boost output and employment in both Germany and the rest of the euro area. Germany also plays an important role in advancing the single market. However, it is performing below the EU average in the transposition of single market rules. Obstacles include restrictive regulation in business services and public procurement practices.

- **Labour productivity growth in Germany shows a long-term declining trend and turned negative in 2018, due to cyclical factors as well as structural weaknesses.** The recent decline in labour productivity was mainly driven by a decline in output in manufacturing, and in the automotive sector in particular. Structural factors explaining the long-term decline in productivity include weak growth-enhancing investment, in intangible assets and among small and medium-sized businesses (SMEs) in particular, lack of modern digital infrastructure, demographic developments and shortages of skilled labour, a decline in business dynamism, slow technology diffusion, weaknesses in eGovernment, and low competition in business services.

- **Improving resource productivity can be an important driver for future competitiveness, while minimising negative environmental impacts.** Despite resource efficiency gains and a relative decoupling of raw material use and economic growth, natural resource use remains at an environmentally unsustainable level. Germany will miss its target of doubling raw material productivity by 2020, and its secondary raw material use rate is below the EU average. Moving to a circular economy can generate cost savings and create jobs, while reducing the environmental footprint.

- **Despite the GDP slowdown, overall wage growth continued, as unemployment reached historically low levels.** Labour market performance remained remarkably strong, despite the marked slowdown in economic growth. This, however, hides some labour hoarding and diverging trends between services and manufacturing. While job creation in manufacturing and related services halted, hiring continued in construction and most services, particularly in public services. Despite decelerating employment growth and declining labour productivity, growth of nominal and real compensation per employee has accelerated between 2018 and 2019. However, the labour market potential of women and people with migrant background remained underused.

- **The tax system relies strongly on labour tax revenues, while taxes supporting inclusive and sustainable growth remain underused.** The share of labour tax revenues (56.9% of total tax revenue) is among the highest in the EU. Despite measures taken, disincentives to work persist, including for second and low-wage earners. At the same time, revenues are low from taxes supporting sustainability and inclusiveness goals, such as environmental taxes (4.5%), recurrent taxes on immovable property (1.1%) and wealth and inheritance-related taxes (0.4%).

- **The tax system is not sufficiently addressing climate change and environmental degradation.** Germany's environmental tax revenues remain among the lowest in the EU, stemming primarily from energy-related taxes, while revenues from transport fuel taxes and taxes on resources are particularly low. Current price signals across energy carriers and users limit the potential for clean energy technology deployment and emissions reduction. As environmental taxes are typically regressive, their increased use needs to be coupled with policy measures mitigating the impact on the vulnerable population groups.

- **The energy transition requires investments in electricity networks, smart sector integration and energy efficiency, and**

expansion of renewable energy. The lack of appropriate transmission and distribution grid infrastructure is causing financial losses and market distortions in Germany and other EU countries due to congestion and limited flexibility of the electric system. The need for investment in additional transmission capacity is growing. Taxes and levies limit the smart integration of electricity in the heating, transport and industry sectors. The installation of wind turbines show a declining trend.

- **Transformation of the transport sector can address air pollution, mitigate climate change and improve productivity.** The transport sector has done particularly badly at cutting emissions of both greenhouse gases and local air pollutants, which has meant that Germany has fallen behind in meeting its target under the Effort Sharing Decision setting national emission targets for EU countries between 2013 and 2020. The transformation of the transport sector can be facilitated by stronger investment in clean public transport and infrastructure, including in alternative fuels such as hydrogen and e-fuels. In addition, appropriate incentive structures are needed for clean, safe and better-performing mobility solutions, which would encourage technological competition and spur innovation.

- **The lack of affordable housing has become a major challenge.** The housing cost overburden rate is one of the highest in the EU. House prices rose by half over the last decade, suggesting overvaluation in the bigger cities and an increasing risk of a housing bubble. Policy measures mitigate rental price increases, but do not keep pace with the demand for affordable housing. The annual target for new housing agreed on by the country's governing coalition was not met.

Other key structural issues analysed in this report, which point to particular challenges for Germany's economy, are the following:

- **The banking sector suffers from low profitability.** Capitalisation ratios are satisfactory, but German banks face challenges related to their cost structure. Consolidation efforts are needed, as a fragmented market structure weighs on profits. The disruption initiated by fintech and bigtech may further squeeze revenues. There is also a need to strengthen macro-prudential tools.

- **Overall, Germany's social protection system is well-developed, but increasingly affected by demographic developments.** Demographic change is expected to challenge the sustainability and the adequacy of pensions. Furthermore, the large gap in life expectancy across socio-economic groups, combined with the relatively low pension net replacement rates for low-income earners compared to other countries,raises the issue of intra-generational fairness.. Healthcare efficiency can be improved by consolidating the hospital sector, focusing more strongly on prevention and care integration, providing the same price signal for the same treatment, and better use of eHealth.

- **Challenges in equality of opportunity persist also in the education and training system.** Germany is spending less of its resources on education than it did in the past and also at a rate below the EU average, even though the country is particularly affected by automation and immigration. Inequalities in educational attainment persist, with socio-economic and migrant backgrounds still exerting a strong influence. Teacher shortages threaten the provision of quality education.

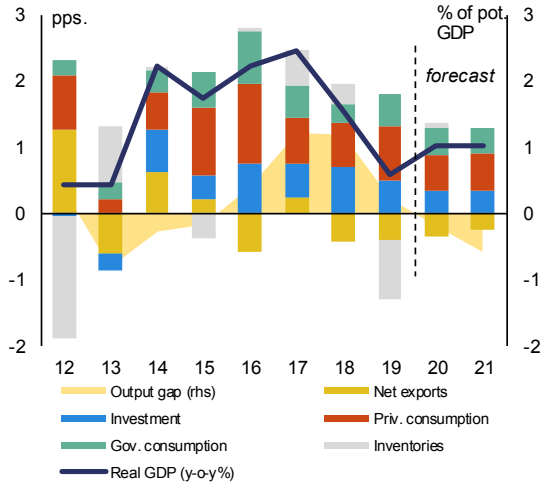
- The Commission's proposal for a Just Transition Mechanism under the next multi-annual financial framework for the period 2021-2027, includes a Just Transition Fund, a dedicated just transition scheme under InvestEU, and a new public sector loan facility with the EIB. It is designed to ensure that the transition towards EU climate neutrality is fair by helping the most affected regions in Germany to address the social and economic consequences. Key priorities for support by the Just Transition Fund, set up as part of the Just Transition Mechanism, are identified in Annex D, building on the analysis of the transition challenges outlined in this report.

1. ECONOMIC SITUATION AND OUTLOOK

Economic growth

The economic expansion slowed sharply in 2019. Growth has been uneven and fragile since 2018, following the pattern of export growth and held back by the pronounced weakness of manufacturing activity. After a rebound to 0.5% in Q1 2019, the economy contracted by 0.2% in Q2 and narrowly avoided a technical recession in Q3 (+0.1%). Overall investment increased robustly early in the year (by 1.6%), but weakened in the subsequent quarters (-0.3% and -0.1%). For the year as a whole GDP increased by just 0.6%, slowing further compared to the buoyant growth averaging 2.2% in 2014-2017.

Graph 1.1: **Demand components of GDP growth**



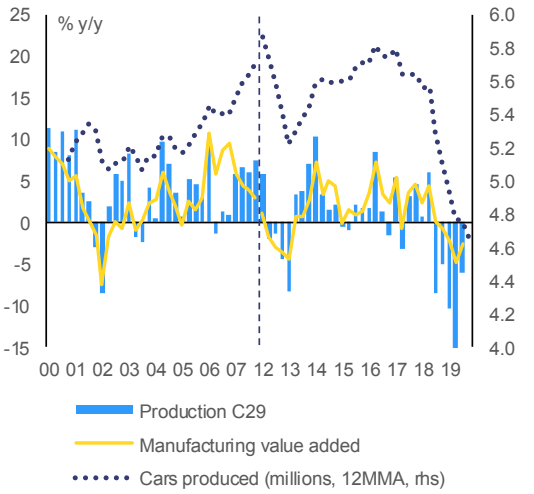
[1] GDP growth and contributions to annual growth
Source: European commission

The domestic side of the economy remained resilient and employment reached a new record high. Despite the weakness in activity and deteriorating business sentiment, the labour market remained strong. Job growth continued in the services sector. Layoffs in industry remained contained, as companies try to avoid losing skilled workers and to stay fit for an upswing. Wages continued to grow. This helped consumption growth stay relatively steady at 0.4% quarter on quarter on average. Public consumption supported growth. The buoyant growth in construction continued. There was a mixed picture in services, with public and consumer services showing resilience, while business-related services, including transport, remaining weak.

Germany's economy is expected to see muted growth in 2020 and 2021. Consumption should continue benefitting from stable employment and ongoing wage increases. Even if constrained by capacity, construction activity is expected to continue expanding. Equipment investment should strengthen as export activity normalises as expected in a few quarters. The ten-year expansion is set to continue. However growth is expected to remain subdued at just above 1% in 2020 and 2021 and thus well below the potential estimated at 1.4% for 2019-2021.

These prospects are subject to downside risks. Risks for exports and investment relate to global growth and trade uncertainty, sectoral structural issues (e.g. in the auto sector). Planning and implementation capacity in the public sector could constrain the further expansion of public investment. Recent strong wage growth has boosted the saving rate and this trend could be reinforced if consumer confidence deteriorates.

Graph 1.2: **Developments in manufacturing**

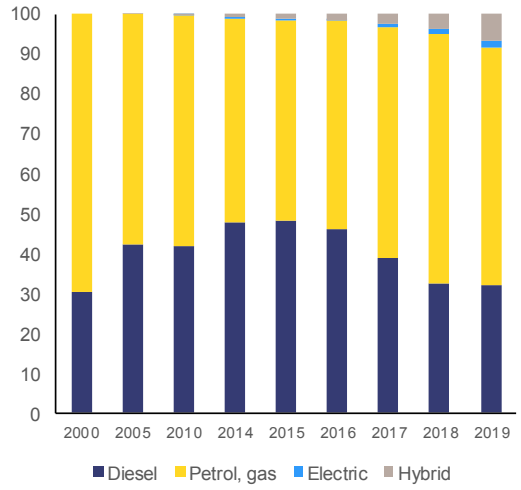


[1] C29 refers to the manufacturing of motor vehicles, trailers and semi-trailers.
[2] The period 2008-2011 has been concealed because of extraordinary abrupt dynamics.
Source: Eurostat, German Association of the Automotive Industry (VDA)

Manufacturing weakness is weighing on economic growth. Export growth slowed considerably and the production side of the economy weakened further in 2019. In Q4 manufacturing continued to decline for the sixth consecutive quarter since early 2018. The car-

manufacturing sector is undergoing a structural transformation and production is depressed while equipment manufacturers are adversely affected by the impact of trade conflicts and weakening global trade on investment demand.

Graph 1.3: **New car registrations by fuel type**

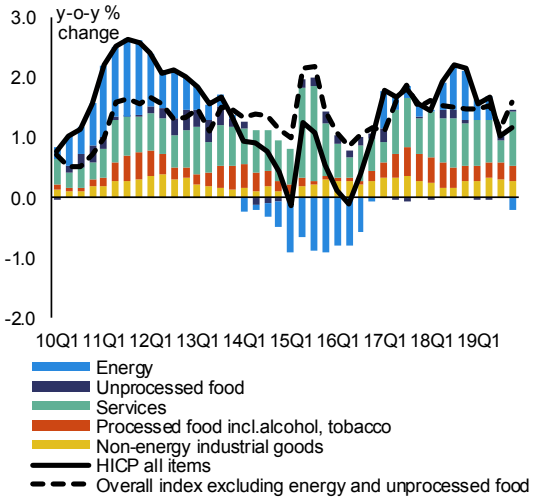


[1] % of total
Source: German Federal Motor Transport Authority

Car production in Germany has shrunk considerably, while German carmakers produced more abroad. The automotive industry is Germany's most important manufacturing sector and accounts for about 22% of manufacturing value added, 4.7% of total value added and about 4% of employment. Through its complex value chain, it has a significant impact on the overall dynamics of manufacturing (Graph 1.2). The industry is experiencing a significant decline in domestic production. The production of 5.1 million vehicles in 2018 represented a 9.3% decline from 2017. At the same time, German companies increased their production abroad by 3.7%, to 11.2 million. The domestic trend continued in 2019: domestic production tumbled by another 5% to 4.7 million and reached a level close to the lows seen in 2009 (Graph 1.2), while production abroad continued at the same level of 11.2 million cars. The prospect of a swift recovery is dimmed by the current "wait-and-see" attitude of potential car buyers. The decline in new car registrations in Germany and the EU in general has been driven largely by falling demand for diesel cars.

Demand for diesel cars has declined while the share of alternative-fuelled cars is increasing slowly. In the first half of 2019, registration of new diesel cars in the EU dropped 17% year on year, after an 18% year on year drop in 2018. Following the 2015 diesel scandal and reinforced plans for reducing emissions through stricter regulations, the demand for cars with traditional internal combustion engines, and diesels in particular, is falling. Several Member States and cities have adopted ambitious plans to reduce air pollution, including by restricting diesel entry into city zones. Some countries plan to ban sales of new petrol and diesel cars in a decade or two. In Germany the number of new registrations of diesel cars stabilised in 2019 after a drop since the diesel scandal (Graph 1.3). Hybrid vehicles and electric vehicles are clearly the fastest growing segment in new car registrations, but as a proportion of total cars in use, their share is still very low, below 1%. Demand is switching above all to hybrid cars, (of which plug-in hybrids are a small part), rather than purely electric driven models. This could help bridge the performance gaps of the electric vehicles currently available while still getting the transition to low-emission local and long-distance road transport underway (see Box 4.5.7).

Graph 1.4: **Contributions to headline inflation**



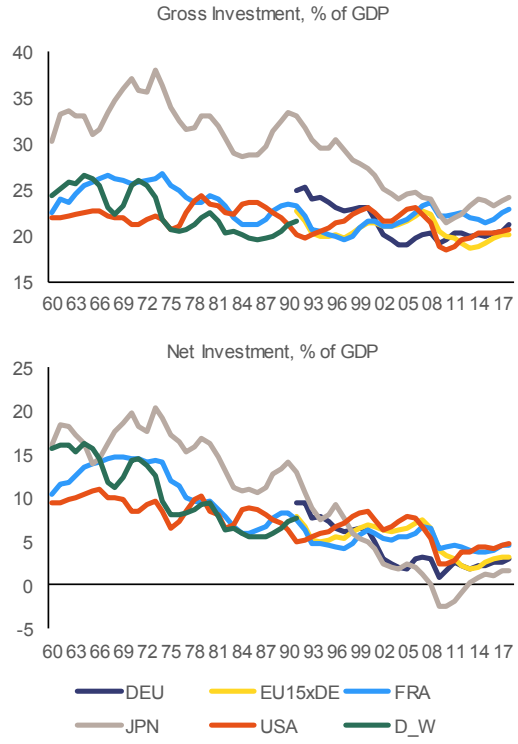
Source: European Commission

Inflation

Inflation should remain moderate. Consumer price inflation has been running below wage growth, which is supportive of purchasing power.

Having been close to 2% in 2018, the Harmonised Index of Consumer Prices inflation declined to just above 1% in the second half of 2019. Not taking into account volatile energy and unprocessed food prices, it hovered around 1.4% throughout 2019. Inflationary pressure is expected to remain contained and inflation not to change significantly, reflecting the moderate level of domestic demand projected.

Graph 1.5: **Net and gross investment in international comparison**



Source: European Commission, AMECO database

Investment

Public investment has continued increasing against the backdrop of a significant investment backlog, and is likely to increase further with the 2020 budget. Gross public investment increased by around 6% annually in 2015-2017. It then grew by close to 9% in 2018 and close to 7% in 2019 in nominal terms. In real terms the increase averaged about 4% in 2015-2019 as price inflation for construction works was high (more than 4.5% on average) in 2017-2019. This raised the public investment rate from 2.1% of GDP in 2015 to 2.5% of GDP in 2019. In 2017 and 2018, total government net investment turned positive for the first time since 2012 (0.12% of GDP, compared to 0.03% for the euro area). In 2018, this development was driven by municipal investment, where, however, net investment remains negative and needs to catch up with depreciation. The investment gaps identified by municipalities remain high at € 138.4 billion. Data for January-September 2019 suggest that, investment growth intensified at the level of municipalities.

Private investment remains solid despite slowing economic growth. Private investment increased strongly in real terms in total (3%) and across most asset types in 2018 (housing 3%, equipment 3.9%, other investments 4.7%). Only non-residential construction investment growth remained subdued. In 2019, real investment continued increasing somewhat more slowly (2.4%). Non-residential investment picked up speed, while equipment investment growth weakened. Altogether, private investment's share of GDP increased to 19.2% in 2019. The fastest growing components in recent years have been housing (see Section 4.4) and other investment (comprising essentially research and development and other intellectual property). Equipment and non-residential construction have seen their shares of investment change little.

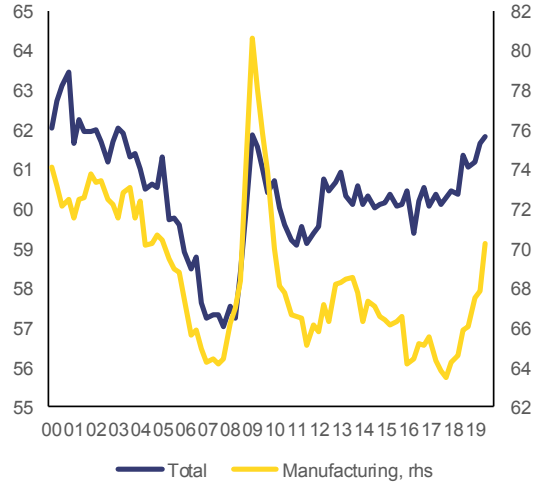
The aggregate net investment rate remains relatively low by historical and international standard. The gross investment rate increased to 21.7% in 2019, the highest level since 2001. It has also been above the level in the rest of the euro area since 2010. By contrast, following a globally relevant trend, Germany's net investment rate has been declining over the long term, possibly reflecting factors like the rapid capital accumulation as economies were rebuilt after the Second World War. It has remained subdued since the turn of the century after an initial post-unification surge. Currently it ranges around the average for the rest of the EU15 (the 15 countries which were Member States before the 2004 enlargement of the EU) but significantly below the levels for peers like the US or France. For example, irrespective of the generally high quality of transport infrastructure, the effects of insufficient infrastructure investment in recent years continue to be felt, adding to concerns about road maintenance and congestion, also in view of Germany's role as a transit country, north-south

but also east-west. Investment in transport infrastructure in recent years has stayed constant below 0.6% of GDP. Germany's highly developed infrastructure would benefit from a consistent and long-term-oriented effort to maintain it and keep it up-to-date.

Labour market

Labour market performance remained remarkably strong, despite the marked slowdown in economic growth. The unemployment rate continued to decline, stabilising at a post-reunification low of around 3.2% 2019. The employment rate for the 20-64 age group is up by about 1 percentage point from a year before, at 80.5% in the third quarter of 2019, one of the highest in the EU. Still, employment growth has been slowing, and companies in the manufacturing sector increasingly rely on short-time-work arrangements to avoid dismissals (see Section 4.3). While labour shortages are still apparent in some sectors, Germany does not fully use the labour market potential of some groups and female part-time work remains among the highest in Europe.

Graph 1.6: **Real ULC, labour share of GDP/GVA, %**



Source: Destatis, European Commission

Aggregate wage growth increased in 2018 and 2019, while a deceleration is expected for 2020. Gross nominal wages and salaries per employee increased by 2.5% in 2016, 2.6% in 2017 and 3.2% in 2018 and 2019, driven by the increasingly tight labour market. These developments come after a prolonged period of wage moderation during which wages did not keep up with productivity and external imbalances accumulated (see Section 4.3) and wage growth, both nominal and real, is expected to ease again slightly in 2020.

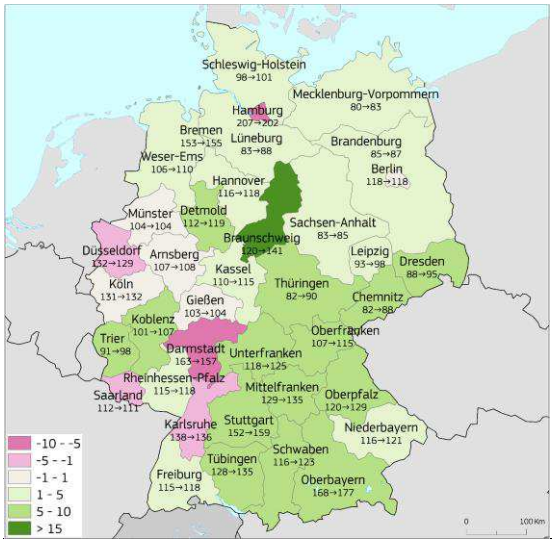
A drop in labour productivity growth, coupled with wage increases, contributed to increasing unit labour costs. As employment levels remained high while production declined in the manufacturing sector and job growth continued in the non-tradable sector, overall productivity growth turned negative in early 2018 (see also Section 4.4.1). While labour productivity declined by 0.3% in 2019, nominal compensation of employees increased by 3.3%, leading to a unit labour cost increase of 3.6%. This contributed to some rebalancing of the German economy *vis à vis* the rest of the euro area. The real effective exchange rate appreciated, due partly to the nominal effective appreciation of the euro.

Social developments

While the risk of poverty or social exclusion continues to decline moderately, rising income inequality raises concerns. In 2018, 18.7% of the population were at risk of poverty or social exclusion. This was a further small improvement from 2017 (19%) and the peak reached in 2014 (20.6%). In addition, in the past five years Germany made significant progress in reaching the SDG 1 (People at risk of poverty or social exclusion). Similarly, the disposable income of households continued to grow. Yet, in 2018 the income share of the bottom 60% of the population fell by 2.5% compared to the previous year, while the top 20% saw their income share increase by 3.7%. In 2018, the richest 20% of households had a disposable income five times higher than that of the poorest 20%, with an increase in this gap observed since 2017, flagging as "to watch" according to the Social Scoreboard. Still, this ratio is in line with the euro area average. Wealth inequality remains high: in 2017, the richest 10% of households possessed around 55% of total net wealth, and the Gini coefficient for household net wealth was 74%. This was slightly below its value in 2014 (76%) but remained well above the level for the euro area as a whole (68.5% in 2014) (Bundesbank, 2019). The uneven profile of property ownership and steeply rising house prices (see Section 4.2 and 4.4) are likely to have been

strong contributing factors to this trend, while the tax system plays some role in addressing Germany's high wealth inequality (see Section 4.1).

Graph 1.7: **Change in GDP per head (2010-2017) in Germany by NUTS-2 region**

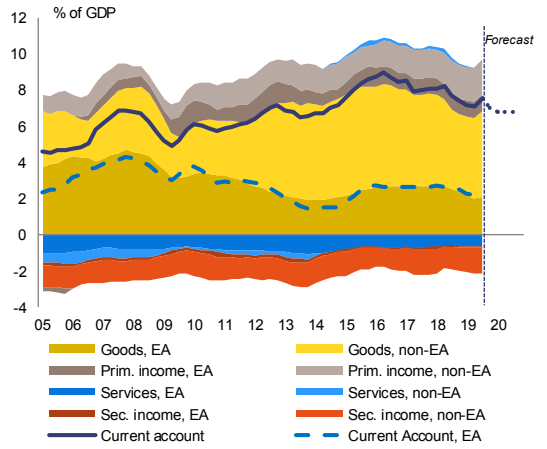


(1) in PPS
(2) Index, EU28=100 in 2010 and 2017
Source: Eurostat

Regional disparities

Regional disparities in Germany have steadily decreased since 2001, especially between the east and west of the country, but the gap between the most and least developed regions of the country remains wide. Even though they have caught up in the last three decades, the least developed regions remain in the east. GDP per inhabitant of the eastern regions in 2018 represented 74.7% of the west German level, with the difference narrowing over the last decade. Nevertheless, between 2010 and 2017 GDP growth per capita exceeded 2.3% in several German regions, such as Oberfranken and Unterfranken in Bavaria, Chemnitz and Thuringia. However, other Eastern regions like Mecklenburg-Western Pomerania (1.0%) and Berlin (1.1%) have been growing at a slower pace than the rest of the country (1.8%) and the EU economy (1.2%). (see Graph 1.7). Regional disparities across Germany also exist with regard to competitiveness, productivity, investment, unemployment rates and demographic developments (see Section 4.4).

Graph 1.8: **Current account and component balances**



[1] 4 quarter moving average
Source: German Bundesbank, European Commission

External sector

The gradual decline in the current account surplus since 2015 temporarily paused in 2019. The current account surplus for 2019 stood at 7.7% of GDP. Compared to 2018, the trade surplus increased by 0.3 pp. of GDP reflecting cheaper energy imports and weak demand for imported inputs by the manufacturing sector. The primary income balance increased by 0.1 pps. The services balance and the secondary income balance remained unchanged.

The transformation of the automotive sector is reflected in the evolution of the trade balance. Net automotive exports continued to decline and account for much of the decline in the trade surplus since 2015. This trend continued in recent quarters as automotive imports increased further while exports declined or stagnated relative to GDP. This reflects both the global slowdown in overall demand for cars and the relocations abroad of a sizeable share of the production of German-branded cars.

Public finances

Despite weakening growth, the budget surplus remains considerable and the fiscal position favourable, while government debt continues its downward path. Germany's public finances benefited over recent years from the favourable economic situation, with tax revenues growing more strongly than expected and interest payments

declining fast due to the low interest rate environment. Having peaked at 1.9% of GDP in 2018, the headline balance declined to 1.5% in 2019, reflecting the effects of fiscal measures and to some extent the slowdown in the economy. Nevertheless, in 2019 the fiscal position, as measured by the structural budget balance over the medium-term budgetary objective at currently -0.5% of GDP, remained favourable. It is set to decline gradually in the coming years, as tax revenues are projected to increase less strongly and the implementation of government measures increases overall expenditure (European Commission, 2019a) (see also Section 4.1).

Overall, Germany performs well in achieving the Sustainable Development Goals. According to Eurostat's Sustainable Development Goals (SDGs) indicators (see Annex E), Germany has been making progresses on most goals over the past 5 years. It is particularly the case for "Peace and justice" (SDG 16) and "Decent work and economic growth" (SDG 8) and "Partnerships for the goals" (SDG 17). In addition, most outcomes are above the EU average for "Good health and well-being" (SDG 3). On the other hand, some deterioration can be observed in reducing inequality (SDG 10), in sustainable transport (SDG 9) and most indicators remain below the EU average for "Responsible consumption and production" (SDG 12).

Table 1.1: **Key economic and financial indicators — Germany**

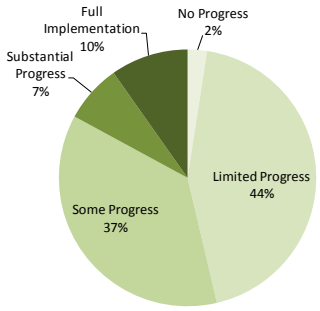
	2004-07	2008-12	2013-16	2017	2018	2019	forecast 2020	forecast 2021
Real GDP (y-o-y)	2.2	0.7	1.7	2.5	1.5	0.6	1.1	1.1
Potential growth (y-o-y)	1.3	1.0	1.6	1.6	1.5	*1.4 f*	1.4	1.4
Private consumption (y-o-y)	0.6	0.9	1.4	1.3	1.3	1.6	.	.
Public consumption (y-o-y)	0.7	2.1	2.5	2.4	1.4	2.5	.	.
Gross fixed capital formation (y-o-y)	2.9	0.7	1.9	2.4	3.5	2.5	.	.
Exports of goods and services (y-o-y)	9.8	2.2	3.4	4.9	2.1	0.9	.	.
Imports of goods and services (y-o-y)	7.8	2.3	4.2	5.2	3.6	1.9	.	.
Contribution to GDP growth:								
Domestic demand (y-o-y)	1.0	1.0	1.6	1.7	1.7	1.8	.	.
Inventories (y-o-y)	0.0	-0.4	0.1	0.5	0.3	-0.9	.	.
Net exports (y-o-y)	1.1	0.1	-0.1	0.2	-0.4	-0.4	.	.
Contribution to potential GDP growth:								
Total Labour (hours) (y-o-y)	0.2	0.1	0.6	0.6	0.5	*0.3 f*	0.3	0.2
Capital accumulation (y-o-y)	0.3	0.2	0.3	0.3	0.4	*0.4 f*	0.4	0.4
Total factor productivity (y-o-y)	0.8	0.6	0.7	0.7	0.7	*0.7 f*	0.7	0.7
Output gap	-0.3	-0.8	-0.2	1.2	1.2	*0.2 f*	-0.2	-0.6
Unemployment rate	10.1	6.6	4.7	3.8	3.4	3.2	3.4	3.5
GDP deflator (y-o-y)	0.9	1.2	1.7	1.0	1.5	2.1	2.0	1.7
Harmonised index of consumer prices (HICP, y-o-y)	1.9	1.7	0.9	1.7	1.9	1.4	1.5	1.6
Nominal compensation per employee (y-o-y)	0.7	2.2	2.5	2.6	2.9	3.3	2.5	2.5
Labour productivity (real, person employed, y-o-y)	1.5	-0.1	0.7	1.1	0.1	-0.3	.	.
Unit labour costs (ULC, whole economy, y-o-y)	-0.8	2.3	1.8	1.5	2.7	3.6	1.6	1.7
Real unit labour costs (y-o-y)	-1.7	1.1	0.1	0.4	1.2	1.5	-0.4	-0.1
Real effective exchange rate (ULC, y-o-y)	-1.9	-0.3	1.0	1.9	2.8	*0.0 f*	-1.1	-0.3
Real effective exchange rate (HICP, y-o-y)	-0.1	-1.6	0.0	1.1	2.6	*-1.4 f*	-1.2	-0.7
Net savings rate of households (net saving as percentage of net disposable income)	10.6	10.3	9.8	10.4	11.0	10.9	.	.
Private credit flow, consolidated (% of GDP)	0.3	0.7	2.0	4.5	6.5	.	.	.
Private sector debt, consolidated (% of GDP)	115.8	107.0	99.4	100.0	102.1	.	.	.
of which household debt, consolidated (% of GDP)	65.9	59.0	54.2	53.3	53.6	.	.	.
of which non-financial corporate debt, consolidated (% of GDP)	49.9	48.0	45.2	46.7	48.5	.	.	.
Gross non-performing debt (% of total debt instruments and total loans and advances) (2)	.	2.1	2.0	1.6	1.2	.	.	.
Corporations, net lending (+) or net borrowing (-) (% of GDP)	1.6	2.4	2.0	1.3	0.0	-0.4 f	0.0	0.1
Corporations, gross operating surplus (% of GDP)	26.4	25.1	24.1	24.1	23.4	22.4 f	22.9	23.0
Households, net lending (+) or net borrowing (-) (% of GDP)	5.9	5.4	5.0	5.4	5.7	6.1 f	6.1	6.1
Deflated house price index (y-o-y)	-2.0	0.7	4.8	4.6	5.1	.	.	.
Residential investment (% of GDP)	5.2	5.4	5.9	6.0	6.3	6.6	.	.
Current account balance (% of GDP), balance of payments	5.5	6.1	7.7	8.1	7.4	7.7	6.6	6.2
Trade balance (% of GDP), balance of payments	5.6	5.5	6.8	7.8	6.7	6.9	.	.
Terms of trade of goods and services (y-o-y)	-0.7	-0.5	1.6	-0.9	-0.9	0.9	1.0	0.2
Capital account balance (% of GDP)	-0.1	0.0	0.0	-0.1	0.1	0.0	.	.
Net international investment position (% of GDP)	14.1	24.2	43.4	55.2	62.0	.	.	.
NENDI - NIIP excluding non-defaultable instruments (% of GDP) (1)	9.6	19.0	33.4	42.0	44.7	.	.	.
IIP liabilities excluding non-defaultable instruments (% of GDP) (1)	125.9	164.3	155.6	141.5	135.9	.	.	.
Export performance vs. advanced countries (% change over 5 years)	15.6	-0.8	-3.1	2.8	1.0	.	.	.
Export market share, goods and services (y-o-y)	-0.4	-3.6	1.7	-1.1	-1.4	*-0.4 f*	-1.5	-1.6
Net FDI flows (% of GDP)	1.7	1.2	1.6	1.5	1.3	1.7	.	.
General government balance (% of GDP)	-2.0	-1.7	0.7	1.2	1.9	1.5	0.6	0.2
Structural budget balance (% of GDP)	.	.	0.9	0.9	1.4	*1.1 f*	0.7	0.5
General government gross debt (% of GDP)	65.8	76.4	73.9	65.3	61.9	*59.2 f*	56.8	55.0
Tax-to-GDP ratio (%) (3)	39.2	39.5	40.0	41.0	41.5	*41.8 f*	41.6	41.5
Tax rate for a single person earning the average wage (%) (4)	42.3	40.4	39.6	39.8	39.8	.	.	.
Tax rate for a single person earning 50% of the average wage (%) (4)	31.8	31.1	30.9	31.1	31.1	.	.	.

(1) NIIP excluding direct investment and portfolio equity shares
(2) domestic banking groups and stand-alone banks, EU and non-EU foreign-controlled subsidiaries and EU and non-EU foreign-controlled branches
(3) The tax-to-GDP indicator includes imputed social contributions and hence differs from the tax-to-GDP indicator used in the section on taxation
Source: Eurostat and ECB as of 4-2-2020, where available; European Commission for forecast figures (Winter forecast 2020 for real GDP and HICP, Autumn forecast 2019 otherwise); Deutsche Bundesbank; Destatis

2. PROGRESS WITH COUNTRY-SPECIFIC RECOMMENDATIONS

Since the start of the European Semester in 2011, Germany has made at least "some progress" with 54% of all its country-specific recommendations. However, 46% of the country-specific recommendations (CSRs) recorded 'limited progress' or 'no progress' (see Graph 2.1). Compared to 2014-2017, Germany's implementation of CSRs has improved recently, though only to a limited extent, and is now roughly in line with the average progress made by other Member States.

Graph 2.1: **Overall multiannual implementation of 2011-2019 CSRs to date**



* The overall assessment of the country-specific recommendations on fiscal policy excludes compliance with the Stability and Growth Pact.
** 2011-2012: Different CSR assessment categories.
***The multiannual CSR assessment looks at implementation from the time when the CSRs were first adopted up to the February 2020 Country report.
Source: European Commission

Public finances have kept improving and measures have been taken to increase public investment. Yet, further efforts to address the savings investments imbalance would be welcome. Between 2011 and 2019, Germany's fiscal position improved considerably, in line with CSRs from the early 2010s regarding compliance with the medium-term budgetary objective and reducing debt. The good fiscal position also created room to intensify investment, and the public investment rate increased from 2.1% of GDP in 2015 to 2.5% of GDP in 2019. Still, a significant investment backlog remains, with investment gaps persisting in particular at municipal level in education and infrastructure.

Progress towards efficient market structures has been moderate. While the competition law framework was improved, little has been done to open up public procurement and allow more entry into business services and regulated professions, even though complaints abound about a lack of capacity. Barriers to competition in railways have been reduced only to a limited extent. Improvements in network industries such as telecommunications, energy and transport, have been limited overall, reducing consumer welfare and endangering future competitiveness and sustainability targets. Investment needs in energy transmission and distribution infrastructure are increasing, but there is currently no systematic and comprehensive tracking of investment needs in different types of energy networks and at different levels of government.

The labour market has performed well , but more efforts are needed in view of demographic change. Continuing the trend since 2011, employment and wage levels improved in 2019 even as the economy slowed. Labour market incomes have improved through the introduction of the statutory general minimum wage, as well as through efforts to reduce taxes on labour and disincentives to work.

Overall, Germany has made limited progress with regard to the 2019 country-specific recommendations (CSRs) ([4]). Some progress has been made towards achieving sustained growth in public and private investment and strengthening conditions to support higher wage growth — two CSRs closely related to the euro area recommendations about fostering investment and supporting wage growth (see Table 2.1). There have been certain efforts to reduce the labour tax wedge, most notably the abolition of the solidarity surcharge for most taxpayers from 2021. Yet taxes on labour remain high, while some of the potential remains underused to raise tax revenue from sources more supportive of inclusive and sustainable growth, such as environmental and wealth-related taxes. There has been no progress in promoting competition in business services and the regulated professions. A pending law to reintroduce conditions for practising 12 craft professions even reverses a reform of 2004. Limited progress has been recorded in improving

([4]) Information on the level of progress and the measures taken in response to the policy advice in each subpart of a CSR is presented in the overview table in Annex A. This overall assessment does not include an assessment of compliance with the Stability and Growth Pact.

the educational outcomes and skill levels of disadvantaged groups. The results of the 2018 OECD Programme for International Student Assessment (PISA) underlined the need for further action in this regard as underachievement in all disciplines increased compared to 2015.

At the request of a Member State the Commission can provide tailor-made expertise through the Structural Reform Support Programme to help design and implement growth-enhancing reforms. Since 2018, Germany has received such support in the form of three projects. In 2019, the Commission provided the authorities with support to establish a large-cases unit in the German statistical system to ensure adequate coverage in the national statistics of multinational business groups with high economic impact. Also in 2019, work started on defining the IT infrastructure for this solution and building capacity for its successful implementation.

Table 2.1: **Implementation of 2019 CSRs**

Germany	**Overall assessment of progress with 2019 CSRs: Limited**
CSR 1: *While respecting the medium-term budgetary objective, use fiscal and structural policies to achieve a sustained upward trend in private and public investment, in particular at regional and municipal level. Focus investment-related economic policy on education; research and innovation; digitalisation and very-high capacity broadband; sustainable transport as well as energy networks and affordable housing, taking into account regional disparities. Shift taxes away from labour to sources less detrimental to inclusive and sustainable growth. Strengthen competition in business services and regulated professions.* (MIP-relevant)	**Limited progress** • Some progress in achieving a sustained upward trend in public and private investment. • Limited progress in increasing expenditure in education. • Some progress in improving investment in research and innovation. • Limited progress in improving investment in digitalisation and very high-capacity broadband. • Limited progress in improving investment in sustainable transport. • Limited progress in improving investment in energy networks. • Limited progress in improving investment in affordable housing. • Limited progress in shifting taxes away from labour to sources less detrimental to inclusive and sustainable growth. • No progress in strengthening competition in business services and regulated professions.
CSR 2: *Reduce disincentives to work more hours, including the high tax wedge, in particular for low-wage and second earners. Take measures to safeguard the long-term sustainability of the pension system, while preserving adequacy. Strengthen the conditions that support higher wage growth, while respecting the role of the social partners. Improve educational outcomes and skills levels of disadvantaged groups.* (MIP-relevant)	**Some progress** • Some progress in reducing disincentives to work more hours. • Some progress in reducing the high tax wedge in particular for low-wage earners. • Limited progress in reducing disincentives for second earners. • Limited progress in safeguarding the long-term sustainability of the pension system, while preserving adequacy. • Some progress in strengthening conditions to support higher wage growth. • Limited progress in improving educational outcomes and skills levels of disadvantaged groups.

(1) This overall assessment of CSR1 does not include an assessment of compliance with the Stability and Growth Pact.
Source: European Commission
(2) The assessment of CSR1 does not take into account the contribution of the EU 2021-2027 cohesion policy funds. The regulatory framework underpinning the programming of the 2021-2027 EU cohesion policy funds has not yet been adopted by the co-legislators, pending inter alia an agreement on the multiannual financial framework (MFF.)

Box 2.1: EU funds and programmes to address structural challenges and to foster growth and competitiveness in Germany

In absolute numbers, Germany is one of the main beneficiaries of EU support. EU cohesion policy funds([1]) amount to €30.3 billion under the current Multiannual financial Framework (covering 2014-2020), equivalent to around 0.1% of Germany's annual GDP. By the end of 2019, some €27.6 billion (around 91% of the total amount planned) was allocated to specific projects and €13.7 billion (45% of the total amount planned) was reported as spent by the selected projects, showing a level of implementation above the EU average. ([2]) The allocation from the rural development policy, including the national contributions, totals €14 billion([3]). By the end of 2019, €7.4 billion (52%) was reported as spent, in line with the EU average.

While reducing economic, social and territorial disparities, EU cohesion policy funding also tackles structural challenges in Germany. Cohesion policy programmes for Germany have allocated €6.2 billion for smart growth, €3.5 billion for sustainable growth and sustainable transport and €7.9 billion for inclusive growth. In 2019, following the performance review([4]), an additional €1.5 billion were made available for Germany for performing priorities.

EU cohesion policy funding has made a valuable contribution to Germany's economic transformation. Through the promotion of research, technology and innovation, but also environment-friendly economic development and SMEs, substantial progress has been made since 2014. By end 2018 the European Regional Development Fund (ERDF) has supported 18,300 businesses and 2,000 start-ups. Furthermore, it has contributed to the creation of over 6,700 new jobs in enterprises and improved infrastructures for more than 2,400 researchers. Cohesion policy has also helped de-carbonise Germany's economy as projects decreased emissions with 73,500 tonnes of CO_2-equivalent annually. In addition, EU support has promoted integrated urban development for over 1.4 million people in 130 cities. The European Social Fund (ESF) provided EU added value in fostering sustainable and quality employment, combating social exclusion and discrimination and boosting investments in skills and education. Funds disbursed between 2015 and 2018, have helped more than 1.3 million beneficiaries, mainly long term unemployed people (over 180,000), disadvantaged people (over 150,000), people with a migrant background (over 390,000) and young people/ those not in education, employment or training (over 100,000).

EU rural development policy has contributed to strengthening of rural economies in Germany. Between 2015 and 2018, the EAFRD supported more than 5,000 farmers invest in restructuring and modernisation of their agricultural holdings, thus enhancing the competitiveness of the agricultural sector. Furthermore, 321 local action groups have been established to foster local development in rural areas, covering over 63% of the German rural population.

The fisheries fund and other EU programmes also contribute to addressing the investment needs. The European Maritime and Fisheries Fund (EMFF) is supports Germany with €286 million (including the national co-financing). In addition, Germany benefits from other EU programmes, such as the Connecting Europe Facility, which has allocated €2.2 billion to strategic transport networks, and Horizon 2020, which allocated EU funding of €7.1 billion (of which about €921 million to 1,500 SMEs).

EU funds already invest substantial amounts on actions in line with the Sustainable Development Goals (SDGs). In Germany the ESI funds are supporting 12 of the 17 SDGs. Up to 97% of the expenditure is contributing to these.

([1]) European Regional Development Fund (ERDF) and European Social Fund (ESF). Data include national co-financing.
([2]) https://cohesiondata.ec.europa.eu/countries/DE
([3]) European Agricultural Fund for Rural Development (EAFRD), including national co-financing.
([4]) The performance review is regulated by Article 22 of Regulation (EU) No 1303/2013, whereby 5-7% of overall resources allocated are released to performing priority axes of the operational programmes.

3. SUMMARY OF THE MAIN FINDINGS FROM THE MIP IN-DEPTH REVIEW

The 2020 Alert Mechanism Report concluded that a new in-depth review should be undertaken for Germany to assess the persistence or unwinding of the imbalances that affect it. In February 2019, Germany was identified as having macroeconomic imbalances (European Commission, 2019b). The imbalances identified related in particular to excess savings and weak private and public investment. This chapter summarises the findings of the analyses in the context of the macroeconomic imbalance procedure (MIP) in-depth review that are set out in various sections of this report. ([5])

3.1. IMBALANCES AND THEIR GRAVITY

The German economy's persistently large current account surplus reflects among others a subdued level of domestic demand relative to income. While there is a continuing shift towards more domestic demand-driven growth, the overall shares of consumption and investment remain relatively low, given the resilient labour market, favourable financing conditions and infrastructure investment needs. As a result, the current account surplus remains considerably above what could be inferred from fundamental factors, in particular population ageing and the associated provision for old age, Germany's high manufacturing intensity and its competitive exports (see Section 4.2).

The subdued net investment share of GDP continues to put at risk Germany's future growth potential, and has implications for the euro area. Private investment is lagging behind infrastructure and housing needs. This is reflected in short-term pressures, observed for example through increases in house prices and rents. Even if the gross investment rate in 2018 exceeded the euro area average (21.2% vs 20.8%), the net investment share remains subdued and significantly below that of leading developed economies (e.g. US and France). This could act as a drag on potential growth. Public investment has picked up, but a still large investment backlog, with depreciation still exceeding new investment at municipal level, will take longer to make up.

Meanwhile, the savings rate has been increasing even as interest rates fell to historic lows. Wage growth continued and disposable incomes expanded, but a large part of these impulses fed to savings rather than consumption, despite the lower return on savings. Precautionary saving for future risks (Rodriguez-Palenzuela, 2016) is an important savings motive. In addition, inequality of income and wealth contribute to high private savings, as high earners have a particularly high savings rate (Brenke and Pfannkuche, 2018). Moreover high corporate savings partly reflect the savings of wealthy German households accumulated within firms due to preferential tax treatments for example within the inheritance and gift tax system (IMF, 2019). Enhancing confidence in the future, and recalibrating the tax system, reducing inequality, could be thus ways to strengthen consumption.

Combining investment policies with structural reform is a potentially powerful tool. Stronger investment in innovation, quality education and skills, very high-speed broadband networks, sustainable transport, electricity infrastructures and affordable housing, could be combined with a set of structural reforms to unleash productive potential. Reducing taxes on labour could increase the labour supply. This would contribute to potential growth in two ways: directly, by improving labour's growth contribution, and indirectly, by helping the realisation of investments at a time when the availability of labour remains a constraining factor for production. Reducing barriers to competition in the construction sector and related professional services could help to alleviate capacity constraints, and raise both short-term growth and long-term potential. This would be of crucial importance especially as population ageing intensifies and immigration may slow down. Growth-enhancing policies could also have positive spillovers for the other EU countries.

([5]) Analyses relevant to the in-depth review can be found in the following sections: public and private investment, the housing market (Chapter 1.), public finances (Section 4.1), financial sector (Section 4.2), labour market and social policy (Section 4.3), investment (Section 4.4) and climate adjustment (Section 4.5). An asterisk shows that the analysis in that section contributes to the in-depth review under the MIP.

Table 3.1: **Outward spillover heat map for Germany**

	EU partner																										
	AT	BE	BG	HR	CY	CZ	DE	DK	EE	EL	ES	FI	FR	HU	IE	IT	LT	LU	LV	MT	NL	PL	PT	RO	SE	SI	SK	UK
Imports	16.7	15.3	6.4	3.3	0.6	26.5		6.4	4.8	3	3.6	4.3	3.9	23.3	6.5	3.6	6.3	32.8	4	3.2	20.3	14.2	4.3	6.8	3.9	15.3	17.7	2.5
Imports (in value added)	7.3	3.7	3.3	4.8	1.9	7.9		2.9	2.6	1.7	2.0	1.9	2.0	6.7	4.0	1.9	3.3	8.2	2.1	5.2	4.4	5.6	1.9	3.1	2.1	4.7	6.1	1.5
Financial liabilities	32.5	34.1	2.8	4.1	28.1	7.4		36.3	2.8	4.0	5.9	12.5	16.5	6.2	55.8	8.5	0.8	1208.1	3.1	53.3	84.5	1.7	7.4	1.2	14.7	7.0	4.1	24.8
Financial assets	60.2	30.9	8.2	12.5	38.1	19.4		25.0	4.4	55.0	23.1	31.6	29.6	20.2	75.4	16.0	13.2	1732.0	13.2	141.0	107.0	18.8	20.3	8.2	26.5	24.3	19.6	29.2
Liabilities (to banks)	10.1	1.5								1.6	4.7	3.7	6.6		0.4	8.4					19	1.1			3.6			6.2
Bank claims	9.4	5.4	0.5		5.5	2.9		4.7	0.5	2.6	4.6	7.4	6.1	2.5	9.8	4.4	0.9	123.0	1.4	10.6	8.1	9.2	2.8	0.2	5.0	2.0	2.3	10.7

Note: cross-border figures for Gemany expressed as a % of the GDP of the partner country. The darkest shade of red corresponds to percentile 95 and the darkest shade of green to percentile 5. The percentiles were calculated for each variable based on the full available sample of bilateral exposures among EU countries. The blank spaces represent missing data. Data refer to: Imports — 2017, Imports (in value added) — 2015, Financial liabilities — 2017, Financial assets — 2017, Liabilities (to banks) — 2019-Q2, Bank Claims — 2019-Q2.
Source: IMF, OECD, TiVa, BIS and Commission services

3.2. EVOLUTION, PROSPECTS, AND POLICY RESPONSES

The current account surplus remains at levels still considerably above 6%. Following a gradual decline since 2015, the trade balance has widened again in 2019, due to weak demand for imported inputs in manufacturing and cheaper energy imports. The primary income balance also improved somewhat, while the negative services balance and secondary income balance remained unchanged. The current account surplus continued to edge down vis-à-vis the euro area to 2.2%, from 2.7% in 2015.

The large current account surplus currently reflects savings in the household and public sectors alone, as the non-financial corporate sector no longer has a positive net savings position. While companies' savings contributed to the current account surplus before 2017, now they have a slightly moderating impact. This reflects increases in corporate lending and corporate investment and a reduction in corporate savings as a result of rising unit labour costs, compounded lately by the recession in manufacturing. By contrast, while consumption's share of GDP remained unchanged, the household savings rate increased, propped up by rising labour incomes, and is expected to stay high in the coming years, remaining the highest in the euro area. Wage growth is expected to slow down closer to the euro area average, being less conducive to rebalancing. The public sector's net lending position peaked at 1.9% in 2018, and is expected to gradually decline, while remaining in surplus.

Given the size of the German economy and its strong trade and financial linkages, there are potentially sizeable spillovers to other EU countries. Germany's strong exports make it a key trading partner for all EU countries. Indeed, imports from Germany exceed 20% of GDP in some countries, including Luxembourg, Czechia, Hungary and the Netherlands, and are above 10% of GDP in Austria, Slovakia, Belgium, Slovenia and Poland (see Table 3.1). High trade volumes also reflect the fact that German companies operate and invest in other Member States, resulting in integrated value chains. Developments in the car industry reveal the complex nature of the resulting linkages across countries: the weak demand for cars in 2018 resulted in a production decline in Germany, while German companies actually increased production in other EU countries. This production shift now seems to have bottomed out but it is clear that the ongoing structural change in the car industry will have significant implications also for production facilities across the EU. Financial linkages are on average smaller than trade linkages, yet for some countries they are very strong. The countries with the strongest financial links, Luxembourg and the Netherlands, saw their linkages strengthen considerably further.

More recently, Germany has taken some important policy steps to address its macroeconomic imbalances, but more efforts will be needed in the coming years to fully address them. There have been policy advances in the area of public investment, though municipal level investment is still lagging behind. There have also been some smaller advances as regards investment in digital infrastructure, reducing disincentives to work and promoting wage growth. However, it remains to be seen if policy action has been decisive enough to produce the desired outcomes.

Box 3.2: Spillovers of a sustained increase in public investment – the case of Germany

The European Commission's QUEST model([1]) was applied to simulate the impact of increasing public investment by 1 percentage point of GDP over a period of 10 years. Such a policy would largely go in the direction of the proposal of a study commissioned by the German Trade Unions and the Employers' Association (Bardt et al., 2019) to implement an investment programme totalling €450 billion over the next 10 years (around 1.3% of GDP annually). This is the estimated additional investment required to meet Germany's investment needs in the areas of decarbonisation, digitalisation, transport, education and research and development. The simulation assumes that no neutralising fiscal measures (e.g. tax increases or expenditure cuts) are implemented([2]). The output elasticity with respect to the public capital stock is assumed to be 0.12, which is a mid-range estimate (Arslanalp et al., 2010). Monetary policy is assumed to retain its accommodative stance at the zero lower bound for the first 2 years and gradually normalise afterwards.

A sustained increase in public investment would have positive domestic and cross-border spillovers. Public investment tends to have a larger output multiplier than public consumption due to the impact on long-term output and wealth. As illustrated in Table 1, under the stipulated assumptions, increasing the public investment rate in Germany boosts output, employment and price dynamics in both Germany and the rest of the euro area, without exacerbating imbalances. There is also a frontloading of GDP effects. It derives from a real interest rate decline under the zero lower bound and expected positive long-term income effects from capital build-up even under an evenly distributed stimulus. It would weaken if the duration of stimulus were reduced.

The accommodative monetary policy is essential to realising of sizeable positive spillovers in this simulation exercise. Assuming a prolongation of the accommodative stance beyond 2 years could result in even stronger effects on the GDP of the rest of the euro area. This gain is associated with the export demand effects from a stronger depreciation of the euro, and with a strengthening of the real interest rate decline. Conversely, a monetary contraction would neutralise the spillovers onto the rest of the euro area or make them negative. On the other hand, at typical average debt maturity, debt costs would be affected only slowly by a gradual normalisation of monetary policy. The debt stock increases during the 10 years of stimulus, but (together with the assumed low financing costs) the impact of the package on the debt-to-GDP is strongly mitigated in the long term by rising tax revenue and growth in nominal GDP.

Table 3.1a:**Spillover effects of Germany implementing a comprehensive investment package over 10 years**

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Germany										
GDP	1.1	0.9	0.8	0.8	0.8	0.9	1.1	1.2	1.3	1.4
Employment	0.5	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Consumer price inflation	0.3	0.3	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Current account balance (% GDP)	0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Rest of euro area										
GDP	0.4	0.4	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Employment	0.2	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Consumer price inflation	0.3	0.4	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.1
Current account balance (% GDP)	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Note: Results in % or pps (current account balance) deviation from baseline.
Source: European Commission

This simulation complements earlier QUEST simulations designed to model a demand stimulus or structural reforms. Earlier simulations include an increase in public investment and a reduction in personal income tax (European Commission, 2017a), increases in expenditure on R&D and education (European Commission, 2018a), and implementation of structural reforms to close performance gaps (European Commission, 2019b).

([1]) For detailed information on the QUEST model and applications, see: http://ec.europa.eu/economy_finance/research/macroeconomic_models_en.htm.
([2]) Based on the most recent fiscal projections for Germany (European Commission, 2019a), such an increase in public investment would be consistent with SGP requirements.

Table 3.2: **MIP Assessment Matrix**

	Gravity of challenge	Evolution and prospects	Policy response
Imbalances (unsustainable trends, vulnerabilities and associated risks)			
External balance	Germany has a persistently large current account surplus considerably above the level of 3% of GDP suggested by empirical benchmarks. Accumulated surpluses have resulted in a large positive net international investment position of 68.6% of GDP in the third quarter of 2019. The surplus reflects saving and deleveraging by households, as well as the public sector. Weak domestic investment has resulted in bottlenecks in taking up renewable energy sources, in making transport and mobility more sustainable, in expanding the housing supply; in slow progress in digitalisation; and in a significant municipal investment backlog. All of this poses risks to Germany's future growth prospects. In addition, considering the strong economic links, strengthening investment in Germany would benefit both Germany and its euro area and EU partners.	The current account surplus has declined somewhat from its peak of 8.6% of GDP in 2015, but recently the decline has paused. With the manufacturing sector exposed to an increasingly challenging external environment and going through structural change, export growth has slowed. Still, due to cheaper energy prices and weak imports of intermediate goods, the surplus for 2019 stood at 7.7% of GDP. It is projected that the decline will resume after the current pause, but the balance will remain above 6% of GDP until 2021. Households' savings remain significantly above their investment. The share of households' disposable income in GDP has improved, benefiting from an increase in government transfers and resilient labour market, and the latter helped also a further recovery of the labour income share. However, in 2018, only two thirds of disposable income growth trickled down to consumption, while the rest led to higher savings. In addition, wage growth is expected to slow and get closer to the euro area average, which may reduce the pace of rebalancing. The net lending of corporates declined from 1.4% of GDP in 2017 to about zero in 2018, with the net lending of non-financial corporations at 0.2% of GDP and that of financial corporations at -0.2% of GDP. Hence, corporates did not contribute anymore to the current account surplus. In 2016-2019, private investment expanded by close to 3% on average. Further developments will merit attention, as private investment slowed from the second quarter of 2019, reflecting economic and trade uncertainty. Public sector investments have expanded, yet net public savings have also increased in 2018 as a share of GDP thanks to strengthening tax revenues and savings on interest expenditure, driving up the fiscal surplus up in 2018. In 2019, the resilience of the labour market helped containing social expenditure and contributed to persistently high revenues. It is expected that the government will gradually reduce its net savings, while remaining in surplus.	Germany has taken some policy steps to address its imbalances. Gross public investment increased by around 6% annually in 2015-2017 by close to 9% in 2018 and close to 7% in 2019 in nominal terms. In real terms it increased by about 4% on average over 2015-2019, as price inflation for construction works accelerated in 2017-2019. This raised the public investment rate from 2.1% of GDP in 2015 to 2.5% of GDP in 2018. However, the backlog remains considerable, especially at municipal level where it is estimated to about 4% of GDP. The statutory minimum wage was increased, although it sent only limited price signals to wage formation in the whole economy. Wages were resilient to the economic slowdown. A number of measures have been taken to improve investment in various areas, in particular education, R&D, digitalisation, sustainable transport, energy networks and affordable housing. Still, as progress in these areas requires time and further efforts, considerable need for action remains. The almost total abolition of the solidarity surcharge represents a notable step towards shifting taxes from labour and reducing the tax wedge, but major disincentives to work longer hours remain in place.

Conclusions from IDR analysis

- Germany is running a persistently large current account surplus reflecting private consumption restraint and subdued investment relative to savings in the private and particularly the public sector. The investment rate has improved, yet further increases could improve potential growth in Germany and also in the rest of the euro area.
- While private consumption has increased, this has been limited by households' higher propensity to save. A slowdown in wage and employment growth as well as heightened economic uncertainty may limit consumption growth. Disincentives to work for certain groups continue to reduce labour supply, thus limiting growth in disposable income. Regulatory restrictiveness is also contributing to capacity constraints.
- Public savings have increased up until 2018, while a decline is expected. Public investment has increased, yet remains below the level that appears necessary for closing the infrastructure investment gap.

Source: European Commission

3.3. OVERALL ASSESSMENT

The adjustment of the current account surplus has been limited so far, but a gradual decline is set to continue while the surplus level remains elevated. With the persistent weakness and uncertainty in the external environment, growth is expected to be driven primarily by domestic demand in 2019-2021. According to the draft budgetary plan, implementation of measures to increase public investment is set to continue. Private investment is also expected to remain solid amid strong housing demand and, more importantly, due to the need to adopt new technologies.

A comprehensive, long-term investment programme in Germany could reduce the external imbalance and would considerably increase GDP. More progress is needed to reduce the investment backlog and to support the long-term prosperity of the country. An investment programme could contribute to these. Moreover it could largely counterbalance an expected decline in potential growth. In addition, it would also have positive spillover effects on other euro area countries (see Box 3.2) ([6]).

([6]) The simulations presented in Box 3.1 are in the spirit of the 2020 Council Recommendations for the euro area.

4. REFORM PRIORITIES

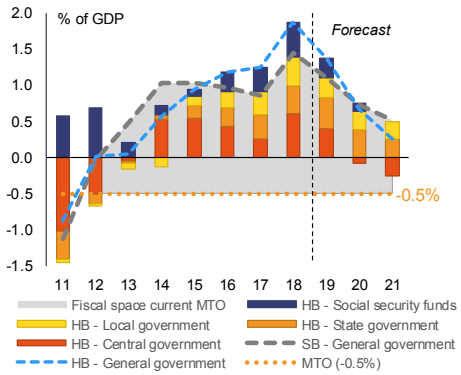
4.1. PUBLIC FINANCES AND TAXATION* ([7])

Public finances

Despite the economic slowdown in 2019, German public finances recorded a solid general government surplus and public debt fell below the 60% of GDP reference value, thus complying with the Stability and Growth Pact. Since 2014, the government sector achieved headline balance surpluses that have increased over time to peak at 1.9% of GDP in 2018. This surplus has declined to 1.5% in 2019, and is projected to decline markedly further in the next 2 years, to a nearly balanced budget position. The structural balance is also expected to decline over the same period, but to remain in a clear surplus. Several government measures to reduce taxes and increase spending are projected to have an expansionary fiscal stance over the period 2019-2021, according to the Commission 2019 autumn forecast (European Commission, 2019a). Public debt continues its downward path and is expected to have fallen below the 60% of GDP Maastricht threshold in 2019, for the first time since 2002. Public debt is expected to decline further in the coming years. For a debt sustainability analysis and associated fiscal risks see Annex B.

Germany has accumulated considerable fiscal space in recent years, which starts being used and could be used further to sustain the upward trend in public investment. 2018 also marked the peak in fiscal space of 1.9% of GDP, calculated as the difference between the structural balance of 1.4% of (potential) GDP and the medium-term budgetary objective (MTO) of -0.5% of (potential) GDP. Fiscal space is on average present at all levels of government. While the federal government is expected to largely use its headline surplus and return to balanced budgets, the state and local governments, at aggregate levels, still have reserves to boost public investment and overcome the investment backlog especially at municipal level. However, investment barriers in the form of constraints in planning and construction capacities persist. With the measures announced by the government up until 2021, the fiscal space could be reduced to 1.0% of GDP, which could be used to further strengthen public investment. The latter reached 2.5% of GDP in 2019, above the long-term average since 2000 of 2.2% of GDP. However, more efforts are needed to reduce the investment backlog, especially at municipal level, including increased absorption of federal funding provided for investment support ([8]).

Graph 4.1.1: **Headline balance (HB), structural balance (SB) and fiscal space**



Source: European Commission, Destatis, Draft Budgetary Plan 2020

Having a long-term vision for investment could facilitate sustainable and inclusive growth and help improve predictability and planning certainty for businesses and local communities. Trade unions and employer associations have recently agreed on the need for a long-term perspective on public investments in areas such as decarbonisation, digitalisation, transport and education. The yearly investment need was estimated at €45 billion over 10 years (Bardt et al., 2019). This represents an increase by more than half of the current public investment total of around €85 billion in 2019. The €450 billion package over 10 years would need to be specially allowed for and permitted to increase the current federal debt, which stands at €1 trillion. According to the social partners and their research institutes, the low interest rate environment offers a unique opportunity for a debt-financed investment programme. Furthermore, capacity constraints could be alleviated by giving incentives to

([7]) An asterisk shows that the analysis in the section contributes to the in-depth review under the MIP (see Section 3 for an overall summary of main findings).

([8]) Municipalities in 2018 planned investment expenditure of nearly €35 billion but spent only around €23 billion (KfW, 2019).

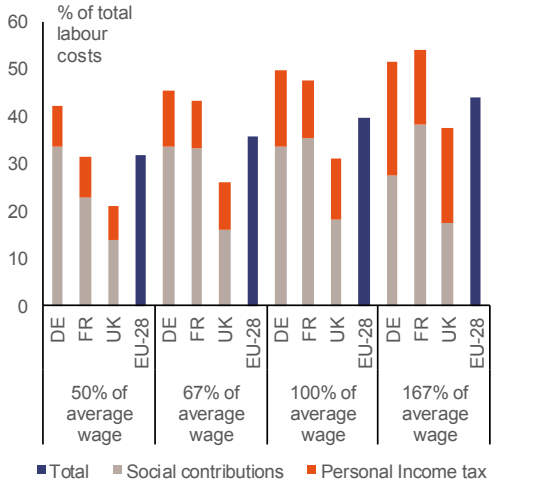
companies from all over the EU to bid for lucrative German contracts. According to the German Economic Institute (IW), the creation of a special federal investment budget (*'Föderaler Investitionshaushalt'*) responsible for the €450 billion investment package would not require a change in the constitution, as it would be in line with the debt brake. According to the social partners and their research institutes, the legally independent special budget should be bound to new, additional tasks, and there should not be expenditure shifts from the main federal budget (Hüther, 2019). Having a long-term investment plan could create continuous demand for public construction projects. It could give planning certainty to construction companies and municipalities to increase their capacities for managing public investment projects, also by hiring engineers at competitive salaries. It could also ensure that public investment does not decline in an economic slowdown due to consolidation efforts.

Taxation

Tax revenues in Germany continued to grow, with a major part coming from labour taxation, while taxes more supportive of inclusive and sustainable growth, such as environmental and wealth-related taxes, remain underused. In 2018, tax revenues reached 40.1% of GDP, which was the highest level since 2000, slightly below the euro area-19 (40.5%) and above the EU-28 (39.2%) averages. Germany's tax revenue structure is characterised by its relatively high reliance on labour tax revenue (56.9% of total tax revenue, which remained relatively stable over recent years). This is among the highest in the EU (the EU average is 49.4%), and is largely driven by the level of social contributions (39.3%). At the same time, revenues from indirect taxes are relatively low (27.0%), including VAT (17.5%) and environmental taxes (4.5%, with revenues slightly but continuously decreasing since 2005). The same is true for recurrent taxes on immovable property (1.1%) and inheritance taxes (0.4%). The share of revenues from taxes on capital stock and on capital income of households is significantly below the EU average.

Germany's tax burden on labour is high, particularly for low-income earners. The tax burden on labour, as measured by the tax wedge, is among the highest in the EU (51.3% against the EU average of 43.8% for a single worker earning the average wage), see Graph 4.1.2. In particular, the tax wedge for low-income earners (42.3% against the EU average of 31.8% for a single worker earning 50% of the average wage) is high. The progressivity of Germany's labour taxation is lower than in most EU Member States (European Commission, 2020). This is largely due to the limited progressivity in social security contributions.

Graph 4.1.2: **Tax wedge for different income levels, DE, FR, UK, EU-28, 2018**



Source: European Commission Tax and benefits indicators database

Certain features of the German tax-benefit system result in disincentives to work in the lower-income segment. Despite some improvements in recent years, the interplay of income taxes, social security contributions and transfer withdrawals leads to very high effective marginal tax rates ([9]) of 100% and more for certain income categories (Peichl et al., 2017). This results in strong disincentives for people to increase their working hours (the intensive margin), or — for the jobless — to start working ([10]). This is particularly an issue for people in part-time occupations

([9]) The effective marginal tax rate is the key measure of the incentivising effect of a tax-and-transfer system. This indicates what proportion of every additionally earned euro has to be deducted, whether in the form of the withdrawal of social welfare benefits, through income tax, or as social security contributions, from the total amount of income directly available to the earner.

([10]) The extensive margin is affected by the marginal tax rates via the increase in the average tax rate.

(predominantly women), and goes against considerations of efficiency and fairness (see Section 4.3). The 2019 increase in the midi-job threshold, above which full social security contributions are paid lowers the tax burden below the threshold, yet effects merit monitoring, as for some groups the marginal effective tax rates increase (European Commission, 2019b).

Germany's environmental tax revenues remain among the lowest in the EU. Increased use of environmental taxation could help internalise environmental costs, incentivise more efficient use of resources and contribute to the achievement of SDGs 3, 7, 11 and 13. It could also provide short-term tax revenues, which can be used for compensatory measures to improve the distributional impact of environmental taxes and their acceptance among the population. Germany's environmental tax revenues relative to GDP remain among the lowest in the EU (in 26th place in 2018), accounting for 1.8% of GDP (EU average 2.4% of GDP), a decline from 2.4% in 2005. Environmental tax revenues in Germany stem primarily from energy-related taxes (82.8% of environmental tax revenue), including the energy tax (69.2%) and electricity tax (11.8%). The implicit tax rate on energy in Germany fell from €222.2 per tonne of oil equivalent (toe) to €202.9 between 2006 and 2017, while the EU average grew from €192.9 to €236.1 per toe. Tax revenues from transport fuel taxes and taxes on resources are particularly low in Germany compared with other EU countries. Germany has no pollution-related tax revenue (Graph 4.1.3). As environmental taxes are typically regressive (European Commission, 2020), it is important to accompany their increased use with policy measures, including labour tax cuts and cash benefits, that alleviate their impact on vulnerable populations. Box 4.1.4 models the introduction of a CO_2 tax, including possible compensation mechanisms, which goes beyond the CO_2 pricing chosen by the government. Furthermore, as environmental taxes aim to change behaviour, which would, over time, result in the erosion of the associated tax base, an expansion of the tax base and a gradual increase in tax rates could ensure stable revenues.

Current price signals across energy carriers and users limit the potential for deploying clean energy technologies and reducing emissions. Taxes and levies (including the levy to finance subsidies for the producers of renewable energies) on electricity are currently higher per unit of energy than those on other energy carriers such as petrol and diesel, natural gas and heating oil in Germany (Kemfert et al., 2019). This limits the smart integration of electricity into the heating, transport and industry sectors. The situation is unlikely to change significantly over the coming years, despite planned reductions in electricity charges in support of the production of renewable energies. Exemptions for energy-intensive companies from the renewable surcharge add to the electricity bill of other industrial consumers and households. Furthermore, like many other EU Member States ([11]), Germany imposes a lower nominal marginal tax rate on diesel fuel for private road usage than on unleaded petrol and the ratio of diesel to petrol excises is significantly below the EU average. This is done even though the former has a higher carbon content and greater negative impact on ambient air quality ([12]). This is true for both the tax per litre and the tax per tonne of CO_2 emissions (European Commission, 2020). One might argue that the German tax system offsets this advantage for diesel fuel (at least partially) through higher car circulation taxes on diesel cars. According to the Federal Audit Office, the diesel privilege triggers revenue shortfalls in the amount of €9.5 billion annually, of which roughly €8 billion can be attributed to the lower energy tax rate for Diesel and €1.5 billion to the value added tax (Bundesrechnungshof, 2017). Taking into account the higher circulation tax for diesel cars, the net revenue shortfall from the diesel privilege is estimated at about €1.5 billion annually. However, the circulation taxes do not affect the extent to which a car is actually used once it is owned and available (i.e. the marginal cost of driving a car). To serve policy objectives of environmental sustainability, it would be preferable to tax transport fuel consistently based on consumption, reflecting the associated externalities in terms of carbon emissions and air pollution.

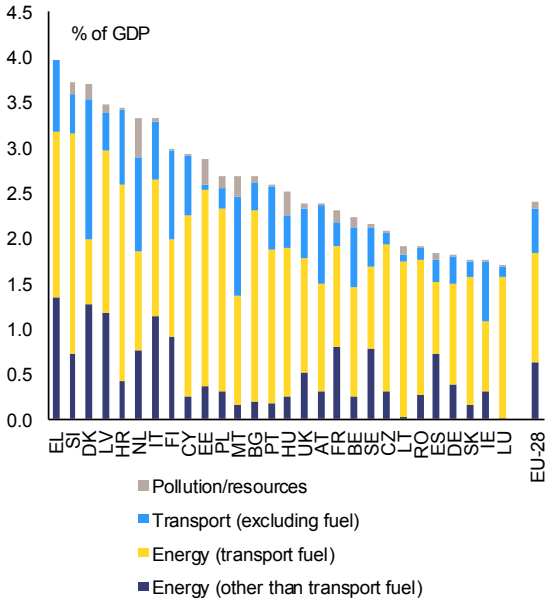
Simplifying Germany's tax system could help make the business environment more

([11]) With the exception of Belgium and the UK, where rates are equal per volume of fuel consumed.

([12]) It should be noted that diesel engines are on average more efficient than petrol engines.

investment-friendly. The tax system remains relatively complex, which contributes to comparatively high compliance costs for businesses. Both statutory rates and effective average tax rates on corporate income are relatively high in Germany (European Commission, 2019c). Given that many businesses will not benefit from the abolition of the solidarity surcharge, this situation remains unchanged. Similarly, the debt bias in corporate taxation remains high (European Commission, 2019b).

Graph 4.1.3: **Structure of environmental tax revenues, 2018**



[1] Energy taxes also include taxes on CO_2 emissions and Member States' revenues from the EU emission trading system. Transport taxes include taxes on owners and users of means of transport. Pollution taxes include taxes on emissions, waste management and noise. Resource taxes include any taxes linked to the extraction or use of a natural resource. They do not include other levies, e.g. those levied to subsidise the production of renewable electricity.
[2] EU-28 values are weighted averages by GDP size.
Source: Eurostat

Recent tax reforms

The government agreed on the abolition of the solidarity surcharge for large parts of the population, and this is expected to help spur job creation and private consumption. The solidarity surcharge (an additional 5.5% on top of the personal/corporate income tax rate) was introduced in response to additional fiscal needs stemming from German unification ([13]) and was intended to be temporary in nature. The German *Bundestag* abolished the surcharge for about 90% of taxpayers currently paying it, and reduced it for a further 6.5% of taxpayers by substantially increasing the threshold of the tax-free allowance, starting from 2021 ([14]). The reform is expected to create more than 100,000 additional jobs (in full time equivalents) and generate a substantial fiscal stimulus. While this reform will through these cuts increase the progressivity of the upper tail of the income tax system, income inequality as measured by the Gini index will likely increase slightly, as the reform will benefit the (upper) middle class more than the bottom of the income distribution (Blömer et al., 2019).

As part of the recently agreed Climate Package, Germany will introduce a CO_2 price with a proposed price path which can help the attainment of its medium-term climate targets, but which might also have a regressive effect. The Climate Package is expected to increase the cost of pollution, lower costs for less-polluting transport modes and give more incentives to promote the use of building insulation and less-polluting types of heating (Projektgruppe Gemeinschaftsdiagnose, 2019). While initially set at a low entry price for 2021 (10 €/tCO_2), the CO_2 price was raised to €25, gradually increasing in stages to €55 by 2025. Evaluations by economic research institutes found that the moderate CO_2 price initially proposed by the government for transport and buildings would not be sufficient to reach the 2030 target for reducing emissions not covered by the EU emission trading system (DIW, 2019). Evaluations also pointed out a regressive effect of the proposed CO_2 pricing mechanism (DIW, 2019). The regressive effect is expected to be partially reduced through a substantial reduction in the renewable electricity surcharge.

([13]) Initially it was introduced for 1 year in 1991 to finance the fiscal needs in response to the Gulf War, in support of central and eastern European countries and German unification. In 1995, it was reintroduced for an unlimited period with the sole purpose of financing the long-term costs of German unification.

([14]) Alternatively, the legislator could have abolished the solidarity surcharge altogether and – in return for not keeping it at the upper end of the income scale – increase for that part the income tax correspondingly. However, the revenues from the solidarity surcharge accrue in full to the federal level while revenues from the income tax are shared between the federal and the *Länder* level.

Box 4.1.3: **The 2030 Climate Package**

The coalition government agreed on a 2030 Climate Package that is mainly composed of a proposal for a federal law on climate protection and a 2030 climate protection programme that contains a list of sectoral policies aimed at achieving Germany's 2030 greenhouse gas emission reduction target. In the meantime, most of the corresponding legislation has been adopted by the German Parliament. The law on climate protection makes legally binding the national greenhouse gas reduction target of at least 55% by 2030, compared to 1990. The law also sets the long-term objective of climate neutrality by 2050. The law further apportions the overall emissions reduction targets into sectoral emission budgets between key sectors of the economy, in particular, energy, buildings, transport, industry, agriculture and waste management. Compliance with these sectoral annual emission budgets is allocated to the federal ministry responsible for the respective sector. In case of failure, the lead ministry must present an emergency adjustment programme of measures to reach future targets. The law also provides for an annual monitoring process under the leadership of a governmental body ('*Klimakabinett*') ([1]) as well as the creation of a commission of independent experts to monitor progress in reducing emissions and advise the government on actions and impact assessments.

As part of the 2030 federal climate protection programme, a CO_2 pricing system will be introduced in the transport and heating sectors - the so-called national emission trading scheme (nETS). The government's proposal was criticised for its lack of ambition and its distributional impact (DIW, 2019; MCC and PIK, 2019). The German Parliament agreed to raise the level of environmental ambition and the volume of compensatory measures. The CO_2 price will be phased in gradually, starting in 2021 at €25/ t-CO_2 (initial proposal €10). Afterwards, the fixed price will annually increase to reach €55/t-CO_2 in 2025 (initial proposal €35). The maximum amount of emissions decided in 2026 will be set to decrease annually in line with German climate targets. The emission certificates will be traded on a national emission market, separate from the EU ETS. From 2026 the price of the emission certificates will be set by the market between a minimum of €55/t-CO_2 and a maximum of €65/t-CO_2. An evaluation of the law is foreseen for 2025 to determine whether a price corridor for the following years after 2026 is reasonable or necessary

Several initiatives listed in the 2030 Climate Package aim to partly compensate final consumers and economic agents for increased energy prices. First, a large part of the income generated by the nETS is planned to be used to reduce electricity charges and levies In particular, the surcharge on renewable electricity for households and small businesses will be gradually decreased. Second, between 2021 and 2026 long-distance commuters (as of 21km of distance) will have an additional possibility to reduce their taxed income ('*Pendlerpauschale*'). This extra fiscal benefit of 5 eurocents per km will be increased to 8 eurocents per km in 2024 to 2026. Third, housing benefits will be increased by 10%. However, a large part of the additional revenue will go to the federal budget to finance additional climate and energy measures.

In addition, the Climate Package includes a long list of sectoral policies aimed at reducing sectoral emissions. For example, in the **buildings sector**, Germany plans to increase tax support for refitting heating systems. To facilitate the exchange of old heating oil burners, new heating systems will get a subsidy of 40% of the cost. At the same time, after 2026 it will not be allowed to fit a new oil heating system (as long as an alternative exists). In the **transport sector**, electro-mobility will be supported across the board. The goal is to have 1 million electric vehicle (EV) charging points available across Germany by 2030. The creation of EV charging infrastructure at commonly used private properties will be supported. The premium scheme for electric, hybrid and fuel cell vehicles will be extended to cover the purchase of vehicles costing less than €40,000. Public transport investment, creation of new cycling routes, modernisation of ports and inland waterways, support to rail transport (Deutsche Bahn), digitalisation and development of new motor fuels (e.g. based on hydrogen) are among the initiatives listed. From 2021, the motor vehicle tax for newly registered vehicles will be related to their CO_2 emissions per km. To make train journeys cheaper and flying more expensive, VAT on train tickets are reduced from 19% to 7% from 2020 on and it will not be possible to sell air tickets below a minimum price (to prevent the price falling below the levels of charges and taxes). The transformation of German **industry** will be supported by, among other things, investment programmes, higher minimum standards in eco-labelling and the national decarbonisation program, which targets in particular high-emitting sectors. Battery cell production will be supported. With regard to **energy**, Germany will phase out coal in power stations by 2038. By 2030, Germany should get 65% of its energy from renewable energy sources. The Climate Package includes also initiatives in **other sectors**, such as (more climate-friendly) agriculture, waste management, an increased role for R&D and hydrogen, CO_2 storage and implementation of the sustainable finance strategy.

The 2030 Climate Package has been welcomed as a step into the right direction but criticised for its distributional impact, showing that low-income households would be more affected than those with high incomes. Germany's Council of Economic Experts has advocated carbon pricing for some time as the most cost-effective measure to reduce greenhouse gas emissions, but warned against a too-low CO_2 price strategy (German Council of Economic Experts, 2019a). Germany's leading economic institutes called for CO_2 prices in line with those of the EU's emissions trading scheme (EU ETS) for economic efficiency reasons. According to the German Institute for Economic Research, the low price of CO_2 and low price cap initially proposed would not have reduced emissions in line with the proposed climate objectives for 2030 (DIW, 2019) ([2]). The study also analysed the distributional impact of the programme and revealed that despite compensatory measures such as the reduction in the surcharge on renewable electricity or the increase in the commuting allowance, low-income households would be more impacted than high-income households. Although this study assessed a government proposal with a considerably lower level of ambition, concerns about the distributional effects remain. This is mainly due to the further increased *Pendlerpauschale* which benefits richer households proportionally more than those on lower incomes. An assessment made by the Berlin climate research institute MCC and the Potsdam Institute for Climate Impact Research (PIK) came to a similar conclusion that the climate protection programme initially proposed by the federal government is unlikely to be sufficient to achieve the 2030 climate targets. Policymakers were advised to make four specific adjustments: (i) raise the level of ambition for the carbon price; (ii) improve the social balance; (iii) integrate the programme more closely with EU-level action; and (iv) introduce an effective monitoring process (MCC and PIK, 2019).

([1]) The climate committee of the government consists of the chancellor and six ministers (environment, finance, economy, construction, transport and agriculture).

([2]) It should be noted that the study focused only on CO_2 pricing and did not include the effect of additional specific sectoral measures included in the programme, whose impact was considered difficult to quantify.

However, the net effect might still be regressive as the long-distance commuter tax rebate, which benefits high-income earners, will increase significantly.

The success of the Climate Package will also depend on a multitude of additional measures. The package includes numerous measures beyond CO_2 pricing (see Box 4.1.3), but their effectiveness and efficiency are unclear. The new approach of 'ex post' adjustment for meeting sector targets might lead to delayed action. In addition, the intended beneficial effect will be dampened by the continuation of environmentally problematic fossil fuel subsidies. In 2016, €9.5 billion went to fossil fuel energy support (BMF, 2019).

In 2019 the government adopted draft legislation to reform Germany's immovable property tax in response to a ruling by the Constitutional Court. In its ruling of 10 April 2018, the Federal Constitutional Court declared the way in which properties are valued for the purposes of the immovable property tax (*Grundsteuer*) to be unconstitutional as the tax had been calculated based on outdated property values ([15]). The government aimed at a revenue-neutral reform that would comply with the ruling. Furthermore, the administration of the reform is intended to remain relatively simple, with limited distributional ramifications. In principle the amounts of immovable property tax due will continue to be based on property values, although regional governments may opt out and apply a different valuation method. The draft legislation envisages a fundamentally unchanged valuation method. First, the immovable property will be valued for tax purposes ([16]). Then, this value will be multiplied by a uniform factor (basic federal rate: *Steuermesszahl*) and another multiplier (*Hebesatz*).

([15]) The assessed values date from 1964 in the states (*Länder*) of the former West Germany and 1935 in those of the former East Germany.

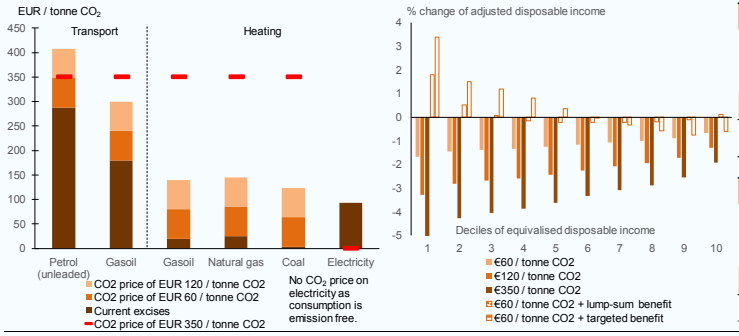
([16]) Various simplified valuation methods will be applied to avoid costly valuation of each real estate individually.

Box 4.1.4: The distributional and equity effects of introducing a CO_2 price

This box presents hypothetical CO_2 tax scenarios in transport and heating and discusses their distributional effects. Environmental taxation, including CO_2 pricing, can help internalise externalities from environmental degradation, incentivise more efficient use of resources and contribute to sustainability goals (see Section 4.5). Transport and heating were also targeted by the recently adopted carbon pricing policy as part of the 2030 Climate Package. While the aim of this box is not to assess the exact policies included in that package (for the assessment, see Box 4.1.3), it nevertheless provides an illustration on the effects of the introduction of a CO_2 price and ways to design it to avoid regressivity. Studies show that such taxes are typically regressive, as those on low incomes spend a higher proportion of their income on environmental taxes (Hassett et al., 2009; Grainger and Kolstad, 2010; Edenhofer et al., 2019; DIW, 2019; German Council of Economic Experts, 2019a), and high-income earners have a much higher CO_2 footprint than low-income earners. While the average household in the lowest income decile emits on average about 7 tonnes of CO_2 per year, the average household in the fifth income decile emits almost twice that amount. In the top income decile, the carbon emissions are almost three times higher than in the lowest decile. However, this increase in CO_2 emissions is disproportionate to income, as the average net equivalent income of the top income decile is almost six times that of the bottom decile ([1]) (German Council of Economic Experts, 2019a). These findings justify redistributive measures to counteract the regressive distributional effects of environmental taxes.

Based on the EUROMOD Indirect Tax Tool, the distributional effects of the introduction of CO_2 prices of €60, €120 and €350 per tonne are simulated, with and without compensatory measures ([2]). As the aim is to assess the 'overnight' distributional effect of introducing a CO_2 tax, the simulation assumes that households continue to consume the same quantities of all goods as before. While this assumption is plausible in the short term, the tax is intended to have steering effects that will ultimately lead to behavioural change and a reduction in CO_2 emissions, and hence in tax revenues. The first scenario uses an average price of €60 per tonne of CO_2 that comes on top of the excises currently in place, in line with the current CO_2 price in Finland. In the second scenario a more ambitious price of €120 per tonne of CO_2 is introduced on top of the excises, in line with the CO_2 price for example in Sweden. The third scenario of €350 per tonne of CO_2 existing excises are replaced by a CO_2 price, reflecting a scenario that achieves net zero greenhouse gas emissions in ETS sectors by 2050 (European Commission, 2018b). The additional revenue in the first scenario is spent entirely on compensatory measures in a budget-neutral way. Two types of compensations are considered: a lump-sum cash benefit to all households and a targeted cash benefit for households that spend at least 15% of their disposable income on energy consumption. The benefits for a one-person household amount to €18.0 per month in the lump-sum scenario and €42.1 in the targeted scenario ([3]).

Graph 4.1.3a: **Environmental tax scenarios: distributional and equity effects, with and without compensatory measures**



At-risk-of-povery-rate

Current excises	€60 / tonne CO_2	€120 / tonne CO_2	€350 / tonne CO_2	€60 / tonne CO_2 + lump-sum benefit	€60 / tonne CO_2 + targeted benefit
15.7%	16.3%	17.0%	17.7%	15.5%	15.1%

Note: Poverty line is set to 60% of median equivalised adjusted disposable income.

Gini coefficient

Current excises	€60 / tonne CO_2	€120 / tonne CO_2	€350 / tonne CO_2	€60 / tonne CO_2 + lump-sum benefit	€60 / tonne CO_2 + targeted benefit
0.2842	0.2858	0.2873	0.2890	0.2836	0.2797

Note: Gini coefficient of adjusted disposable income.

[1] The simulation uses German tax-benefit rules in place in 2016.
[2] Adjusted disposable income is defined as disposable income minus indirect tax payments.
Source: European Commission, Joint Research Centre, based on the EUROMOD model

The results confirm that the impact of a CO_2 tax is regressive, but also indicate that well-designed compensatory mechanisms can lead to an overall progressive effect. Without compensatory measures, the regressive effect is stronger the higher the CO_2 price. As a result, adjusted disposable income decreases

in the range of 0.7%-1.9% in the tenth decile and in the range of 1.7%-5.2% in the bottom decile in the scenarios without compensation. The introduction of a cash benefit renders the reform progressive, leading to a gain in adjusted disposable income for households until the third decile in the case of a lump-sum benefit and until the fifth decile in the case of a targeted benefit (see Graph 1).

Inequality and the at-risk-of-poverty rate are reduced where compensatory measures are in place. Inequality, as measured by the Gini coefficient, increases in the scenarios without compensatory measures as the price of CO_2 rises. It decreases in the case of the targeted cash benefit and stays roughly the same if a lump-sum compensation is in place. The at-risk-of-poverty rate evolves in a similar way (see Graph 1).

([1]) If regression models are used to control for other socio-demographic characteristics, the annual CO_2 emissions per €100 of available monthly income increase by an average of 2%.The heterogeneity between the deciles is not only reflected in the absolute amount of CO_2 consumed. In the lowest income decile, almost half of CO_2 emissions come from heating and electricity consumption, while individual mobility and the consumption of goods or services play a more important role in higher income deciles

([2]) In a first step, the tool imputes private household expenditures for 16 commodity groups to EUROMOD data (based on EU-SILC) by means of Engel curves, which were estimated using national Household Budget Surveys. The data allow the simulation to capture solely the energy consumption of private households for heating and transport and can be affected by over- and under-reporting of expenditures. In a second step, the tool applies estimated implicit tax rates (relative to consumer prices) to compute households' indirect tax liabilities for the different commodity groups. The tool rests on the assumption of full tax compliance and that changes in indirect taxes are entirely passed on to consumers. For detailed methodological descriptions see De Agostini et al. (2017).

([3]) The amount per household is evaluated as a weighted share, taking into account its composition according to the OECD equivalence scale (a weight of 1 is assigned to the household head, 0.5 to other members aged over 14 and 0.3 to children under 14). The benefit does not interact with the rest of the tax-benefit system, so that the entitlement to other cash social benefits remains unchanged.

While the basic federal rate will be the same across all of Germany, the multiplier — and therefore the amount of tax ultimately due — will be determined by local authorities. Still, the *Länder* will have the possibility to diverge from federal legislation. For example, Bavaria has already stated its intention to use land values instead of property values to determine the relevant tax base.

The reform did not aim to raise additional tax revenues from property owners, and thus missed the opportunity to shape the tax system in a way that is more conducive to inclusive growth. Recurrent taxes on immovable property are generally considered a relatively efficient tax, given the immobility of the tax base (European Commission, 2020). In addition, taking account of the relatively low rate of home ownership in Germany and its unequal distribution, recurrent property taxes may also contribute to a fairer distribution of the tax burden. However, even after the reform, tax revenue from immovable property is expected to remain relatively low as the government envisaged a revenue-neutral reform. Furthermore, the reform did not restrict the possibility for the owner to include the taxes due in the utilities to be paid by the tenant. This makes the tenant the de facto entity on whom the tax is imposed. ([17]).

Wealth-related taxes account for a small part of revenues. The inheritance and gift tax in Germany yields only about €6 billion a year, corresponding to an average effective tax rate of only about 2% ([18]) largely due to exemptions for business assets. Also, since 1997 Germany no longer applies its wealth tax legislation as it discriminated against non-real-estate wealth. Thus, while revenues from wealth-related taxes in Germany have declined over the years, the accumulation of wealth has increased substantially, wealth concentration is very high in international comparision (Bach and Thiemann, 2016; Bach et al., 2019) and also the share of wealth that is inherited as opposed to accumulated has increased significantly from about 20% (as a percentage of total wealth) in the 1970s to about 50% in 2010 (Brülhart et al., 2018).

([17]) Whether introducing such a legal restriction would result in a shift of the tax burden from tenants to landlords is not clear-cut, as landlords may increase net rental prices. However, those adjustments would take time and might be further slowed down by regulative measures limiting rental price increases.

([18]) Calculated as the ratio between tax revenues and the estimated total of wealth transfers.

Healthcare

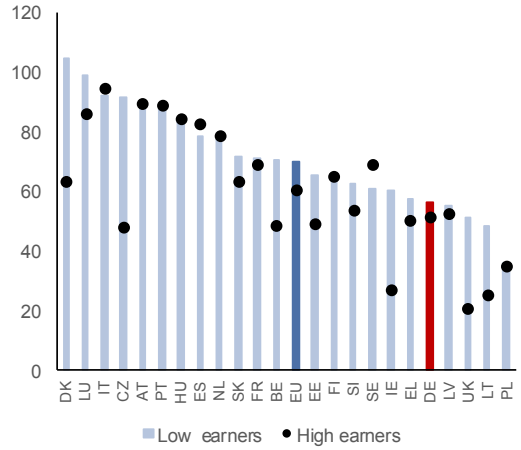
Inefficiencies in healthcare persist. In 2017, Germany spent €4,300 per person on healthcare (11.2% of GDP), the highest in the EU (EU average €2,884). At the same time, avoidable deaths from preventable and treatable causes are close to the EU average and higher than in many other western European countries. The German healthcare system continues to be very hospital-centric. Hospital bed density in 2017 (8 beds per 1,000 people) was higher than the EU average (5). Also the average hospital stay, at 8.9 days, is comparatively long and day surgery is not as common as in the majority of EU Member States. The quality of healthcare suffers from a highly fragmented system, with many services provided in small and often inadequately equipped hospitals. A stronger focus on prevention and care integration could bring efficiency gains. Inefficiencies in the healthcare system also arise from the legal framework, which allows people on higher incomes, civil servants and the self-employed to opt out of the solidarity-based statutory health insurance scheme. It also allows doctors to charge patients with private health insurance more than those covered by the statutory scheme, which incentivises overprovision of health services.

Pension system

The retirement of the baby boomer generation is affecting Germany more than other EU countries, putting considerable pressure on public finances. By 2040, the country is expected to be facing one of the largest increases in spending on public pensions in the EU (up by 1.9 pps of GDP), while the public pension benefit ratio is expected to fall to 37.6%, according to the 2018 Ageing Report. The long-term fiscal sustainability risk has increased from low to medium, reflecting a softening of the initial budgetary position, which however remains favourable. This yields an increase in the S2 level (by 0.5 pps) to 2.2, slightly above the 2.0 medium risk threshold (Annex B) ([19]).

([19]) The pension measures of 2018-2019 do not translate into significant revisions of the cost of ageing component, while anticipated future significant policy changes are to be reviewed in future updates of the Ageing Report.

Graph 4.1.4: **Net pension replacement rates for low and high earners (2018)**



[1] Low-earners are defined here as workers earning half of average worker earnings (in Germany in 2018, average earnings were €50,546).
Source: OECD, 2019a

Demographic developments also have implications for the adequacy and fairness of pensions. Since 2005, pension increases are linked to the pension sustainability factor, which measures the change in the number of contributors relative to the number of pensioners. While in 2019 this led to an additional pension increase of 0.6%, from 2020 it is projected to be negative with an average reduction in pensions of 0.5% per year until 2033 (BMAS, 2019). At the same time, net pension replacement rates are already relatively low, especially for low-wage earners (56.1%, against an EU average of 69.8%, see Graph 4.1.4). Furthermore, life expectancy varies between socio-demographic groups and is lower for low-income earners than for high-income earners, as also reported in the Federal Government Report on Poverty and Wealth (BMAS, 2017). As a result, the annualised compound return of expected pensions compared to their earlier contributions is currently higher for high-income earners than for low-income earners (Haan et al., 2019; Breyer and Hupfeld, 2009). The latest reform from July 2019, which maintained benefits for certain low-income earners ('midijobbers') while reducing contributions, and the planned introduction of *Grundrente* that aims at providing a contribution-period based top up to benefitlong-term insured low-income earners, are partly addressing the issue of intra-generational fairness as they entail benefits for low-income earners above the normal accrual

rate. The principle of intra-generational fairness could be further strengthened in the *Grundrente* by basing the contribution years on full-time equivalents. This would avoid treating those that worked part-time in relatively well-paid jobs the same as those that have worked their entire life full time in badly paid jobs.

Fiscal framework

Through extension to the Länder level, the national debt rules are becoming even more binding. Since 2016 the fiscal rules of the national 'debt brake' (*Schuldenbremse*) were already fully applicable to the federal level, requiring a structural deficit not higher than 0.35% of GDP. From 2020 on, the 'debt brake' applies also to the *Länder* level, requiring the budgets of the states to be balanced without new debt. Structural deficits are no longer allowed.

Germany continues to conduct spending reviews to increase the efficiency and effectiveness of government spending. Since 2015, the country has held yearly cycles of spending reviews targeting specific policy areas and ministries. The review cycle for 2018-2019 analysed the 'management of receivables', whereas the ongoing fifth review cycle for 2019-2020 focuses on 'further education, re-entry and start-up of a new business'.

'Green' budgeting does not seem to be factored into budget planning in Germany. Although internationally there is a trend towards identifying the 'green' contribution of fiscal policy measures within budgetary documents, this does not seem to be the case in Germany yet. While a comprehensive view may be missing, the policy impact could still be analysed for specific climate and environment policy-related actions. This is a much more restricted approach than for example in France, where a first attempt is being made to coherently present how 'green' the French budget is. The French 'yellow book' covers both budgetary information and policy strategies, and also features an impact assessment on households and businesses (République française, 2019). Similarly, in Italy the presentation of 'green' items represents a long-standing practice in the budgetary documents.

4.2. FINANCIAL SECTOR*

4.2.1. BANKING SECTOR

The banking industry needs to adapt to the challenging times ahead. Banks will have to accelerate consolidation and reorient their business strategy in the foreseeable future of ultra-low interest rates ([20]). While further cost-cutting is necessary, the financial sector needs to invest more in IT infrastructure to modernise day-to-day business. The disruption initiated by fintech and bigtech may squeeze revenues, while consumer preferences and the regulatory environment may also change ([21]). The sector as a whole needs to adapt to a rapidly changing environment and develop a strategic vision in order to remain viable.

Profitability in the banking system remains low on aggregate, despite Germany's years of continued economic expansion. The past years of economic growth have helped banks to keep non-performing loan ratios low, while the low interest rate environment contributed to lower funding costs. However, profitability has been dented by the decline in lending interest rates combined with an over-reliance on intermediation income, over-capacity stemming from splintered bank networks, compliance cost, an old IT infrastructure that needs costly overhauls. Still, banks have managed to remain profitable on aggregate by realising hidden reserves, increasing the maturity transformation, increasing credit flows and taking on higher risks during the past years. Relying on these factors appears more difficult in the future.

Profitability differs widely between banking types. German banks' profitability has been low for decades, as saving banks and cooperatives are stakeholder banks that do not operate primarily for profit. By contrast, savings banks and cooperatives are currently more profitable than big commercial banks and Landesbanken. For the banking system as a whole, the return on assets in 2018 was 0.23%, the lowest in Europe after Greece. ([22])The return on equity (RoE) after tax was 2.4%, with pronounced differences between banking groups: 8.2% for cooperatives, 7.3% for savings banks and 1.1% for commercial banks, while Landesbanken recorded a loss in aggregate, with -3.9%. The latter has been influenced by Nord LB's 2018 €2.4 billion loss mainly stemming from off-loading non-performing shipping loans. Consequently, the public bank received a capital injection of €2.8 billion[23].

Low profitability calls for an overhaul of cost structure. High costs were a major driver of low profitability. German banks' cost/income ratio fell from 75.9% in June 2018 to 73.6% in June 2019, still somewhat above the EU average of 64.5% in both years. Over those 12 months, Landesbanken and big commercial banks' cost/income ratio rose 130 basis points to 83.2%. Consolidation progresses still have a long way to go. With 1,603 banks, Germany has a crowded banking market, which is shrinking by around 3% annually, while the number of branches is falling faster (by 7.4% in 2018) (Bundesbank, 2019). Over 2018, the number of savings banks (386) and cooperative banks (878) declined by 1% and 4% respectively, while Germany now only counts 5 Landesbanken as 2 changed their legal nature and are now classified differently by the Bundesbank. Mergers across pillars remain difficult, also because their legal set-up differs. Salaries and pension liabilities account for half of banks' expenses. In 2018, pension liabilities' discount rate was reviewed for the first time since 2005. Given the much lower discount rate, pension liabilities increased commensurately. Yet, thanks to limited bankers' bonuses, and shrinking headcounts, overall staff cost fell 0.7% over 2018.

([20]) Low interest rates also very much impact the life insurance sector. The challenges related to this sector were discussed extensively in previous country reports: European Commission (2015) and European Commission (2016).

([21]) Among other things, the increased focus on sustainable finance, e.g. how finance can contribute to achieving climate objectives, is expected to impact banks. The federal government is now developing a sustainable finance strategy in cooperation with financial institutions. As part of this, the federal development bank KfW will further concentrate on the environmental sustainability of projects.

([22]) Germany's three-pillar model's heterogeneousness makes international comparison difficult. Deutsche Bank is a global systemically important bank (G-SIB) and the world's 15th biggest bank. Its total assets are larger than those of the 386 savings banks combined (€1.4 versus €1.25 trillion). Therefore, that bank's results impact national averages disproportionally. Whilst in other Member States individual banks' key performance indicators are usually closer to the average, in Germany they often lie further away from the median.

[23] Please refer to case number SA.49094 https://ec.europa.eu/competition/state_aid/cases1/202033/283125_2123117_150_5.pdf

Table 4.2.1: **Quarterly financial soundness indicators**

	Germany															EU	Euro area
	2014q4	2015q4	2016q2	2016q3	2016q4	2017q1	2017q2	2017q3	2017q4	2018q1	2018q2	2018q3	2018q4	2019q1	2019q2	2019q2	2019q2
Non-performing loans	3.9	3.0	2.8	2.7	2.6	2.5	2.3	2.1	1.8	1.7	1.7	1.6	1.4	1.2	1.3	2.9	3.4
o/w foreign entities	0.7	0.7	3.1	3.0	0.7	0.7	0.7	0.6	1.7	2.2	2.3	2.2	2.0	1.4	1.2	-	-
o/w NFC & HH sectors	6.7	4.9	5.0	4.9	4.6	4.6	4.3	4.0	3.0	2.9	2.8	2.6	2.2	2.1	2.0	-	-
o/w NFC sector	8.9	6.5	6.6	6.5	6.4	6.3	6.0	5.6	4.1	3.8	3.6	3.3	2.7	2.6	2.5	5.5	6.1
o/w HH sector	2.9	2.3	2.1	2.0	1.8	1.8	1.8	1.7	1.8	1.9	1.9	1.8	1.7	1.5	1.4	3.1	3.6
Coverage ratio	34.8	36.7	37.4	38.1	36.9	37.1	38.4	38.4	56.5	55.1	54.3	54.4	56.6	56.7	56.4	46.2	47.7
Return on equity(1)	2.5	1.7	1.6	1.3	2.2	2.4	1.9	2.0	2.9	4.1	4.8	4.4	2.4	4.9	3.8	6.7	6.4
Return on assets(1)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.3	0.3	0.2	0.3	0.3	0.5	0.4
Total capital ratio	17.3	17.9	17.8	17.9	18.1	17.9	18.4	18.7	18.8	18.3	18.5	18.6	18.4	18.4	18.0	18.8	18.1
CET 1 ratio	14.3	14.9	14.8	14.9	15.0	14.9	15.4	15.8	15.9	15.4	15.8	15.8	15.7	15.8	15.4	15.0	14.8
Tier 1 ratio	14.8	15.4	15.4	15.5	15.6	15.6	16.0	16.4	16.4	16.0	16.3	16.4	16.3	16.3	15.9	16.3	15.8
Loan to deposit ratio	97.5	94.6	94.2	95.2	92.6	92.5	91.0	91.2	89.4	90.5	90.3	90.5	90.2	90.1	87.6	99.5	97.2

(1) Annualised data. o/w: out of which. For the EU and euro area data includes domestic banking groups and stand-alone banks, foreign (non-EU) controlled subsidiaries and foreign (non-EU) controlled branches.
Source: ECB-CBD2 Consolidated Banking, data

Credit growth has facilitated private investment, while also increasing banks' leverage. In 2018, the stock of mortgages increased by 4.6%, consumption loans by 5.1% and corporate loans by 5.3%. Outstanding bank credit to the private non-financial sector increased to EUR 1,1 trillion at the end of September 2019. Growth accelerated to 5.4% from 4.5% a year earlier. Outstanding credit increased by 3.2 pps to 89.3% of GDP in the year ending in September 2019. Thus, private debt is growing again relative to GDP while it remains well below its peak in 2001 at 103% of GDP.

German banks still depend predominantly on intermediation income. It accounts for three quarters of their total income, while in several other euro area jurisdictions non-interest income constitutes about half of aggregate revenue. Over 2018, loan stock increased by 4.9% but intermediation income rose by only 1.3% - feeble growth given that deposits go largely unremunerated. Although the German banking system as a whole kept the average intermediation margin above 1%, there were stark differences across banking pillars. Savings banks and cooperatives had an average margin of 1.73% and 1.8%, respectively, whereas commercial banks' margin amounted to 0.77%. Banks pass on negative interest rates to larger corporate customers, but only very timidly to large household depositors. During 2018, the interest offered on corporate deposits was -0.03%, whereas banks remunerated new household deposits with 0.02% on average.

Risk-adjusted capital ratios are still somewhat above the European average. Germany's leverage ratio, which divides capital through unweighted assets, is one of Europe's lowest. German banks' CET1 ratio (Common Equity Tier 1 divided through risk-weighted assets) of 15.4% is respectively 40 and 60 basis points above the EU and euro area average. With 1.3%, Germany has been having one of the lowest non-performing loan ratios in the euro area. (Table 4.2.1) Very low default rates over the last decade have influenced banks' internal risk models, and raise the issue whether credit risk may be underestimated. Indeed, once Basel III is fully implemented, capital requirements might rise significantly for German banks (EBA, 2019).

The Bundesbank's stress test on smaller banks confirms that financial stability ratios are generally satisfactory. Whilst the European Banking Authority conducted a stress test on Europe's bigger banks in 2018 (EBA, 2018), the Bundesbank ran a test on Germany's 1,412 smallest banks holding 38% of bank assets in 2019. In EBA's stress test scenario, the German institutions' CET1 ratio would fall to 7-34% by end 2020. In the Bundesbank's baseline scenario, Return on Assets would rise from 0.42% in 2018 to 0.46% in 2023 and banks' end 2018 CET1 ratio of 16.5% would grow slightly to 16.7%, whereas for 1/3 of the banks, capital ratios would fall even in the baseline. The stress scenario implies a severe downturn causing the CET1 ratio to fall to 13.0% in 2023. Hence, smaller banks would, on average, remain above regulatory minima, which does obviously not preclude individual institutions from falling below that threshold.

The share of hard-to-value Level 2 and Level 3 assets has been falling in the last decade. Assets held for trading are classified in three levels depending on the progressing complexity of valuing the asset. Accounting rules (IFRS 13) oblige banks to report gross positions, which might be partly hedged against each other, and are therefore of limited explanatory power compared to net positions. Gross level 2 and level 3 assets amount to 18.7% and 1.6% of those banks' assets. In France, these figures are 17.2% and 0.9%, respectively. Their share in Germany has been falling slightly over the past decade. Given their complexity, these assets are rather concentrated in the bigger banks. The European Banking Authority stress-tested the 48 biggest European banks' Level 2 and 3 assets' net positions in 2018 (EBA, 2018). For 31 of the banks tested the impact on Common Tier 1 capital levels would be less than 20bp, 10 banks would see their CET1 ratio fall 20-40bp, and only 7 banks would face a capital impact ranging from 73 to 40bp.

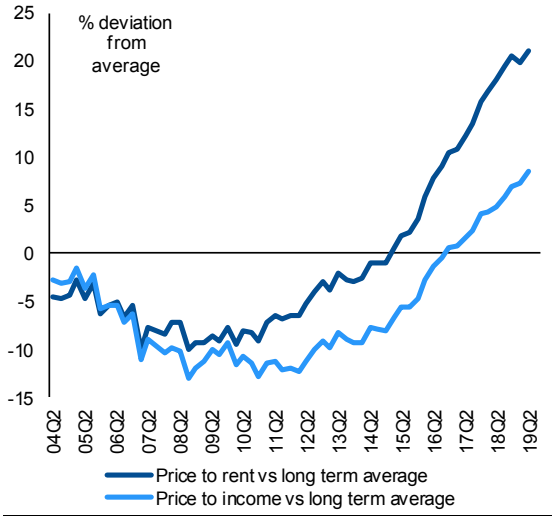
4.2.2. HOUSING MARKET

House prices rose by half this decade, catching up after years of stagnation. Most of the available residential real estate price indicators point to an overvaluation in the bigger cities. Following a period of mainly nominal increases since 2000, real house price growth has accelerated in recent years, slightly outpacing the growth in household income. Today house prices considerably exceed their long-term average, compared to both rents and incomes, suggesting increasing risks of a housing bubble. House price increases in urban areas reflect a shortage of housing supply relative to demand. The federal government has introduced a number of measures aimed at alleviating this shortage. Future price movements are therefore likely to depend on these measures' effectiveness. (See also Section 4.4.)

New mortgage attribution is still accelerating, outweighing redemptions quite significantly. In September 2019 the mortgage stock was 5.0% higher than 12 months earlier. Rising housing prices have led to a higher number of mortgages. Over 2018, average annuities increased by 5.5% to €7,041. The loan to value at origination increased by 170 basis points (bp) to 86.5%, reflecting easing credit standards. Riskier loans also led to higher interest rates. Over 2018, interest rates increased from 1.76% to 1.84% whereas in the euro area they generally fell by 10bp to 1.62%. Yet over 2019, mortgage rates fell faster in Germany, and in September they stood 17bp below the euro area average of 1.29%. In Germany, most homebuyers choose fixed interest rates insulating them from interest rate changes. The home ownership rate is the lowest in the EU, yet a quarter of the German population has a mortgage, which is close to the EU average. Despite stark mortgage growth, household indebtedness has remained around 36% of GDP over the past decade and can be considered moderate by comparison with the rest of the EU. Households' non-performing loan ratio is less than half the European average.

The macro-prudential tools are only partially appropriate. Adding debt-based limits to the toolkit would enhance its effectiveness as currently only loan-to-value and maturity limits could be activated. In its warning, the European Systemic Risk Board identifies loosening lending standards, accelerating mortgage growth and urban overvaluation as systemic risk sources (ESRB 2019). Even though Germany will introduce a 0.25% Counter Cyclical Capital buffer from July 2020 onwards, the Board argues for further measures.

Graph 4.2.1: **House prices compared to fundamentals**



Source: Eurostat, OECD, ECB, BIS and Commission services calculations

4.2.3. CAPITAL MARKETS

Germany's venture capital funds are somewhat less developed than the European average. Venture capital funds amount to 4.3bp (0.04%) of German GDP, below the EU average and considerably below the UK or France (Invest Europe, 2019). There is a strong concentration of venture capital in two major hubs across all stages of financing. Berlin accounts for two thirds of total venture capital investments and Munich for around 12%. This concentration is related to the relatively strong innovation performance by both regions. Regarding the sectoral distribution of venture capital investments, ICT and manufacturing stand out (Flachenecker et al., 2020).

Public financing programmes have improved access to early-stage finance. The High-Tech Start-up Fund appears to have emerged as the most active seed stage investor in Germany and has led to substantial crowding in of private investment, mainly through the signalling effect of the fund's investments. Unlike other public programmes aimed at promoting venture capital investments, the INVEST programme allows private investors to choose which businesses to invest in. Tighter links between entrepreneurs and investors through investment in incubators, accelerators and business angel networks have improved the entrepreneurial culture and made Germany more attractive to local and international investors. However, access to early-stage and growth finance is still a major impediment for high-growth businesses (EFI, 2019; Flachenecker et al., 2020).

Recent initiatives focus on providing finance to high-tech and innovative sectors. Other relevant initiatives include the expansion of the Tech Growth Fund with Venture Tech Growth, and the expansion of the Collective Industrial Research Programme. In October 2018, KfW's programmes were pooled in KfW Capital as an independent growth-oriented venture capital company, which committed €147 million of investment until October 2019.

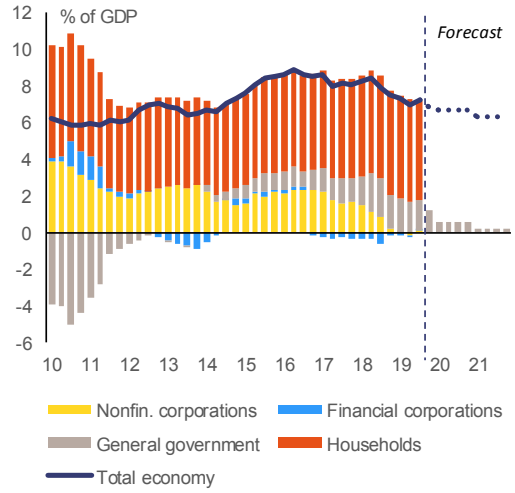
Private placements of debt add an important layer to Germany's capital market. Issuing private placements of debt (promissory notes, *Schuldscheine*) is considerably less costly than issuing a bond. Disclosure requirements are also less burdensome, interest rate spreads are low and, contrary to bondholders, promissory note holders are protected by Germany's deposit guarantee scheme. If interest rates rose, fixed income bonds' net present value would fall and banks would need to adjust the bonds' value in their books according to fair value accounting principles. Promissory notes do not need to be marked to market and therefore banks prefer holding them over classic bonds which are subject to valuation changes.

4.2.4. SECTORAL SAVING-INVESTMENT BALANCES

The high current account surplus is reflected in household and public savings, while corporate deleveraging has halted. Until recently, all sectors of the economy contributed to the current account surplus. This now only holds for households and the general government. Since 2018, non-financial corporations have turned into net borrowers: the net lending of corporations declined from 1.4% of GDP in 2017 to about zero ([24]) in 2018. This reflects a consistent increase in corporate investment since 2016 in response to high capacity utilisation. Households have benefited from an increase in government transfers and the resilient labour market. The share of labour income has been recovering further, reflecting the continuation of employment growth and resilient wages. Only a part of the disposable income increase found its way into consumption and investment: the household savings rate increased further to 18.8% in 2018, the highest in the euro area (average at 11.9% in 2018) while net lending stayed stable relative to GDP. By contrast, general government savings increased in the years to 2018 as a share of GDP, reflecting strengthening tax revenues. This has driven the fiscal surplus up, creating room for more public investment and other long-term growth-enhancing expenditure. The public sector net lending position peaked at 1.9% in 2018 and came down to 1.5% in 2019, reflecting higher public investment, transfers and to some extent the slowdown in the economy. Further reductions are expected in the future, to a broadly balanced balance by 2021.

([24]) Not taking into account capital transfers, nonfinancial corporations have been net borrowers since 2018.

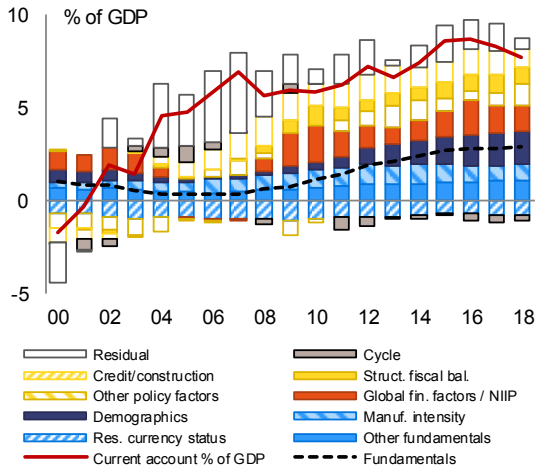
Graph 4.2.2: **Current account balance and net lending by sectors**



[1] 4 quarter rolling average
Source: German Bundesbank European Commission

The current account surplus and the net international investment position remain considerably above what fundamentals suggest. According to the European Commission's current account 'norm' calculations, fundamental determinants of savings and investment currently suggest a surplus of 3.0% of GDP (compared to the 2018 surplus of 7.4% of GDP). Though this is mostly due to population ageing ([25]), (+1.7 pps), the high manufacturing intensity and the competitiveness of German exports is another relevant factor (+0.9 pps) ([26]). Yet, a large part of the surplus (3.0 pps) and its dynamics are explained by factors that can be more directly influenced by policies. The contribution of these policy-driven factors turned positive in 2005 and has been around 3% since 2011. Private-sector deleveraging since 2000 explains a considerable part of the surplus, although its impact declined in 2018 (+1.0 pps, down from +1.3 pps) along with the fiscal stance (+0.9 pps, a slight decrease of 0.05 pps). An increasing net international investment position continued to contribute to a sizeable positive income balance (1.4 pps, a slight decrease of 0.05 pps). Still, compared to the high international investment position, the profitability of external investments appears relatively low (Hünnekes et al, 2019).

Graph 4.2.3: **Factors explaining the current account surplus**



Source: European Commission

([25]) European Commission, 2018 discussed the importance of provision for old age and other ageing-related factors as a driver of the high household saving rate.

([26]) The current account 'norm' benchmark is derived from regressions capturing the main fundamental determinants of the saving-investment balance (e.g. demographics, resources), as well as policy factors and global financial conditions. See also Coutinho et al., 2018.

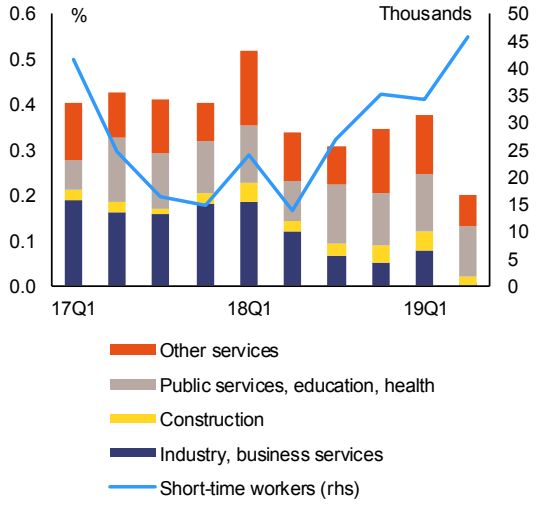
4.3. LABOUR MARKET, EDUCATION AND SOCIAL POLICIES*

4.3.1. LABOUR MARKET ([27])

The remarkably strong labour market masks labour hoarding and diverging trends between services and manufacturing. The unemployment rate stabilised at around 3.2% in 2019 and employment, albeit more slowly, increased further (see Chapter 1), contributing to significant progress towards SDG 8. While manufacturing and related business services have contributed about half of the employment growth in recent years, since the second quarter of 2018 job creation in these sectors slowed noticeably and it even came to a halt in 2019 (Graph 4.3.1). Still, dismissals were limited as many manufacturing companies hoarded labour, reducing hours worked by winding down working time account balances (*Arbeitszeitkonten*) and using short-time work arrangements (*Kurzarbeit*). The number of workers participating in cyclical short-term work arrangements increased markedly from its lowest level of about 10,000 to about 84,000 in November 2019 (remaining nonetheless far below the peak of 1.4 million reached in spring 2009). This suggests considerable further room for labour hoarding against a cyclical shortage of demand. *Kurzarbeit* however is not a general remedy for structural transformation needs, which in the car sector are already leading to dismissals. Even as job creation in manufacturing and related services halted, hiring continued in construction and the large majority of services, notably public services, healthcare and education.

Overall wage growth has been resilient so far but is expected to slow this year towards the euro area average. Even as the labour market started to show signs of stress, with employment growth decelerating and productivity declining ([28]), growth in nominal compensation per employee accelerated, from 2.9% in 2018 to 3.3% in 2019. Wage increases in services contributed considerably to overall wage growth, while wages in manufacturing slowed along with the declining production. Despite relatively strong wage growth (Graph 4.3.2), the accumulated gap between productivity and real wage growth since 2000 persists and is not expected to close rapidly in 2019 and 2020. In general, wage growth may decelerate as employers see their bargaining power increasing due to a softer labour market and also react to low productivity growth and squeezed profit margins. Effective collective bargaining may be a tool for finding the right balance between wage increases and maintaining employment. In this respect the situation is roughly unchanged, as the proportion of workers covered by collective bargaining agreements stagnated in 2018 (Kohaut, 2019) at a relatively low level compared to the past.

Graph 4.3.1: **Employment change by sector, workers in short time work arrangements**



Source: Eurostat

([27]) An asterisk shows that the analysis in the section contributes to the in-depth review under the MIP (see Section 3 for an overall summary of main findings).

([28]) Productivity per employee increased by only 0.1% in 2018 and declined by 0.3% in 2019.

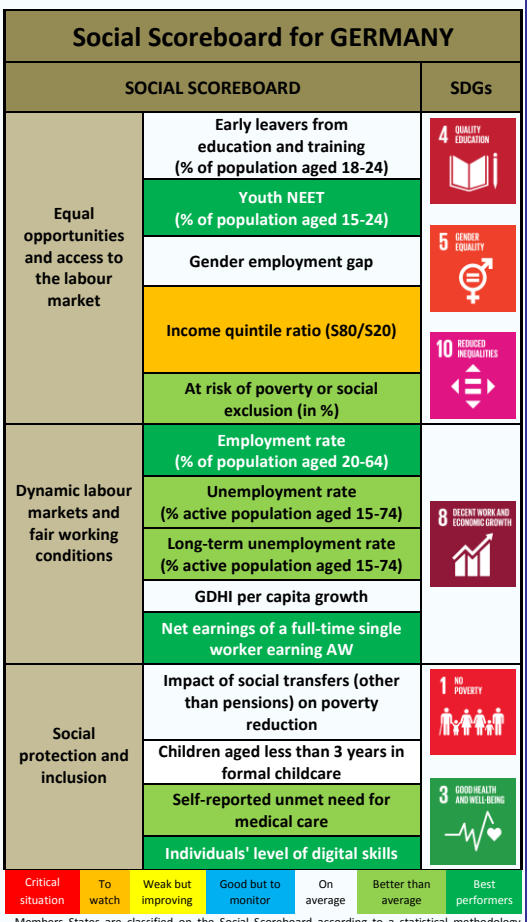
Box 4.3.5: **Monitoring performance in light of the European Pillar of Social Rights**

The European Pillar of Social Rights is a compass for a renewed process of upward convergence towards better working and living conditions in the European Union. It sets out 20 essential principles and rights in the areas of equal opportunities and access to the labour market, fair working conditions and social protection and inclusion.

The Social Scoreboard supporting the European Pillar of Social Rights points to relatively few employment and social challenges in Germany. While it has one of the highest employment rates for women in the EU and a gender employment gap below the EU average, Germany also has one of the EU's highest part-time employment rates for women. This is accompanied by a wide gender pay gap, reflecting differences in the number of hours worked and in the sectoral composition of employment across genders. Germany has one of the highest proportions of women working for low wages.

Educational outcomes differ considerably across regions. Early school leavers account for 14.6% of all 18-24 year olds in Bremen, against on average 10.3% nationwide and only 5.2% in Lower Bavaria (*Niederbayern*). Moreover, the NEET rate (the proportion of young people who are not in education, employment or training) varies by almost 6 pps between the best- and worst-performing regions. In Berlin, 9.1% of young people aged 15-24 are NEETs, against a national average of 5.9% and only 3.5% in the best performing region, *Unterfranken* in Bavaria. The tertiary education attainment rate among 30-34 year-olds also differs significantly (by 30pps) between regions.

The proportion of people who are long-term unemployed has decreased in recent years. On the back of a strong labour market performance, long-term unemployment stood at 3.4% in 2018, half the EU average of 6.8%. Further improvements can be expected, due partly to government measures like the *Teilhabechancengesetz*. Under this law, when a long-term unemployed person is hired, the state pays 75% of their wage in the first year and 50% in the second year. In addition, the 'Qualifications Opportunities Act' (*Qualifizierungschancengesetz*) and the Act on Strengthening Continuing Vocational Training and Insurance Protection improve access for low-skilled and long-term unemployed people to education that is relevant for the labour market.

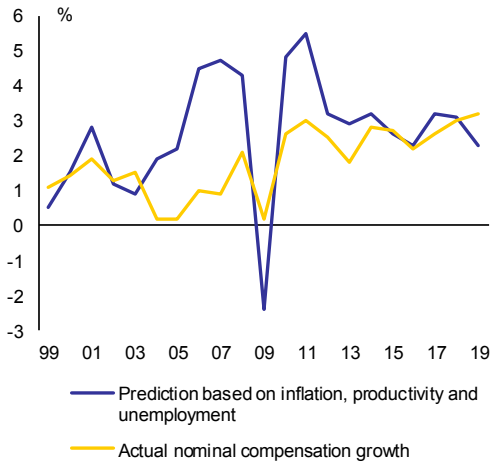


Members States are classified on the Social Scoreboard according to a statistical methodology agreed with the EMCO and SPC Committees. It looks jointly at levels and changes of the indicators in comparison with the respective EU averages and classifies Member States in seven categories. For methodological details, please consult the proposal for a Joint Employment Report 2020, COM(2019) 653 final; NEET: neither in employment nor in education and training; GDHI: gross disposable household income. Update of January 2020.

Following past increases in negotiated wages, minimum wage updates appear to have lagged behind general wage developments. In 2018, the Minimum Wage Commission (*Mindestlohn-kommission*) proposed increasing the minimum wage to €9.19 per hour for 2019 (a nominal increase of about 4% compared to 2018, after no increase from 2017) and to €9.35 per hour for 2020 (a nominal increase of about 1.7%). These increases, given legal force by the federal government, were based on developments in negotiated wages in 2016-2017 (for the 2019 increase) and the first half of 2018 (for the 2020 increase). Linking minimum-wage increases to past developments in negotiated wages appears to have resulted in a gradual erosion of the relative

level of the minimum wage since 2015. While in 2015 the minimum wage was about 48% of the median and 43% of the average wage, by 2018 it had decreased to 46% of the median and 40% of the average wage (OECD data). According to European Commission calculations, the ratio to the median is expected to stay unchanged in 2019, but the ratio to the average wage is expected to further decrease.

Graph 4.3.2: **Nominal compensation growth: actual and predicted based on economic fundamentals**



Source: European Commission calculations based on the AMECO database

Shortages of skilled labour are acting as a drag on growth. Despite slowing economic activity, labour shortages remain considerable. The share of firms in industry reporting labour shortages as a factor limiting production has fallen from a high of 27% in the second quarter of 2018, but remains sizeable, at 18% in the third quarter of 2019. At the same time, the vacancy rate (the number of vacant jobs as a proportion of all jobs) is close to its historical highs at 3.2% (2019-Q3), against 2.3% on average in the EU and 2.2% on average in the euro area. Demographic ageing and technological transformation are making securing a skilled workforce also a structural challenge. Without additional measures, potential growth in Germany is expected to decline from 1.6% in 2018 to 1.2% in 2022 (European Commission, 2019a).

Upskilling and reskilling of the labour force can help relieve labour shortages. While Germany has one of the highest employment rates in the EU, the employment rate for the low-qualified is relatively low at 60.7%, 19.2 pps below the overall employment rate (against an EU-28 average of 17.0 pps). In 2018, 14.2% of Germans aged 20-64 (that is 7 million people) had low qualifications. Atypical employment and low pay are particularly widespread in this group. While in Germany 50% of the low-qualified earned an hourly wage below 2/3 of the median wage, the proportion was 33% in the UK, 25% in Denmark, 18% in France and a mere 5% in Sweden (Eichhorst et al., 2019). Participation in adult learning, at 8.2%, is well below the EU average of 11.1%, suggesting room for improvement. On average, 4.3% of the low-skilled participated in training (in the 4 weeks before being asked), which matches the EU average but is well below the participation rate in countries performing better in terms of upskilling, including the Netherlands (9.9%), Denmark (14.9%) and Sweden (20.7%). Strengthening the upskilling of low-skilled workers would also be beneficial given that Germany is estimated to have only 3.2 million jobs requiring low skills levels (2017) (BIBB, 2019).

In 2019 Germany started some promising reforms to improve upskilling and reskilling, yet there is potential to do more. Promising initiatives include the 'Qualifications Opportunities Act' (*Qualifizierungs-chancengesetz*), which improves access to and financial support for further education of employees whose occupational activities are at risk of being replaced by new technologies. Another is the 'Vocational Training Act' (*Berufsbildungsgesetz*), updated in 2019. The national skills strategy (*Nationale Weiterbildungsstrategie*), adopted in 2019, is a substantial component of the federal government's skills strategy, combining federal adult learning programmes with the *Länder* programmes ([29]). It is, inter alia, expected to improve transparency and accessibility, better recognise informal skills and guide the low-skilled to formal qualifications, including through partial qualifications. As a response to skill shortages and the projected decline by 10.2 million in the working-age

([29]) A joint report by the OECD and German ministries will analyse implementation in 2021 to review and, if necessary, further develop the national training strategy. The national partners of the national development strategy will implement these in a continuous exchange. In a committee that meets regularly, the implementation activities are coordinated and networked.

population by 2060, the government is implementing a comprehensive three-pillar strategy. This includes fostering skilled labour immigration from third countries, in addition to relying on the potential of domestic and European skilled workers (*Fachkräftestrategie*) Immigration of skilled workers from third countries demands more efficient and transparent administrative procedures, as well as improved recognition of educational and vocational qualifications.

Making better use of women's labour market potential could help alleviate skills shortages, counter the implications of ageing and raise potential growth. While Germany has one of the highest employment rates for women in the EU (75.8% in 2018, against an EU-28 average of 67.4%), almost half of this is part-time employment (46.7%, against an EU-28 average of 30.8%). Consequently, the female employment rate in full-time equivalents is only 59.4%, and is accompanied by a wider unadjusted gender pay gap at 21% (versus an EU average of 16%) in 2017 ; than the adjusted gender pay gap at 6%. The gender employment gap in full-time equivalents is the fourth highest in the EU (20.8 pps vs EU average of 18 pps), flagged as 'on average' in the Social Scoreboard. The wide unadjusted gender pay gap reflects the lower number of hours worked, and the sectors in which women tend to work more commonly ([30]). Germany has the highest proportion of women working for low-wages (32.4%) compared to neighbouring countries like France (13.2%), Denmark (10.5%) or the United Kingdom (25.8%) (Eichhorst et al., 2019). Although the Transparency in Wage Structures Act (*Entgelttransparenzgesetz*) has increased awareness of the principle of equal pay, few employers have changed their pay policy due to the complicated procedures (BMFSFJ, 2019).

Full-time childcare and all-day school facilities remain key drivers to support women's attachment to the labour market. The employment rate of women with children younger than 6 is 17.5 pps lower than that of women without children — one of the widest gaps in the EU (the average is 9 pps). In addition, 2018 30.2% of the 15-64 year old women in Germany who work part-time cite caring responsibilities as a key factor in why they do not work full time, compared to 27.7% in the EU as a whole. Germany is taking ambitious measures to respond to the increasing demand for childcare and more places in all-day schools ([31]), but with 29.8% of children under 3 in formal childcare in 2018, the country remains below the EU average of 35.1% and the Barcelona target of 33%. Ensuring the quality of childcare provision also remains an issue. The participation rate for children aged between 3 and compulsory school age is 87.6%, above the EU average (85.7%), but it remains below the Barcelona target (90%). Measures such as the Good Kindergarten Law (*Gute Kita Gesetz*), substantially (by €5.5 billion) increases support for childcare provision (2019-2022) in the *Länder*, and could help women to work longer. So could the law on the right to return to the former full-time employment from part time employment, which came into force in January 2019 Considering that the affordability and quality of childcare both require considerable additional funding, an assessment of whether funding needs are indeed covered would have merits. Recent reforms will need to be followed up and their effects properly evaluated.

Further reducing tax disincentives for second and low-wage earners may also increase hours worked. More than a quarter of women earned low wages (28.7%, while only about one sixth of men did (16.9%), as of 2014. Women are thus particularly affected by the high tax wedge for low-wage and second earners, a considerable proportion of whom are women. Tax and social security rules such as the specific arrangement of joint taxation (*Ehegattensplitting)* create disincentives to working more hours (see also Section 4.1). The low-wage trap for second earners has not improved for years and remains one of the highest in the EU. The continuing application of the factor method (*Faktorverfahren*) that rearranges tax liabilities within the couple has had only limited success in creating better work incentives for second earners. As of July 2019, the midi-job threshold from which full social security contributions are paid was increased from €850 to €1,300, resulting in a more gradual phase-in of

([30]) The majority of women are occupied in the public administration, education, health and social services, and in wholesale and other services.

([31]) According to government data, the provision of childcare facilities for children under 3 more than doubled between 2007 (15.5%) and 2017 (33.1%).

social security contributions. As noted in the 2019 Country Report, these measures will merit close monitoring to evaluate whether the intended positive effects materialise. Additional measures to increase the disposable income of lower and middle-income families, such as abolishing the solidarity surcharge (for some 90% of taxpayers as from 2021) and offsetting the effects of the fiscal drag for 2019-2020, may improve incentives to work longer hours.

Temporary agency work is shrinking, driven by a combination of cyclical and structural factors. Temporary agency work represents 2.5% of total employment in Germany (around 950 000 people, moving annual average until end of June 2019). 17% of exits from unemployment in 2019 were from temporary agency work, while 15% of newly unemployed people were previously employed under such a contract (Bundesagentur für Arbeit, 2019a). The low-skilled, males, young people with a migrant background and refugees are overrepresented groups in temporary agency work. The 2017 legal change aimed at ensuring equal pay after 9 months of working in the same user undertaking and the introduction of a maximum assignment period of 18 months was followed by a decline in the number of agency workers (Hutter et al. 2019). This was more than compensated for by the expansion of regular employment (permanent contracts subject to social security contributions, with at least 21 hours worked per week). In 2019, these increased to 70.3% of all employment, for the first time since 2002. Since 2018, the weakening economic situation has also contributed to fewer job openings in agency work.

The potential of people with a migrant background remains underused. The gap in employment rates between native-born people and those born outside the EU remains one of the highest in the EU (16.3 pps vs EU average of 9.4 pps), even after a slight narrowing (by 0.8 pps) (European Commission, 2019b). By eliminating this gap, almost 1 million more people could be in employment. The situation is particularly challenging for women born outside the EU, for whom the employment gap is twice as wide as for non-EU-born men. The gender activity rate gap between those born in the EU and those born outside it is also wide, at 20.2 pps in 2018 (EU average 9.5 pps). Facilitating the recognition of vocational and professional qualifications issued in third countries by implementing the new law on skilled labour migration (*Fachkräfteeinwanderungsgesetz*) is expected to improve the labour market integration of those born outside the EU. So is the new increased access to integration and occupation courses and vocational training provided by the new law to promote the employment of foreigners (Ausländerbeschäftigungsförderungsgesetz).

Although improving, the labour market participation of refugees remains a challenge. Thanks to ambitious ongoing measures supporting language learning and work-based training for refugees, the labour market participation of recently arrived migrants (i.e. those born outside the EU and established for less than 5 years) is increasing: their employment rate reached 42.9% in 2018, up from 37.3% in 2016. The employment rate of nationals of major refugee countries increased to 34.7% in September 2019. However, it remains significantly lower than that of foreign nationals in general and of German nationals. Refugees are also increasingly participating in vocational training ([32]). The number of refugees among training place applicants registered with the Bundesagentur für Arbeit continued to increase (2016: 10,300; 2017: 26,400; 2018: 38,300). Of the 38,300 applicants in 2018, only 14,000 (36.5%) found a training place (BIBB, 2019) even though the number of training places exceeded the number of applicants, and there remained a high number of unfilled training places (53,000 at the end of September 2019). Insufficient knowledge of the German language, a lack of professional qualifications acquired in their home country and the difficulties in getting their qualifications recognised remain the main obstacles for the labour market integration of this group. As part of the Migration Package adopted in June 2019, a new law (*Duldung bei Ausbildung und Beschäftigung*) enlarged possibilities for people who only had temporary permits to stay to complete vocational training.

([32]) Employment rates are estimated on the basis of German social security data from December 2018 (Bundesagentur für Arbeit, 2018).

4.3.2. SOCIAL POLICY

While the labour market is performing strongly, the social situation is improving moderately. In 2018, 18.7% of the population were at risk of poverty or social exclusion (EU average 22.5%), a small improvement from 2017 (19%). This was mainly driven by a decline in severe material deprivation (2017: 3.4%, 2018: 3.1%) and in the number of households with very low work intensity (2017: 8.7%, 2018: 8.1%). Material and social deprivation is also falling (2017: 8.1%, 2018: 7.5%) ([33]), while monetary poverty declined only by 0.1 pp. The rate of people in work who are at risk of poverty stood at 9.1%, only slightly below the EU average (9.5%), reflecting challenges in labour market outcomes for certain groups (see Section 4.3.1).

Challenges remain as regards equality of opportunities at an early age. Children in single parent households, in families with three or more children, or whose parents have low educational attainment or a migrant background are the most vulnerable to poverty. Investing in children and their families creates positive long-term effects for society as a whole (European Commission, 2019d). The federal government has adopted a Strong Family Law (*Starke-Familien-Gesetz*), which entered into force on 1 July 2019. This should improve social protection of children by easing access to child-related benefits, the supplementary child benefit (*Kinderzuschlag*) and benefits for education and participation (*Leistungen für Bildung und Teilhabe*). Furthermore, several of those benefits have been expanded. It remains to be seen whether the reform of these benefits will reach a higher number of eligible families and children. Meanwhile, discussions continue on the possible introduction of a child guarantee (*Kindergrundsicherung*). Also, positively noted is the ongoing reform of the social security code VIII (*Sozialgesetzbuch VIII*), which aims at establishing a more inclusive child and youth welfare system.

Comprehensive measures to improve the pension system are still pending. In 2018, the rate of people aged 65 and over who were at risk of poverty or social exclusion stood at 19%, 1.3 pps above the 2017 figure and 0.5 pps above the EU average ([34]). On the other hand, in the future public finances will be under pressure (see Section 4.1). Thus, providing cost-effective measures against old-age poverty will prove essential, along with a range of potential improvements of the pension system (European Commission, 2019b). The introduction of the basic pension (*Grundrente*) and the intended inclusion of self-employed in the statutory pension pillar are expected to improve pension coverage for targeted groups ([35]). However, the decision on the future architecture of the pension system has been postponed with the set-up of the 'Pension Commission for Reliable Intergenerational Contract'. Major reforms are not expected until after the Pension Commission presents its recommendations in spring 2020.

The lack of affordable housing has become a major challenge. Although the housing cost overburden rate has been falling, Germany has still one of the worst rates in the EU. In 2018, 14.2% of the population lived in a household that spent 40% or more of its income on housing costs. The situation is more severe for the elderly (19.3%) and people at risk of poverty (49.5%), particularly in core cities of the metropolitan regions (European Commission, 2019b) ([36]). Demand seems to outweigh the supply of units in the middle and lower price segments (see Section 4.4).

([33]) The Material and Social Deprivation indicator (MSD) is the result of a revision of the material deprivation indicator (MD). It takes into consideration a broader concept of deprivation as it also includes items related to social activities, whereas the MD measured only material deprivation. It is based on 13 items (some of which are common to MD). The MSD rate is the proportion of people in the total population lacking (because of an enforced lack) at least 5 items out of the 13 MSD items (as opposed to 3 or more out of 9 items for MD).

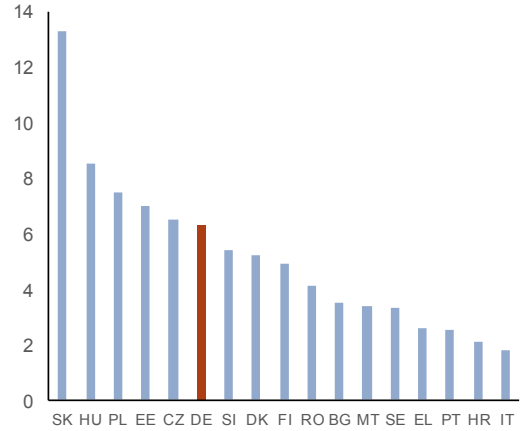
([34]) The persistent at-risk-of-poverty rate for the elderly has increased by over 2 pps (2017: 12%, 2018:14.1%).

([35]) The basic pension is unlikely to address the risk of old-age poverty among low earners with longer career interruptions (see also assessment in OECD, 2019a). The legislative implementation of the government coalition's commitment to improve coverage of the self-employed under the statutory pension pillar will start in 2020. Until then, the exact sub-groups to be included, along with further details of the design of measures, remain to be defined.

([36]) Official statistics on how the lack of affordable housing affects the number of homeless persons (see for estimates Hanesch, 2019) will be available from 2022 once the bill on 'Reporting on Homelessness' (*Wohnungslosenberichterstattungsgesetz*), adopted in September 2019, is implemented.

Although access to healthcare is generally good and health coverage broad, inequalities persist. Unmet needs for medical care in 2018 were among the lowest in the EU (0.2%), and considerably below the EU average (1.8%). However, the gap in self-reported health by income groups indicates problems with inequality. Only half of Germans in the lowest income group have self-reported good health, compared with 80% of those in the highest income group ([37]). Social inequalities in mortality and life expectancy have increased over time (Lampert et al, 2018) and are considerable (see Graph 4.3.3). This suggests, as confirmed by the prevention law of 2015, that there is potential for strengthening a 'health in all policies' approach, including disease prevention and promoting healthy lifestyles for all ages, and for reducing health inequalities.

Graph 4.3.3: **Years of difference in life expectancy between people with highest and lowest education (at age 40)**



Source: Commission staff services; for DE: Luy et al, 2015

The divide between social health insurance (SHI) and private health insurance (PHI) also continues to raise concerns. The dual health insurance system weakens the solidarity-based principle in healthcare as it allows civil servants, the self-employed and people with high incomes to opt out of SHI. The situation concerning waiting times is good by European standards (in 2018, 0.9% of Germans reported unmet medical needs due to waiting times, against 1.8% across the EU). However, differences that are linked to the insurance status, triggered by incentives to give preferential treatment to patients on PHI, continue to exist (European Commission, 2019b). Two acts of 2015 and 2019 aim especially to reduce waiting times for SHI patients, increase the availability of doctors, including in rural areas, and improve efficiency in care delivery. The impact of this reform will need to be assessed (see Section 4.1).

Recent major reforms of the long-term care system (LTC) in Germany have significantly increased both the number of LTC recipients and public expenditure on LTC. The number of dependents receiving LTC services in the social LTC insurance ([38]) increased by 43% from 2014, before the reforms, to 2018, while in the same period public expenditure grew by 62%. This was mainly due to the redefinition of care levels and care needs assessment methods, which now also cover for people suffering from dementia — an issue of rising importance given Germany's ageing population. Precautionary measures to ensure sustainable financing in view of population ageing were taken and a LTC provident fund financed by increased LTC premiums was established.

Staff shortages in the nursing professions are expected to impact on health and the long-term availability and quality of care in the future. Germany has more practicing nurses per 1,000 people (1.8, 2017 data) than many other EU Member States. However, already today there are five times more vacancies than available skilled workers in elderly care ([39]). The government has released funds for hiring 13,000 additional nurses as from 2019 and is promoting recruitment from non-EU countries. In addition, to improve the job attractiveness and career prospects of nurses, a reform and streamlining of their education and training is taking effect from 2020 (OECD/European Observatory on Health Systems and Policies, 2019). Still, such measures are expected to alleviate the issue only mildly.

([37]) Low income is defined here as being in the fifth of society with the lowest disposable income, and high income is understood as being in the fifth of society with the highest disposable income.

([38]) The social LTC insurance in Germany is established under the umbrella of the social health insurance and covers ca. 90% of the population. The remaining 10% of the population are covered by a compulsory private LTC insurance.

([39]) In 2018, there were 2,900 unemployed skilled workers, compared with 15,100 registered job offers for qualified nursing staff (Bundesagentur für Arbeit, 2019b).

4.3.3. EDUCATION AND SKILLS

Planned investment in education is responding to pressing needs, yet challenges in the education sector persist. Overall, public spending on education rose by 5.6% in real terms between 2010 and 2017, increasing by 21% in pre-primary and primary education and decreasing by 2.4% in tertiary education. Still, Germany is spending less of its resources on education now than it did in the past. While in 2011 it spent 4.3% of its GDP on education, in 2016 and 2017 this was 4.1%, well below the EU average of 4.6%. Private and public expenditure also decreased between 2010 and 2017, dropping 0.4 pp. to 6.4%. The government spends 9.3% of its total expenditure on education, also below the EU average (10.2%). Under the financial agreement reached between the government and federal states on higher education funding in May 2019, each side will invest €1.88 billion per year from 2021. However, a major investment gap remains due to a significant need for infrastructure replacement (Gornig, 2019). The government also plans to increase the loans system for students and apprentices (BAFöG) by more than €1.3 billion in the period 2018 to 2021, compared to 2.7 billion in 2018. While the municipal investment deficit for school infrastructure decreased by €4.9 billion in 2018 compared to 2017, it still amounted to €42.8 billion, higher than in any other sector (KfW, 2019a). Under the digital pact for schools, the federal government will invest €5 billion and the Länder €0.5billion by 2024, but this is estimated to cover only one third of financial needs (Breiter et al., 2017). Additional investment needs also arise from the expansion of all-day schooling promised by the government in 2018 under the coalition agreement.

The expansion of early childhood education and care (ECEC) places is progressing, but serious supply gaps remain. The participation of 4-6 year-olds in early childhood education and care was stable at 96.4% in 2018 and above the EU average (95.4%). However, the growing demand for places for under 3 year-olds is leading to substantial supply gaps, in particular in urban areas. A survey among more than 2,600 ECEC managers reveals serious shortages of qualified personnel due to the profession's lack of attractiveness, difficult working conditions and low salaries (DKLK, 2019). A majority of Germans prefer free ECEC provision (Wößmann et al., 2019). But municipalities and researchers (Spiess, 2019) do not necessarily recommend using additional funds of the ECEC quality improvement law indiscriminately to subsidise or abolish tuition fees, irrespective of deficiencies in quantity and quality (DStGB, 2019). In addition, ensuring high quality in ECEC is also an essential condition for reducing the influence of socio-economic and migrant background on educational performance.

The basic skill proficiency of young students remains broadly unchanged, while socio-economic background continues to have a strong impact on education outcomes. The 2018 OECD Programme for International Student Assessment (PISA) puts the reading, mathematics and science performance of 15 year-olds in Germany at around the EU average. In 2018, underachievement increased compared to 2015 in all disciplines, most importantly in reading. The heavy impact of socio-economic background on reading remained stable (Reiss et al., 2019; European Commission, 2019e; OECD, 2019b; OECD, 2019c; OECD, 2020). The percentage of 15 year-old students with a low socio-economic background who underperform in reading is 27.5 pps greater than for those of a high socio-economic background — a gap 2 pps above the EU average. There is a particular performance gap (more than one PISA competence level) between academic and vocational lower secondary schools. Germany is one of the country with the widest gap in underachievement rates in reading between pupils born abroad and pupils who do not have a migrant background, and this has worsened significantly since 2009. However, native-born pupils with parents born abroad are increasingly catching up with pupils that do not have a migrant background. The PISA study shows that students cluster in low- and high-performing schools, and the heads of disadvantaged schools report material and staff shortages more frequently than those in advantaged schools. In addition, disadvantaged schools report a significantly higher share of not fully certified teachers. Ensuring good basic skills for all is increasingly important to face digital and technological change and sustain competitiveness while contributing to SDG 4 – quality education.

Serious teacher shortages are putting a strain on the education system. According to the

German Teachers' Association, in 2019/2020 around 15,000 posts will remain vacant, while 40,000 posts will be filled by people who were not trained originally as teachers. The biggest shortages occur for primary schools, non-academic secondary schools , vocational and special needs schools. Salaries for teachers at such schools are generally lower than for higher educational sectors. While official needs forecasting expected a shortage of 15,300 teachers until 2025 (Sekretariat der KMK, 2018), research based on recent estimates of growth in numbers of primary students identifies a shortage of 26,300 teachers (Klemm and Zorn, 2019). Teacher shortages threaten the comprehensive provision of quality education due to cancelled classes, and there is a challenge from relying on people who did not train as teachers (*Quereinsteiger*). Negative repercussions for the intended expansion of all-day schooling are also likely, as well as for integrating recently arrived migrants (DUK, 2019).

Inequalities in educational attainment persist, with socio-economic and migrant backgrounds still having a strong influence. The rate of 18-24 year-olds leaving education and training early has remained stable just around 10.3% since 2015, but so has the fact that the rate has been more than three times higher for foreign-born people since 2010. Young people from a disadvantaged socio-economic background are three times less likely to be in higher education (Autorengruppe Bildungsberichtersattung, 2018). In addition, attainment rates in both higher and vocational education are lower for people from a migrant background than for native-born people (Autorengruppe Bildungsberichtersattung, 2018). Germany has undertaken serious efforts to integrate recently arrived 'people with a migrant background' in particular into vocational education (OECD, 2019d). However, as the national data report on vocational education and training (VET) education shows, people with a migrant background are still less likely to start VET than people without such a background (34.2% vs 55.7% in 2017). Stronger efforts are needed to better address persisting educational inequalities and low performance levels among children with a migrant background (OECD, 2019d). Among persons with disabilities, the tertiary attainment rate is lower in Germany (23.9%) than the EU (32.4%).

Despite excellent employment prospects, fewer students are enrolling in formal VET programmes. Young people increasingly favour academic education over VET: in 2017, 2.7% fewer new students than in 2016 started formal VET programmes. Unfilled training opportunities increased to 57,700 in 2018 from 49,000 in 2017. Regional imbalances in qualifications and jobs appear to be more pronounced (BIBB, 2019). At the same time, 92.4% of recent VET graduates found employment in 2018, up from 91.3% in 2017 and far above the EU average of 79.5%. For Germany, 60% of openings by 2030 are expected to be for medium-qualification jobs, compared to a 46% EU average (Cedefop, 2018). In response to changing professional profiles, the government aims to raise the attractiveness of VET. In 2019, three continuing education and training (C-VET) levels with harmonised terms of C-VET occupations were introduced and a new federal initiative was launched to support the development and testing of innovative approaches.

Skills shortages in STEM and ICT are increasing, despite above-average attainment in those areas. Science, technology, engineering and mathematics (STEM) studies are attractive in Germany: 35.6% (2017) of tertiary-educated adults hold a degree in these fields, making Germany the best performer in the EU (average 25.8%). While the attractiveness of engineering, manufacturing and construction has slightly decreased, graduation in other STEM fields, such as natural sciences, mathematics and statistics, and information and communication technologies (ICT), has increased. The high share of STEM graduates is, however, still insufficient to fill the large demand-supply gap in this field, which amounted to over 300,000 open positions in April 2019. For IT professions skills shortages have more than tripled since 2014 (IW, 2019).

Germany is particularly exposed to the impact of automation, and this poses challenges to skills strategies. Existing skills imbalances require further efforts, particularly to better align skills supply with labour market demand (OECD, 2019e). Reducing skills shortages and mitigating the impact of socio-economic factors on education and labour market outcomes for disadvantaged groups remains essential (OECD, 2019e). To meet current and future labour force demands related to structural changes in the labour market, Germany

is implementing ambitious measures like the 'Qualifications Opportunities Act' (*Qualifizierungschancengesetz*) ([40]) and the Act on Strengthening Continuing Vocational Training and Insurance Protection. Such measures improve access to further education for the low-skilled and long-term unemployed and may extend their working lives.

([40]) At present, support is limited to employees without a vocational qualification, employees in danger of becoming unemployed, and small and medium-sized enterprises. In the future, all employees should be able to access further education regardless of their qualifications, age or type of employer.

4.4. COMPETITIVENESS REFORMS AND INVESTMENT*

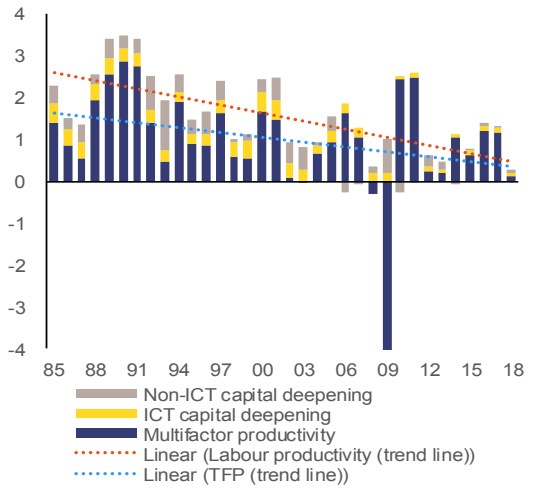
4.4.1. INVESTMENT AND PRODUCTIVITY

Labour productivity

Labour productivity growth in Germany shows a long-term declining trend and turned negative in 2018, due to cyclical factors but also structural weaknesses. The recent decline in labour productivity was more marked than in most euro area countries. It was driven mainly by the manufacturing sector, and in particular the automotive industry. An interplay of external factors (decline in global demand, uncertainty stemming from trade tensions) and domestic factors (including changes in emission testing standards and the failure of some car manufacturers to meet emission standards) lead to consumer uncertainty and a decline in output and labour productivity as manufacturers hoarded some labour (See Chapter 1). Services productivity slowed but remained positive (0.5%). Most of the slowdown in labour productivity was due to lower total factor productivity (TFP) growth, i.e. the efficiency with which labour and capital are used together, which dropped from 1.2% in 2017 to 0.1% in 2018.

While the long-term slowdown in productivity growth is a global phenomenon, a number of country-specific structural factors are hampering efficient allocation of the economy's resources. The long-term decline in TFP and labour productivity growth in Germany (see Graph 4.4.1) is often attributed to a combination of factors. These are: weak growth-enhancing investment, in Knowledge Based Capital and among SMEs in particular; lack of modern digital infrastructure in rural and semi-rural areas; demographic developments and shortages of skilled labour; a decline in business dynamism; slow technology diffusion and delays in transforming knowledge into economic success; weaknesses in e-government, excess regulation and low competition in business services (Bauer et al.,2020; Cléaud et al., 2019). According to the Council of Economic Experts, which has been appointed as the German National Productivity Board, the main drivers of productivity growth in the future are investment in education, research and innovation and an environment that sets the right incentives for private investment (German Council of Economic Experts, 2019b). The Federal Ministry for Economic Affairs and Energy published a new 'SME Strategy' and a 'national industry strategy for 2030', which contain measures to foster innovation and improve the framework conditions for businesses, including corporate taxation and competition.

Graph 4.4.1: **Contribution to labour productivity growth, percentage points**



Source: OECD

Resource productivity

Improving resource productivity can be a main driver of future competitiveness and growth, while minimising negative impacts on the environment. Materials are the main cost factor in the manufacturing sector in Germany, accounting for 44% of costs compared to 18% for labour. Improving resource productivity is therefore a main driver of future growth while minimising impacts on the environment. Using resource-efficient production processes can also reduce dependency on volatile raw material markets. Germany set itself the goal of doubling raw material productivity between 1994 and 2020 as part of its national sustainable development strategy. It has developed a number of initiatives to help and incentivise industry to become more resource-efficient and advance towards SDG 8 'Decent work and economic growth' and SDG 12 'Responsible consumption and production'. However, despite resource efficiency gains and a relative decoupling of raw material use and economic growth, natural resource use remains at an environmentally unsustainable level. Germany's total material consumption amounts to between 33 and 40 tons per person/year whereas

scientists consider eight tons to be sustainable (Wuppertalinstitut, 2019). According to the Federal Environmental Agency, Germany will miss its target of doubling raw material productivity by 2020 (BMU, 2018). Germany's secondary raw material use rate in 2016 was 11.4%, slightly below the EU-average. Moving to a circular economy, e.g. by promoting reuse, recyclability and secondary raw materials markets, would boost Germany's resource productivity and efficiency of its use of natural resources, generate cost savings, and create jobs. A recent study suggests that public support for innovations with environmental benefits (eco-innovations) is an effective policy measure to significantly increase firms' material productivity (Flachenecker and Kornejew, 2019). The study further shows that this improvement has led to substantial increases in firms' competitiveness, while reducing their carbon footprints (SDGs 8, 12 and 13).

Research and innovation

Germany invests considerable resources in R&D but private investment in R&D is increasingly concentrated in large firms, while SMEs and start-ups face challenges. R&D intensity has increased during in recent years, from 2.5% of GDP in 2007 to 3.1% in 2018 (third highest in the EU). A new national R&D intensity target of 3.5% by 2025 was included in Germany's high-tech strategy (BMBF, 2018). With two thirds of R&D performed in the business sector, German business R&D intensity (2.2% in 2018) is the third-highest in the EU. However, business R&D is predominantly performed by large firms in R&D-intensive industries, whereas SMEs' R&D expenditure has stagnated over the past decade (ZEW, 2019). Germany ranks eighth in the European Innovation Scoreboard (EIS) and its performance has stagnated since 2011. Recent years have seen a decrease in particular in SMEs' level of innovation activities. This is reflected in the numbers of SMEs introducing product or process innovations, introducing marketing or organisational innovations, or innovating in-house. The 2019 EIS ranked Germany eighth, sixth and eighth, respectively, for these indicators, while in 2011 Germany was first in all three (European Commission, 2019f; Pellens et al., 2020).

Following a decreasing trend over the last 15 years, the start-up rate in Germany declined further in 2018. German start-ups still face difficulties in attracting funding (KfW, 2019b). The government launched several initiatives to address these key challenges (see Section 4.2). Programmes such as EXIST-Potential and Young Entrepreneurs in Science support entrepreneurship among students, while a new Transfer Initiative aims to improve science-industry knowledge transfer. There are plans to expand existing cluster initiatives in 2019 with a new Future Cluster Initiative. An agency for the promotion of disruptive innovation has been set up and is scheduled to start operations in 2020. The German Parliament adopted a new law introducing a tax incentive for R&D from 1 January 2020. The law allows businesses to claim a tax credit worth 25% of the eligible expenses (personnel costs of research staff or 60% of the fees for subcontracting). All companies regardless of size are entitled to the incentive for qualifying R&D projects. However, the base is capped at € 2 million, translating into a maximum tax credit of € 500,000 per company per year, which should benefit mainly SMEs. The tax credit can be paid out even where there is no tax liability.

Ensuring a sufficient supply of highly skilled workers is vital for business investment in innovation and digitalisation and for high-growth enterprises. The lack of qualified personnel is the most important factor hampering investment in innovation and digitalisation, in particular for SMEs and high-growth enterprises (European Commission/European Central Bank, 2019; ZEW, 2019; Pellens et al., 2020). This is despite some positive trends over the last 5 years. Regarding 25-34 year-olds, these trends include increases in the proportion who have successfully completed tertiary education, in the numbers of new graduates in science and engineering, and in computing graduates (European Commission, 2019f). In terms of ICT graduates, despite a small increase from 4.5% (in 2016) to 4.7% (in 2017) of total graduates, there is still a lack of ICT specialists in the country. The number of IT specialist vacancies increased by 51% from 82,000 in 2018 to 124,000 in 2019. IT specialist positions are unoccupied for sixth months on average (Bitkom, 2019). The proportion of female ICT specialists in Germany is slightly below the EU average (1.3% vs 1.4% of total graduates) (European Commission, 2019g).

Box 4.4.6: **Investment challenges and reforms in Germany**

Macroeconomic outlook

Investment is relatively low as a share of GDP, which undermines Germany's future growth potential and has implications for the euro area (see Chapters 1 and 3). Private investment started to cool down in 2019, responding to the economic weakness. Public investment has picked up but a major investment backlog will take longer to unwind. Stronger capital accumulation will be needed to sustain potential growth in the future, especially if population ageing intensifies as expected and immigration slows down.

Assessment of barriers to investment and ongoing reforms

Barriers to investment in Germany discussed in this report are:

- predictability and planning and management capacities for local communities (see Section 4.1 and below)
- planning constraints and capacity constraints in the construction sector (see Section 4.1 and below);
- a complex tax system with high compliance costs (see Section 4.1);
- financing difficulties for young innovative companies (see Sections 4.2 and 4.4.1);
- shortages of skilled labour (see Sections 4.3.1, 4.3.3 and 4.4.1);
- insufficient availability of certain network infrastructures, including electricity networks and broadband, as well as a lack of digital public services (see Section 4.4.3); and
- a number of sectoral regulations, including those that restrict competition in business services and regulated professions (see Section 4.4.3).

Public administration/ Business environment	Regulatory/ administrative burden	
	Public administration	
	Public procurement /PPPs	
	Judicial system	
	Insolvency framework	
	Competition and regulatory framework	
Labour market/ Education	EPL & framework for labour contracts	
	Wages & wage setting	
	Education, skills, lifelong learning	CSR

Financial Sector / Taxation	Taxation	
	Access to finance	
R&D&I	Cooperation btw academia, research and business	
	Financing of R&D&I	CSR
Sector specific regulation	Business services / Regulated professions	CSR
	Retail	
	Construction	CSR
	Digital Economy / Telecom	CSR
	Energy	CSR
	Transport	CSR

Legend:

	No barrier to investment identified		Some progress
CSR	Investment barriers that are also subject to a CSR		Substantial progress
	No progress		Fully addressed
	Limited progress		Not assessed yet

Investment bottlenecks such as capacity constraints hinder public infrastructure investment projects at municipal level, while lengthy planning and legal proceedings act as an additional major impediment to investment projects in transport, energy and digital infrastructure. While public investment has increased noticeably, in particular at federal level, investment at municipal level has been much less dynamic and continued to fall short of depreciation. A lack of planning capacities and skilled staff (e.g. engineers) remains a major bottleneck at municipal level. As a consequence, the available budget for infrastructure investment is often not fully used. Measures to mitigate these obstacles, such as consulting provided by 'Partnerschaft Deutschland', have yet to show results. Hiring engineers at municipal level, also by providing competitive salaries and rebuilding in-house planning capacities, could help to overcome existing constraints. To provide municipalities with the incentives and planning certainty necessary to undertake such a step, a long-term public investment plan would be needed that creates continuous demand for public construction projects. Furthermore, planning procedures in Germany usually involve extensive consultation of the public and stakeholders, and opposition by individuals or interest groups often results in lengthy court cases. The number of court cases initiated by environmental protection associations increased by about 23% between 2013 and 2016 (Sachverständigenrat für Umweltfragen, 2018). A general increase in

the complexity of planning procedures may also be deduced from Germany's deteriorating performance in the World Bank's Doing Business Report with respect to dealing with construction permits ([1]). Based on the example of a private sector construction project measured by the World Bank, Germany's performance has declined from 8th place in the rankings in 2015 to 30th place (World Bank, 2019). In addition, German municipalities on average have fewer inhabitants than those in other OECD countries, which may have implications for their capacity to manage investment (OECD, 2019f).

Digitalisation of the planning and construction process and faster court proceedings could help speed up the implementation of public infrastructure projects. The use and uptake of the software solution Building Information Management (BIM) for the whole supply chain of planning, construction and operations could help speed up the implementation of public infrastructure projects. Besides sponsoring pilot projects, a national plan presented in 2015 provides that BIM should be systematically introduced by 2020 as the new standard for federal transport infrastructure projects. This would be a welcome step, even though not binding for infrastructure projects at regional and municipal level. Similar plans are also scheduled for other public works. The German National Regulatory Control Council has also issued a number of recommendations to speed up court proceedings in Germany, such as the introduction of a compulsory start date for a first hearing and measures to allow for faster legal certainty.

([1]) This includes the procedures, time and cost to complete all formalities to build a warehouse and the quality control and safety mechanisms in the construction permitting system.

Research and Innovation (contd.)

The generally strong performance of the innovation ecosystem is supporting the development of high-growth businesses, while shortages of skilled staff are hampering it. Limited access to early-stage and growth finance (see Section 4.2), and the scarcity of staff with the right skills are considered major obstacles to investment by high-growth businesses (Flachenecker et al., 2020). This problem is partly rooted in demographic changes, as the cohort of people with the most entrepreneurial activity (aged 30-50) has been shrinking over recent decades. Furthermore, Germany faces a general shortage of qualified labour for particular professions (Pellens et al, 2020). A number of policy initiatives are under way to address skills shortages. In December 2018, the federal government adopted the new skilled labour strategy. A new immigration law, entering into force in March 2020, aims to increase immigration of skilled labour from third countries. To create a stronger culture of life-long learning, the government adopted in July 2019 a National Continued Education Strategy. The MINT action plan, adopted in February 2019, aims to increase the attractiveness of science and technology education.

Research and innovation have a key role to play in ensuring an effective and credible climate policy. In its 2030 climate action programme, adopted in 2019, the government recognised that climate protection requires the mobilization of the entire innovation system, a strong entrepreneurial commitment to R&D, further governmental research and innovation impetus, and research funding. Specific R&D support is envisaged to help expand the use of climate-friendly, low- or zero-emission, technologies. Within the overall concept of 'Research Factory for Batteries', support will be provided for technology development and innovation along the entire battery value chain including sustainable recycling. There is also a focus on options for storing and using CO_2 and a hydrogen strategy will be developed.

Housing investment

Housing investment is still lagging behind housing needs in metropolitan areas. Fuelled by strong demand, investments in dwellings increased considerably (by 30.4% in real terms) between 2010 and 2019, but access to affordable housing remains a challenge. Net migration is an important driver of the strong demand for housing. In parallel, supply has not kept up with demand for a prolonged period (European Commission, 2019h). Despite rising needs, the ratio of housing investments to GDP is currently just above the long-term average, although it has improved significantly since the mid 2000s. Low interest rates coupled with rising incomes have contributed to increased property prices, in particular in big cities that are also foreign investment targets.

House price inflation accelerated from 2-3% after the financial crisis to 10% per year in 2019, making it difficult for low and middle-income households to afford adequate housing. Estimates by authorities and NGO's still point to a significant shortage of housing in metropolitan areas despite booming construction activity (ibid.). The Prognos Institute, for example, estimates that in 2017 alone supply was lower than demand by 90,000 units (or around 25%) ([41]). The largest discrepancy was in social housing, where only one-third of the demand could be accommodated (Koch et al., 2019). The annual housing target of building 375,000 new flats between 2017 and 2021, which the federal government stipulated in the coalition agreement, has thus not been met and strong increases in purchase and rental prices are creating further challenges for affordability.

Recent policy measures are not keeping pace with the demand for affordable housing, and in some cases may even increase housing shortages in the future. Lack of affordable housing has become a major challenge, particularly in core cities of the metropolitan regions, necessitating policy attention (see Section 4.3.2). A constitutional amendment, which came into force in April 2019, allows the federal level to continue providing financial assistance for social housing to the *Länder*. However, insufficient funding for social housing is only one obstacle. Ineffective regional supply strategies and poor framework conditions at the local level (lack of building land, lengthy planning procedures, lack of qualified staff, etc.) hamper the expansion of housing construction. In addition, some part of construction activities takes place in less demanded areas, risking future oversupply in several shrinking regions (Henger and Voigtländer, 2019). Local policies might rather increase the allocation problem and create disincentives for further investment, thus exacerbating the housing shortage (Sagner and Voigtländer, 2019; Bültmann-Hinz, 2019). One example is the currently discussed rent price ceiling (*Mietpreisdeckel*) in Berlin. Similarly, the fine-tuning of the national rent price break, to which the federal government agreed on 9 October 2019, is likely to aggravate the current lack of supply of rental housing (Kholodilin and Kohl, 2019).

([41]) The supply is further reduced when owner-occupied apartments are deducted from the figure.

The housing shortage has put upward pressure on housing rents. In recent years, Germany has experienced strong increases in housing rental costs as recorded by the HICP. In 2017-2018, the inflation differential for this item of the consumer basket vis-à-vis the rest of the euro area averaged 0.8 pps. In the second half of 2019, rental inflation was also above overall inflation, as it also was in the rest of the euro area.

The construction sector is operating at high capacity, which is driving price inflation in construction services higher and boosting profit margins but in many cases also affecting the quality of works. Price and cost developments in the construction sector and with regard to the acquisition of real estate can be traced through various indicators, none of which is directly reflected in the Harmonised Index of Consumer Prices. Price inflation in construction investment (measured by the respective deflator in the national accounts) eased somewhat in the third quarter of 2019 to 4% against a year earlier, but remains high. The deflator of the value added of the construction sector has tended to be significantly stronger (8%), suggesting that the prices of construction output rise faster than input prices. Meanwhile, real unit labour costs (i.e. the labour share) have continued to fall, implying that building firms are maintaining some degree of wage moderation and boosting profitability. At the same time, the cases of structural damage in new construction were found to have increased by 90% compared to 2009 (Institut für Bauforschung, 2018).

The German housing market is characterised by a low rate of home ownership. In 2018, 51.5% of the population were living in a building stock they owned, while 48.6% lived as tenants. The likelihood of being a homeowner or tenant depends to a considerable extent on income. Only 25.2% of people earning below 60% of the median equivalised income (i.e made equivalent for the differences in a household's size and composition) own their home, while this figure reaches 56.5% for people earning above 60% of the median equivalised income. Low home-ownership rates are reflected in the higher share of income spent on housing rentals (5.5% in 2018) compared to the rest of the euro area (3.4%) and peers (3.9% in France). To alleviate some of the pressure in the housing market, the government has introduced the

so-called Housing Construction Campaign, which comprises a number of measures to tackle housing shortages and rising house prices.

Digitalisation

German businesses are increasingly adopting digital technologies but there are still weaknesses compared to other industrialised countries. They are taking advantage of the opportunities offered by big data: 15% of businesses performed big data analysis in 2018 (EU average 12%) up from 6% in 2016. 11% of SMEs sell cross-border (EU average 8%). More than a third of businesses (38%) share information electronically (EU average 34%). However, only 12% of German businesses use cloud services (below the EU average of 18%). The number of SMEs selling online fell from 26% in 2016 to 19% in 2018 (still above the EU average of 17%). There are several national and EU-coordinated initiatives for digitalising the economy, many of which target SMEs. These include the *Mittelstand* 4.0 competence centres, which aim to improve SMEs' digitalisation, and the Go-Digital programme, which promotes consulting and implementation services for SMEs in digitised business processes, digital market development and IT security. There is also an initiative on IT security, designed to increase cybersecurity awareness among SMEs.

Digitalisation has the potential to facilitate and accelerate the 'green' and carbon-neutral transition, but digital readiness among environmental technology sectors varies widely. Digital technologies and applications can save 7-10 times more emissions than they produce and make possible a 15-20% reduction in global CO_2 emissions by 2030. ICT-enabled solutions can reduce energy use by up to 17%, cut emissions from transport by up to 27% and optimise agricultural activities, which account for roughly 24% of all CO_2 emissions. Among the leading German green tech markets, energy efficiency and environment-friendly power generation and storage have a strong digital starting position, while waste management, recycling, material efficiency and water in turn use digital technology much less (BMU, 2018). However, the carbon and energy footprint of digital technologies should also be considered, requiring in particular continued efforts to increase energy efficiency in networks as well as more energy efficient devices

4.4.2. REGIONAL DISPARITIES

Regional disparities in Germany exist in competitiveness, investment, employment and demographic developments. Competitiveness across Germany, as measured by the Regional Competitiveness Index (RCI), varies widely, closely matching economic output and GDP per capita levels (see Chapter 1). The investment ratio also varies significantly between regions, but systematic east-west or north-south patterns cannot be detected. This is different for R&D expenditure, which is highest in southern German regions and much lower in eastern Germany, but also in some less prosperous regions in the west. The highest unemployment rates are in the east of the country. There is a digital divide between rural and urban areas in next-generation access coverage. Certain regions are experiencing significant demographic decline, a development most pronounced in a number of eastern regions, whereas big cities have seen significant increases in their populations. This shows a rural-urban shift occurring across Germany. The planned phase-out of coal for electricity generation will change the economic and social development path of certain German regions where lignite mining plays a major role in the regional economy (see Section 4.5). This requires well-targeted and proportionate investments and other regulatory responses to create new opportunities in the affected areas.

4.4.3. SINGLE MARKET FOR GOODS AND SERVICES

Germany has scope for further improvement in enforcing internal market rules. Germany plays an important role in further developing the Single Market. However, the Single Market Scoreboard suggests scope for further improvement. As the largest importer of goods in the EU, and with Hamburg the third biggest port in Europe, Germany has a major responsibility to ensure that non-compliant products do not enter the EU. Unlike most Member States, Germany so far does not provide data on customs controls in the field of product safety and compliance. Moreover, improved administrative coordination could guarantee a higher number of notifications of draft technical regulations under the Single Market Transparency Directive and would thus allow stakeholders and the European Commission to

react and prevent barriers to trade in the internal market.

Changes in the regulation of business services could boost economic activity and investment. The level of regulatory restrictiveness in Germany remains high and above the EU average for many sectors including architecture, engineering, legal, tax advice and accounting services (European Commission, 2017b). It is also above the OECD average for lawyers, notaries, accountants and civil engineers (OECD, 2019g). Recent economic analysis (e.g. IMF, 2018) concludes that some professional services are over-regulated, with measures in place that stifle competition and increase prices, e.g. exclusivities on the exercise of certain activities. According to the OECD, reducing entry barriers to professional services to the level of a benchmark economy would lead to a GDP per capita increase of 2% after 10 years (OECD, 2018). Despite these findings and concrete reform proposals by the European Commission, there is a lack of policy progress so far, in most cases only reactions to court judgments. The re-introduction of the '*Meisterpflicht*' for 12 craft professions, announced in 2019, will in general permit only professionals with these 'Meister' qualifications to set up a self-employed business. The reform goes against the views of the German Monopolies Commission (*Monopolkommission*), which expects a decline in newly established companies but no increase in quality. An envisaged reform of the rules concerning the legal profession and law firms aims to reduce regulatory barriers.

The retail sector saw steady growth in 2018 and is expected to grow further, but restrictions still have an impact on both establishment and daily operations. According to the Retail Restrictiveness Indicator (Dominguez-Torreiro et al., 2018), Germany scores highly on retail establishment and operations. The planning rules are very detailed and vary according to the Länder, assigning the sale of a large variety of goods to certain specific areas. As regards daily operations, a recent ruling of the Federal Court of Justice now allows bakeries, which operate a café to sell their goods also outside of the prescribed opening hours. Since July 2019, centres of excellence aim to help small retailers modernise and cope with digitalisation.

Digital single market

Germany is not among the digital leaders in the EU due to its weak performance in ultrafast broadband and 4G mobile coverage. Germany ranks 12th among EU Member States on the Digital Economy and Society Index (DESI) 2019 ([42]). The take-up of fast broadband (≥30Mbps) has improved from 36% of households (2017) to 44% (2018). However, Germany still scores below the EU average on the take-up of ultrafast broadband (≥100Mbps), at 15% of households in 2018. 'Fibre to the premises' (FTTP) coverage in Germany was 8.5% in 2018, significantly below the EU average of 29.6%. Rural FTTP coverage is 3.6%, also below the EU average of 14.2%. To date, around € 5 billion of federal funds have been committed to broadband infrastructure. While the government has made considerable efforts on the financial side for the roll-out of digital networks, significant improvements in terms of FTTP coverage is not expected in the short term, given the lack of building capacities and know-how. Germany is only 24th in the EU for 4G coverage and 23rd for mobile broadband take-up. In 2019, a 5G auction took place and all bidders successfully acquired spectrum. A subsidy programme and a strategy to streamline permit procedures and facilitate access to the public estate for the extension and densification of mobile networks aim to improve mobile infrastructure supply in poorly served or unsupplied areas.

Artificial intelligence and cybersecurity are key priorities for the German government. The artificial intelligence (AI) Strategy adopted in 2018 sets out the framework for a holistic policy on the future development and application of AI in Germany. The further development of the existing Excellence Centres for AI was initiated and substantially funded. Several funding initiatives were launched, e.g. in the fields of IT security and autonomous driving. The National Pact for Cybersecurity is bringing together all relevant stakeholders to implement the measures envisaged under the national cybersecurity strategy, such as the Creation of an Agency for Innovation in Cybersecurity and the introduction of an IT-Security Label to inform consumers about IT security features in products. In 2019, Germany

([42]) The five dimensions of the DESI are: connectivity, human capital, use of internet services, integration of digital technology, and digital public services

took part in the newly established European High-Performance Computing Joint Undertaking.

Transport

The insufficient coordination and long-term planning at the different levels of government is hindering the development of key cross-border TEN-T infrastructure projects. This is the case with the Karlsruhe-Basel rail line and the railway access routes to the Brenner Base tunnel, the Fehmarn belt fixed link and the Dresden-Prague high-speed rail line. The same problem affects navigability conditions and transport efficiency for the Rhine, Danube and Elbe Rivers. Consequently, an efficient modal shift from road to rail and inland waterways cannot be ensured. The road sector has the biggest share of freight transport, predominating over rail and inland waterways. In addition, not advancing at national level with such infrastructure projects jeopardises commitments undertaken under the TEN-T Regulation for completing the core network by 2030.

4.4.4. GOVERNANCE AND INSTITUTIONAL QUALITY

Digital public services

Germany is lagging behind in digital public services, including e-health. Germany ranks 24th in the EU for digital public services, well below the EU average (European Commission, 2019g). Despite a small improvement, only 43% of German online users actively used e-government services in 2018 (EU average: 64%). Moreover, the uptake of e-health applications is also still low. In 2018 only 7% of Germans used online health and care services (EU average: 18%), 19% of general practitioners used e-prescriptions (EU average: 50%) and 26% of them exchanged medical data (EU average: 40%). Under the Online Access Act adopted in 2017, administrative services will have to be offered electronically in the future. It is therefore planned to integrate the different administrative portals of the federal government, *Länder* and municipalities into a portal network. However, implementation is proceeding slowly and it and meeting the goal of digitalisation of all 575 services by the end of 2022 will be challenging. In order to cope with its complex national and regional legal system, Germany has implemented a method of federal information management (FIM), both on the federal and Länder level, providing standardised information to be implemented for all digital public services.

A lack of commitment by the federal states to standardise their service provision is leading to high transaction costs, delays and uncertainty. This is limiting the ability of other stakeholders to plan and implement the necessary changes. Although the IT Planning Council decided to keep the five existing state service accounts for organisations, it currently evaluates the possibility to provide one consistent service account based on the digital certificate for authentication which is already well-established with the German digital tax declaration system ELSTER. In 2019, the federal cabinet decided to reorganise the project of modernising the IT infrastructure of the federal public authorities since the project is facing considerable delays and cost increases.

A third Bureaucracy Relief Act was adopted but more can be done to reduce red tape and legal compliance costs. The act passed in October 2019 aims to reduce the administrative burden for businesses by about €1.1 billion per year, i.a. by simplifying the electronic archiving of tax documents, implementing the electronic transmission of certificates of incapacity to work, and introducing the option of a digital registration form in the accommodation industry. In addition, some further simplifications are particularly addressed to start-ups. For example, young businesses will have to submit their advance VAT returns only quarterly rather than monthly. The National Regulatory Control Council provides in its 2019 annual report and its digitalisation monitoring report a number of recommendations to further reduce unnecessary bureaucracy and legal compliance costs. In particular, small businesses and start-ups would benefit from a further reduction in inefficiencies in taxation and modernisation of the tax administration. They would also benefit from simplification of the complex licensing and permitting system, including through further improvement of digital public services (European Commission, 2019i).

The uptake of e-health is low but recent measures accelerated the deployment of e-health infrastructure. The uptake of e-health applications in Germany is still low. In 2018 only

7% of Germans have used health and care services provided online (EU average: 18%), 19% of general practitioners used e-prescriptions (EU average: 50%) and 26% of them exchanged medical data (EU average: 40%). Efforts to roll out the necessary infrastructure started in late 2017. In 2018, the Federal Ministry of Health made major adjustments to the Appointment Service and Care law, enabling health insurance companies to provide electronic patient records on a nationwide and interoperable basis by 2021. The Electronic Emergency Data Set and the Electronic Medication Plan will be launched in 2019.

Public procurement

Public procurement in Germany is largely decentralised and subject to a complex legal system. Germany's public procurement is characterised by decentralisation, a complex national and regional legal system and a lack of data and transparency. Though the value of contracts published EU-wide has slightly improved to 1.6% of GDP and is no longer the lowest in the EU, it is still well below the average of 4.1%. Greater transparency could improve the quality of services and allow for further efficiency gains. It could also improve accountability and trust in public investment.

Better use of e-procurement and sustainable procurement could strengthen public procurement's role as a strategic tool. Since October 2018, it has been mandatory to use e-procurement for all public procurement procedures above the EU threshold. The Federal Government has established various tools to assist contracting authorities to advance sustainable and innovative procurement, in particular the Competence Centre for Sustainable Procurement and the Competence Centre for Innovative Procurement, as well as initiatives like a dedicated web portal for sustainable public procurement and a lifecycle costing calculation tool from the German Environment Agency. However, public procurement in Germany would benefit from a more coordinated and strategic approach.

4.5. ENVIRONMENTAL SUSTAINABILITY*

Germany has the capacity to be at the forefront of climate and environmental protection, but despite recent initiatives, meeting climate targets requires additional efforts. In 2019, Germany increased the ambition of its climate change commitment. The Climate Action Programme 2030 recently adopted by the German government (see Box 4.1.3) and the proposed new Climate Act will enshrine in law the 2030 greenhouse gas reduction target of 55% (below 1990 levels). It will also refer to achieving greenhouse gas neutrality by 2050, up from a 80-95% reduction referred to in the climate package in 2016. However, Germany also declared that it will not reach its climate target for 2020 and that, in order to comply with the EU Effort Sharing Decision and Regulation, it will have to use the respective flexibility provisions. The transition to climate and environmental sustainability could be a major opportunity for Germany to become a lead market and lead supplier of climate-friendly technologies. In 2016, German companies had 14% of the global market for environmental technology and resource efficiency (BMU, 2018). The increased attention to environmental sustainability both at EU ([43]) and international level, coupled with the existing strengths of German industry, provide favourable conditions for the German economy to benefit from this transition. However, this would require a sufficiently ambitious, systematic and coordinated approach, including economic policy levers such as a long-term investment vision, taxation and other incentives to attract private investment for the transition towards sustainable growth (see also Section 4.1). Green criteria in public procurement and green budgeting have the potential to facilitate the transition towards decarbonisation and environmental sustainability.

Transport

The transformation of the transport sector towards clean mobility represents a major challenge for the German economy and plays an important role in meeting climate and environmental targets. Under the combined pressure of regulators and consumers the German car industry, which is a significant contributor to German GDP and employment, will have to switch to environmentally well-performing mobility solutions. This also reflects the fact that the transport sector has done particularly badly at cutting emissions of both greenhouse gases and local air pollutants. This switch is expected to lead to considerable shifts in market shares, value chains, employment, trade patterns and R&D investment. Fewer jobs will be required to manufacture and maintain electric battery vehicles, which are less complex than traditional combustion engine vehicles; at the same time, other jobs may be created in electronic engineering, software development, etc. (Fraunhofer IAO, 2018). So far, most German car producers were trailing behind world leaders when it came to promoting innovative mobility solutions such as alternative power trains or connected and autonomous driving. Many consumers are still deferring their purchase until environmentally well-performing cars are available at affordable prices (see Chapter 1 and Box 4.5.7).

Despite the very high external costs of road transport, including air pollution and greenhouse gas emissions, a modal shift in particular towards rail transport is not taking place. Road transport generates the overwhelming majority (96%) of the external costs created by transport, including accidents, environmental costs (through air pollution, greenhouse gas emissions, noise, habitat damage) and congestion. In 2017, car trips represented more than 84% of passenger-kilometres travelled in Germany, above the EU average of 82%. However, the level of taxes and charges paid by land transport users (around €64 billion) is only a fraction of the total (external and infrastructure ([44])) cost generated by land transport. At the same time, rail transport has failed to improve its services ([45]), hampered by low competition within the passenger sector. The market share of new entrants on long-distance rail services remains low (below 1% in 2016). Rail services' lack of punctuality and the increasing offer of long-distance bus services suggest that there is a market need for alternatives to the incumbent rail operator.

([43]) Several EU funding programmes contribute to sustainable development in Germany. For instance, the European Regional Development Fund spent €4.6 billion on 10 of the 17 Sustainable Development Goals up to December 2018.

([44]) Investment in transport infrastructure over recent years stayed constant below 0.6% of GDP.

([45]) Only around 75% of high-speed (ICE, Inter- or Eurocity) trains arrived on time in 2018.

Box 4.5.7: Transformation of the transport sector

Germany needs more modern, cleaner and better performing mobility solutions to meet environmental and climate targets and improve productivity and the quality of life. Currently, there are more than 57 million vehicles with internal combustion engines registered in Germany, a significant proportion of which do not in reality meet EU emission standards. This is despite several major programmes to replace vehicles that perform poorly in environmental terms by those that perform better. In consequence, air pollution, associated with premature death and morbidity, including cardiovascular and respiratory diseases, continues to exceed EU limit values in many German cities, thus negatively affecting labour productivity and increasing pressure on the health care system (European Environment Agency, 2019). At the same time, the upsizing of the car fleet and the ever-rising share of sport utility vehicles (SUVs) continues to counteract efforts to reduce CO_2 emissions from the transport sector. Moreover, congestion both in cities and on motorways continues to increase and the death toll from road accidents remains at unacceptably high levels. So far, most German car manufacturers, but also German regulators, have been trailing behind world leaders when it came to promoting innovative mobility solutions such as alternative power trains or connected and autonomous driving, and (environmentally) well-performing public transport, including taxis. However, the sheer dimension of the self-inflicted 'diesel scandal' and the subsequent ineffectual crisis management seem to have served as a powerful wake-up call for both private and public actors. Nonetheless, the tax privilege for diesel remained untouched, which still triggers net revenue shortfalls in the amount of €1.5 billion annually (see Section 4.1).

As a strong innovator, with a strong transport-vehicle manufacturing basis and well-developed infrastructure, Germany has the capacity to be at the forefront in offering clean, safe and modern transport and mobility solutions. As it is still unclear what the future alternative powertrain for road transport will look like (or if there might even be a revival of clean combustion engines), policy should preferably foster innovation and competition between various technologies. In order to do so and to meet national carbon emission targets, Germany has decided to introduce a fixed carbon price for the transport and building sector, as of January 2021, and an emissions trading scheme as of 2026. The emission trading system is one of the central policy instruments to lower carbon emissions, as it will gradually put an ever-tighter limit on transport emissions, eventually cutting absolute transport-related CO_2 emissions by about 40% by 2030 Along with this, Germany undertakes big efforts into a countrywide rollout of rechargeable e-mobility. The present generation of e-vehicles faces a number of challenges related to their performance and price, the production, use and recycling of batteries, charging infrastructure, charging time and range. With its strong innovation ecosystem, transport-vehicle manufacturing basis and well-developed infrastructure, Germany has the capacity to be at the forefront in developing new technologies which can enable the transport sector to shift towards greater sustainability and environmental and climate protection. The expected growth in the market for electric vehicles will lead to a significant increase in demand for batteries. Batteries' sustainability, environmental and energy performance will become increasingly important as the market grows. Through the European Battery Alliance, Germany is actively promoting the development of a competitive and sustainable battery value chain.

'Island solutions' in big cities could be a first step in the transition to alternative power trains (such as e-mobility and fuel cells) and new mobility concepts. Strengthening private and public investment in clean and sustainable mobility solutions, notably e-mobility, is high on the political agenda. Such investment should usefully first focus on urban mobility, where the problem of air pollution, noise emissions, congestion and road safety is particularly urgent, and where autonomy-constraints are less of a concern. Special temporary arrangements ('regulatory sandboxes') and targeted public procurement could reduce the time and cost of getting new products to market and make it easier for young companies to secure financing and support regulatory learning, by providing a safe space to test innovative products and business models. Investing in 'public' transport in big cities (i.e. electric buses, postal lorries and taxis) would further encourage technological competition (e.g. ultrafast charging vs provision of replacement batteries) and spur innovation. It could also solve some of the problems currently faced by electric vehicles, as the charging infrastructure would be local and the distances limited. Best practices across other countries show that modernising the public vehicle fleet has significantly improved air quality and reduced public health risks. Regions and cities could declare a clear commitment to clean public transport and could for example set a target for electric buses instead of private electric cars. In addition, and not least given population ageing, promoting autonomous and connected driving should remain a core priority for industry and policymakers. This should include providing sufficiently well-performing telecommunications and roads infrastructure.

The German federal government has introduced a package of stimulus measures for private electric vehicles, including subsidies for the purchase of electric cars. Electric cars (of whatever kind) represented only 0.2% of cars in use and only 1% of new car registrations in 2018. Electrically chargeable cars (which include both fully battery-operated and plug-in hybrids) represent only less than 0.5% of cars in use, and only 2.9% of new car registrations in 2019. Following a number of high-level meetings with representatives from politics, the automotive industry and trade unions (*Konzertierte Aktion Mobilität)* it was decided on 5 November 2019 to increase the purchase incentive for electric vehicles and extend the measure until 2025. For pure electric cars below a list price of €40,000, the subsidy is expected to increase from €4,000 to €6,000, while for cars with a list price above €40,000 the subsidy would be €5,000. This could reduce the price gap, but not the performance gap with respect to charging time and fuel autonomy. At the same time policy measure do not sufficiently target the modernisation and possible electrification of light commercial vehicles, which account for about 5% of the car fleet and are typically powered by environmentally problematic diesel engines. Over the next 2 years the number of publicly accessible charging stations should increase from around 21,100 now to 50,000 (1 per 23 vehicles assuming the German alternative fuels infrastructure policy framework target of 1 million electric vehicles is reached). However, it is not clear yet whether access possibilities and payment systems will be standardised, or whether this initiative includes a strategy for the roll out of private charging stations and adapting the energy supply infrastructure to the new power consumption patterns.

Germany has recently issued a plan for more efficient organisation of the mobility system in order to meet air quality and climate targets, reduce congestion and improve the quality of life. The Climate Action Programme 2030 was adopted in autumn 2019 to cut among other things the transport-related emissions by 40-42% by 2030. A package of measures to encourage electric mobility, promote the railways and introduce CO_2 pricing aims to achieve this. Already before this, the German authorities have taken measures in promoting the electrification of local bus fleets and the exchange of information and best-practices of local and federal authorities on sustainable mobility. The '*Sofortprogramm Saubere Luft* (2017-2020)' aims to incentivise a modal shift (road to rail, individual to public transport) as well as smart and shared transport solutions, to reduce travel times, distances and emissions, using fast data processing, automation and digitalisation. The €1.5 billion programme that is earmarked to be spent over 3 years to support various initiatives (including charging systems, the digitalisation of local traffic systems and retrofitting buses). In addition, the Federal Government supports the retrofitting of heavy and light municipal and commercial vehicles by further €432 million. More could also be done by taking into account the binding targets for public procurement of clean vehicles established in the Clean Vehicles Directive. The federal government plans to adapt the legal and technical framework conditions for automated driving and is preparing a comprehensive hydrogen strategy, as an important element for future mobility, but details are not yet known. Germany has also enacted an increase in the aviation tax, as of April 2020. To promote a more climate friendly alternative mobility rail travel will become cheaper and more attractive: the value-added tax for long-distance rail tickets will be reduced from 19% to 7%. In addition, there will be massive investments in the rail network such as for replacement investment, digitalisation and electrification, which is expected to strengthen the attractiveness of the railway. In addition, the German government plans to raise federal funding for local public transport to €1 billion a year as of 2021. The additional funding is to be used to expand track-based local public transport infrastructure. As of 2025 the funding is to rise to €2 billion a year. The federal funding for local public transport is planned to be increased by an additional €5.2 billion over the years 2020 to 2031. Furthermore, the federal government provides additional €900 million in the years 2020 to 2023 for measures to expand the cycling infrastructure (cycle path network, bicycle parking systems, storage facilities or cycle superhighways), and provides financial assistance to pilot projects.

While Germany's national energy and climate plan lists a number of policies, the lack of detail and integration creates uncertainty about the overall government strategy for decarbonising the transport sector, including the transport of goods. As the main hub and transit country for trans-European haulage, with its strong industrial base and economy, Germany could play a central role in developing solutions. Zero-emission transport of goods based on battery-electric, hydrogen or catenary-electric lorries could be considered (e.g. between two factory sites or within companies' or local authorities' vehicle parks). By 2025, the current 80 hydrogen refilling stations should extend to 400 and become the backbone of a robust hydrogen-based heavy goods transport network. The existing two test tracks for catenary-electric haulage are already commercially used.

Germany's air pollution continues to be a serious concern, adversely affecting the labour productivity of people living in urban areas and healthcare expenditures. Among local air pollutants, fine particulate matter, nitrogen dioxide (NO2) and ground-level ozone (O3) cause the greatest harm. Air pollution has adverse health effects, such as premature mortality and morbidity ([46]), mainly related to respiratory and cardiovascular diseases. It also causes economic losses, for example through higher healthcare costs, reduced yields from agriculture and lower labour productivity (OECD, 2016). For 2018, exceedances of the EU limit value for nitrogen dioxide (NO2) were reported in 32 of the 89 air quality zones. Several cities in Germany exceed the World Health Organization guidelines for fine particulate matter concentrations, but comply with the relatively less stringent EU limits (Thunis et al., 2017). Additional and effective measures are required to ensure compliance with EU air quality standards and EU vehicle type approval rules. Traffic accounts for about 60% of harmful NOx emissions in urban areas, and of this 72.5% is caused by diesel vehicles. The federal government is making €1.5 billion available for municipalities to electrify and retrofit public transport, taxis and commercial vehicles until 2020. However, the large majority of the 15 million registered diesel cars (with Euro 3 to Euro 6c engines) still have significantly high NOx emissions in real-world driving conditions. Following software updates they still exceed limit values by up to around 300% (UBA, 2019). Hardware updates have not taken place yet as regulations enabling system authorisations were only adopted in 2019, and the issue of financing is still contested.

Energy

Investment in energy infrastructure and energy efficiency is crucial to meet climate and energy targets. Various initiatives reflected in Germany's draft National Energy and Climate Plan (NECP)[47] are likely to further underpin efforts towards sustainability and contribute towards advancing towards SDG 7 'Affordable and clean energy' and SDG 13 'Climate action', but their success will depend significantly on the investments these initiatives can spur. Further development of electricity transmission infrastructure is required in order to avoid financial losses and market distortions due to congestion and limited flexibility of the electric system. Recent estimates for investment needs in energy transmission networks increased significantly, while the investment in the power generation sector has stagnated since 2014. According to the latest national network development plan which has been confirmed by the German Regulator in December 2019, the country's electricity transmission network needs approximately €76 billion in investment. €55 billion are needed to upgrade the existing electricity transmission system and to build new transmission infrastructure onshore by 2030. A further €21 billion need to be invested in electricity transmission infrastructure offshore to allow for the installation of 17-20 GW of offshore wind by 2030. The effect of the further expansion of offshore wind on the need to develop additional internal transmission grid remains to be evaluated in detail. However, it can be expected that the pattern of electricity production being located in the north of Germany, but clusters of electricity-consuming industries located in the south, will be reinforced. Investment needs in the gas grid are forecast to reach €7-9 billion by 2028, largely for bottleneck removal, for the L-H-Gas switch and for measures related to the energy transition and achievement of 2050 climate targets. Next to speeding up progress in the expansion of transmission and distribution grids, investment in energy efficiency needs to increase significantly. This would be required to meet the EU's target of improving energy efficiency by 32.5% by 2030. It is therefore important to create the right conditions and put in place mechanisms to attract private financing for energy efficiency investments. Embedding the principle of 'energy efficiency first' in the strategy would allow energy savings to be harnessed in other areas and policies, in particular with respect to private and public investment. In December 2019 the German Federal Government launched the "Energy Efficiency Strategy 2050". It sets a target for 2030 (reduction of national primary energy consumption by 30 % as compared to 2008) and includes numerous

([46]) In Germany an estimated 720 years of life lost per 100,000 inhabitants (or 59,600 premature deaths per year) are attributable to fine particulate matter concentrations and 144 years of life lost (or 11,900 premature deaths) are attributable to nitrogen dioxide (NO_2) concentrations (EEA, 2019).

[47] The Commission will assess, in the course of 2020, the final National Energy and Climate Plan. Germany has not yet submitted its final Plan.

measures to foster energy efficiency investment across sectors.

Stronger progress with expanding renewable electricity is needed in light of Germany's climate ambition. The federal government has set a 2030 target for renewable electricity to provide 65% of gross electricity consumption. However, there is a risk that Germany might not meet its renewable energy target for 2020, also because of the undersubscriptions in recent wind energy auctions resulting from a lack of projects approvals. While there are efforts to address planning-related limitations on renewables deployment, the decision to introduce a minimum distance between wind installations and residential areas of 1,000 metres (with possible regional opt-outs) may affect planning and processes for deploying onshore renewables at local level in certain regions. At the same time, the target for expanding offshore wind power will be increased from 15 to 20 GW by 2030 and the support cap for solar photovoltaics, currently at 52 GW total capacity, will be removed completely.

'Just transition'

The phase-out of coal and lignite mining poses economic and social challenges in some regions. Germany is still heavily reliant on fossil fuels, and coal in particular. Within the EU, Germany has the largest number of coal-fired power plants (53) and produces most coal. To reduce CO_2 emissions and achieve climate neutrality, the German government has announced the phase-out of Germany's lignite mining for the generation of electricity by the end of 2038. This decision entails significant structural change and economic and social challenges, with over 19,650 direct and 35,734 indirect jobs in coal mining affected (Dehio and Schmidt, 2018; European Commission, 2019j). The transition to clean energy will especially affect three coal mining areas: The *Lausitzer Revier* (covering parts of Brandenburg and Saxony), the *Rheinische Revier* (parts of North-Rhine Westphalia) and the *Mitteldeutsche Revier* (parts of Saxony and Saxony-Anhalt). Demographic developments in the eastern regions are less favourable to achieving a smooth structural change as the working population is projected to decline more drastically until 2035 (by 2% per year in *Lausitzer* and 1.4% in *Mitteldeutsches Revier*) than in the west (0.6% per year in *Rheinisches Revier*) (Dehio and Schmidt, 2018).

A 'just transition' to sustainable growth will require the identification of investment needs, a coherent investment strategy and additional measures to create new opportunities for the losers from structural change. The 205 Climate Action Plan (BMU, 2016) emphasises that a successful transition away from coal can be achieved only through a regional and industry-oriented political strategy that integrates subnational authorities, the private sector and workers into the decision-making process. Furthermore, a commission on growth, structural change and employment (referred to as the 'Coal Commission') was set up in June 2018 to build a consensus for the needed transition. The Commission proposed a mix of instruments and made recommendations for future investments in the affected regions (BMWi, 2019). Based on this report, the federal government has pledged to support the affected *Länder* with up to €14 billion in financial transfers for significant regional investments until 2038 at the latest. The federal government will fund additional measures in its own remit (e.g. rail and road infrastructure, research institutions). These projects amount to up to €26 billion, adding up to a total budget of up to €40 billion until 2038. Given the weight of coal-related economic activity and the more peripheral nature of the Lausitz region, the transition to an innovation-based economy looks especially daunting there. The European Commission has proposed a Just Transition Fund to support people in the regions most affected (see Annex D).

Circular economy

Making full use of the circular economy's potential can help Germany reach its climate targets, and an overarching strategy would help to bring about the necessary systemic change. A recent study suggested that EU emissions in material-intensive industries and value chains may be reduced by up to 56% through consistent application of circular economy principles. (Material Economics, 2018). The extraction and processing of natural resources accounted for about 40% of Germany's total climate change impacts, predominantly related to the production of iron and steel, cement manufacturing, petroleum refining, chemical and plastics production, cattle

farming and extraction of coal, natural gas, and oil (International Resource Panel, 2019). While these impacts have slightly decreased in recent years, the absolute level of material-related climate change impacts remained high. Applying resource efficiency and circular economy strategies along the entire supply chain could help decrease these impacts. The new 2030 Climate Action Programme does not take much account of the potential of the circular economy. This is a missed opportunity. A number of strategies and initiatives address elements of the circular economy, but Germany does not have an overarching strategy to help bring about the necessary systemic change. The resource efficiency programme PROGRESS II, the national programme on sustainable consumption and the German high-tech strategy deal with different circularity aspects. Unlike a growing number of EU Member States, Germany does not have a comprehensive strategy to further develop the regulatory framework, make full use of synergies with digitisation and mobilise finance. In recognition of this, and with support from the Federal Ministry of Education and Research, the new Circular Economy in Germany initiative (CEID, *Circular Economy Initiative Deutschland*), has been tasked with drawing up a circular economy Roadmap for Germany by 2021.

Climate change adaptation/nature-based solutions

Climate change is having a significant bearing on the economy and requires additional investment in climate change adaptation. As in the previous year, climate change had significant impacts in 2019. By the end of October 2019, more than 60 local authorities in Germany had declared the state of 'climate emergency'. On 25 September the federal government organised a national forest summit and pledged €547 million in emergency aid in response to forest damage caused by a combination of exceptional heatwaves, droughts, bark beetle outbreaks and forest fires. Climate change and unsustainable forest management practices (monocultures) have led to high economic losses for foresters due to emergency wood-cutting. The agricultural sector has been affected by particularly low soil moisture levels in large parts of the country. Speed restrictions were issued for several concrete highways prone to heat-induced 'blow-ups'. While the year 2019 was characterised by the heavy drought, other climate-change induced extreme weather phenomena such as heavy rainfalls and storms are expected to occur in Germany as well, prompting corresponding investment needs, e.g. in urban areas and along river basins.

Nature-based solutions hold strong climate mitigation potential and are a vital and cost-effective complement to decarbonisation in the energy, transport and industrial sectors in Germany. They combine climate and nature protection and focus on reducing emissions from the land sector and protecting and enhancing natural carbon sinks. Stepping up restoration of peatlands is a cost-efficient carbon sink measure and would promote SDG 13 'Climate action' and SDG 15 'Life on land').

Conserving and restoring degraded ecosystems will help to halt continuing biodiversity loss, while a reform of fertiliser rules would reduce excess nitrate levels and reduce costs. 34% of protected species and 41% of habitats (according to the Habitat Directive) show a negative trend, while for only 14% of protected species and 10% of habitats are development trends positive (BFN, 2019). These negative trends in biodiversity and ecosystems will undermine progress towards SDG 15 'Life on land' and SDG 14 'Life below water'. Significant factors in continued biodiversity loss and soil, air and water pollution are intensive agriculture, high nitrogen inputs and landscape fragmentation. While declining, the daily land-take rate (62 hectares per day in 2015) is still far above the 2030 target of less than 30 hectares per day as set out in the national sustainability strategy. The agricultural area used for organic farming, an important building block of more sustainable food systems, has increased (from 5.8% in 2012 to 6.8% in 2017) but is still below the EU average (7.03%). With current growth rates, the 20% target Germany has set itself for 2030 is not within reach. Germany has the second-highest number of monitoring stations with average nitrate levels exceeding 50 mg/l. Costs for purifying excess nitrates from drinking water have continued to rise and are mainly supported by households and public authorities. Eutrophication by phosphorus has not been addressed sufficiently yet, which is compromising the achievement of SDG 6 'Clean water and sanitation'.

ANNEX A: OVERVIEW TABLE

Commitments	Summary assessment ([48])
2019 country-specific recommendations (CSRs)	
CSR 1: While respecting the medium-term budgetary objective, use fiscal and structural policies to achieve a sustained upward trend in private and public investment, in particular at regional and municipal level. Focus investment-related economic policy on education; research and innovation; digitalisation and very-high capacity broadband; sustainable transport as well as energy networks and affordable housing, taking into account regional disparities. Shift taxes away from labour to sources less detrimental to inclusive and sustainable growth. Strengthen competition in business services and regulated professions.	Germany has made **Limited Progress** in addressing CSR 1
While respecting the medium-term budgetary objective, use fiscal and structural policies to achieve a sustained upward trend in private and public investment, in particular at regional and municipal level.	**Some Progress** Private investment remains solid despite the economic slowdown, but is still lagging behind infrastructure and housing needs. In 2018, private investment increased by 3% in real terms and across most asset types, excluding non-residential construction investment which remained subdued. In 2019, real investment continued increasing at similar rates, however with non-residential investment picking up speed, while equipment investment growth weakened. Altogether, the private investment share of GDP increased from 18% in 2011-2017 to 19% in 2018-2019. The most dynamic components in recent years have been housing and other investment (comprising mainly R&D and other

([48]) The following categories are used to assess progress in implementing the 2017 country-specific recommendations (CSRs):

No progress: The Member State has not credibly announced nor adopted any measures to address the CSR. This category covers a number of typical situations, to be interpreted on a case-by-case basis taking into account country-specific conditions. They include the following:

-no legal, administrative, or budgetary measures have been announced

-in the national reform programme,

-in any other official communication to the national Parliament/relevant parliamentary committees or the European Commission,

-publicly (e.g. in a press statement or on the government's website);

-no non-legislative acts have been presented by the governing or legislative body;

-the Member State has taken initial steps in addressing the CSR, such as commissioning a study or setting up a study group to analyse possible measures to be taken (unless the CSR explicitly asks for orientations or exploratory actions). However, it has not proposed any clearly-specified measure(s) to address the CSR.

Limited progress: The Member State has:

-announced certain measures but these address the CSR only to a limited extent; and/or

-presented legislative acts in the governing or legislative body but these have not been adopted yet and substantial further, non-legislative work is needed before the CSR is implemented;

-presented non-legislative acts, but has not followed these up with the implementation needed to address the CSR.

Some progress: The Member State has adopted measures

-that partly address the CSR; and/or

-that address the CSR, but a fair amount of work is still needed to address the CSR fully as only a few of the measures have been implemented. For instance, a measure or measures have been adopted by the national Parliament or by ministerial decision, but no implementing decisions are in place.

Substantial progress: The Member State has adopted measures that go a long way towards addressing the CSR and most of them have been implemented.

Full implementation: The Member State has implemented all measures needed to address the CSR appropriately.

Commitments	Summary assessment ([48])
	intellectual property). However, investment is still lagging behind infrastructure and housing needs. This is reflected in short-term pressures, observed for example through increases in house prices and rents. Furthermore, the manufacturing sector faces a slowdown in foreign demand dynamics, in tandem with a need to adapt to climate and environmental requirements (e.g. low-emission cars). Public investment has continued increasing against a backdrop of a significant investment backlog. Gross public investment increased by around 6% annually in 2015-2017 and by close to 9% in 2018 and close to 7% in 2019 in nominal terms. In real terms the increase averaged about 4% in 2015-2019 as price inflation for construction works was high (more than 4.5% on average) in 2017-2019. This raised the public investment rate from 2.1% of GDP in 2015 to 2.5% of GDP in 2019. Since 2017, total government net investment has turned positive. In 2018-2019, municipal investment picked up speed, but net investment remains negative. The investment backlog at municipal level remains high at EUR 138.4 billion, 4% of GDP.
Focus investment-related economic policy on education;	**Limited Progress** While education expenses have somewhat been increased in 2019, including through the Digitalpakt Schule, a longer term horizon for education expenses remains missing.
research and innovation;.	**Some Progress** Germany invests considerable resources in R&D, still private investment in R&D is increasingly concentrated in large firms while SMEs and start-ups face challenges. R&D intensity has increased during the last years, from 2.46% of GDP in 2007 to 3.13% in 2018 (3rd highest in the EU). A new national R&D intensity target of 3.5% by 2025 was included in Germany's High Tech Strategy (BMBF, 2018). With two thirds of the R&D performed in the business sector, German business R&D intensity (2.16% in 2018) is the third highest in the EU. However, business R&D is predominantly performed by large firms in R&D-intensive industries, whereas small and medium-sized enterprises' R&D expenditure has stagnated over the past decade.
digitalisation and very-high capacity broadband;	**Limited Progress** Regarding digitalisation, especially digital public services, the implementation of the Online Access Act is proceeding rather slowly, and it is unlikely that the Act's nominal goal of

Commitments	Summary assessment ([48])
	digitalizing all 575 services by the end of 2022 will be met. In November 2019 the Federal Cabinet decided the reorganization of this costly digital project of modernizing the IT infrastructure of the public authorities. Regarding broadband, aalthough the take-up of fast broadband (≥30Mbps) has improved, Germany remains below the EU average, and considerably so in fiber to the premises (FTTP) coverage, 4G coverage and mobile broadband take-up. While the Government made considerable efforts on the financial side for the roll-out of digital networks, significant improvements in terms of FTTP coverage and take-up are not expected in the short term, given the lack of building capacities and know-how.
sustainable transport	**Limited Progress** The transport sector has done particularly badly at cutting emissions of both greenhouse gases and local air pollutants, which has lead to a gap in meeting Germany's Effort Sharing Decision target. Despite very high external cost of road transport, Germany records a high use of passenger cars while at the same time the competition within the rail passenger sector remains low. The Climate Package of Autumn 2019 included a number of promising measures, including support for creating charging infrastructure of electric vehicles, increased subsidies for electric, hybrid and fuel cell vehicles, public transport investment, creation of new cycling routes, modernisation of ports and inland waterways, support to rail transport. However, the impact and the implementation of these needed and overall well-conceived measures still remain to be seen.
as well as energy networks	**Limited Progress** Some measures have been taken, including an agreement on forward-looking internal planning and auditing of grid expansion, and improving construction and access of the liquefied natural gas network to the existing gas transmission system. Still, further investments in energy networks are required; beyond transmission networks also in distribution and heat networks. It is likely that there will be significantly higher investment in transmission infrastructure by 2030 than expected just a year ago. However, there is currently no systematic and comprehensive tracking of investments in different types of energy networks relevant for the energy transition (Energiewende) in Germany at federal level and across different levels

Commitments	Summary assessment ([48])
	of government.
and affordable housing, taking into account regional disparities.	**Limited Progress** Several housing measures have been adopted, however the impact on housing investment may not necessarily be positive. A mechanism to control the increase in rents is planned to be extended until 2025, while some Länder are considering further accelerating rent controls. A new regulation regarding commission fees of real estate agents is intended to lead to a fairer distribution of the costs between the selling and buying parties. An act to strengthen housing benefits will enter into force in 2020 and will increase the reach and level of housing benefits including regular updates, with the next update scheduled in 2022. Taken together, it is not clear that these measures will improve housing investment. While they may have a temporary mitigating effect on rental price dynamics, in the longer run, prices and investment are also shaped by supply-side policies, and longer term outcomes are intimately linked to incentives to invest in housing.
Shift taxes away from labour to sources less detrimental to inclusive and sustainable growth.	**Limited Progress** While the reform of the solidarity surcharge will bring some relief, the tax system continues to rely heavily on taxes on labour, and there was limited progress in shifting the tax burden to sources less detrimental to inclusive and sustainable growth.
Strengthen competition in business services and regulated professions.	**No Progress** No measures have been taken to stimulate competition in business services and regulated professions in 2019. The only announced measures include legal amendments in order to comply with the ruling of the European Court of Justice on tariffs for architects and engineering services and in order to comply with a European regulation. Contrary to this, the federal government presented a draft law that will further stifle competition, as it conditions practicing 12 craft professions on having obtained a Master Craftsman's Certificate (Meisterpflicht). The new measure partly reverses the 2004 deregulation.
CSR 2: Reduce disincentives to work more hours, including the high tax wedge, in particular for low-wage and second earners. Take measures to safeguard the long-term sustainability of the pension system, while preserving adequacy. Strengthen the conditions that support higher wage growth, while respecting the role of the social partners. Improve	Germany has made **Some Progress** in addressing CSR 2

Commitments	Summary assessment ([48])
educational outcomes and skills levels of disadvantaged groups.	
Reduce disincentives to work more hours,	**Some Progress** Some measures were taken to reduce disincentives to work more hours, in partcular regarding taxes on labour. However, overall major disincentives remain in place.
including the high tax wedge, in particular for low-wage [earners]	**Some Progress** A number of measures taken on the social security contributions and tax brackets impact the tax wedge, however the overall reduction in 2019 and 2020 is limited. While the large-scale abolition of the solidarity surcharge from 2021 will have a noticeable impact, the tax wedge will still remain among the highest in the EU, and the tax and benefit system results in high marginal tax rates for certain groups of low wage earners.
and second earners.	**Limited Progress** Second earners also benefit from the slight reduction of the tax wedge and from the continuing expansion of childcare and all-day school facilities, the overall landscape is unchanged, with a tax system that results in high marginal tax rates for second earners and with persisting gaps in availability of quality and affordable early childhood education and care.
Take measures to safeguard the long-term sustainability of the pension system, while preserving adequacy.	**Limited Progress** The Pension Commission (Kommission Verlässlicher Generationenvertrag) continued its deliberations, with proposals expected in March 2020 on the future of the pension system after 2025. Considering the challenges of sustainability, adequacy and fairness, indeed appears to be need for action. The coalition government agreed on the introduction of a contribution-based minimum pension (Grundrente) in November 2019, that is expected to improve adequacy for certain groups, however, the related legislative act has not been adopted yet.
Strengthen the conditions that support higher wage growth, while respecting the role of the social partners.	**Some Progress** Overall wage growth has been so far resilient to the slowdown, yet it is expected to decelerate and converge closer to the euro area average. The minimum wage increase from 9.19 euros per hour in 2019 to 9.35 euros per hour in 2020 represents a nominal increase of about 1.7%, remaining below overall wage growth, and collective bargaining coverage stagnated in 2018, at relatively low level compared to the past.

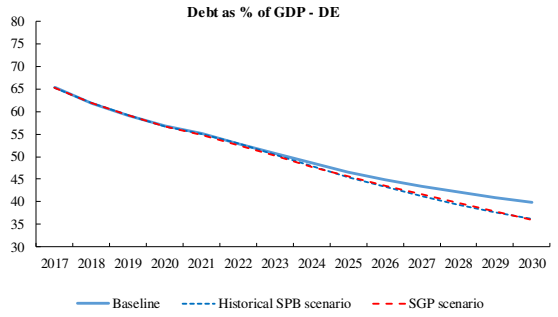
Commitments	Summary assessment ([48])
Improve educational outcomes and skills levels of disadvantaged groups.	**Limited Progress** Germany started in 2019 some promising reforms to improve upskilling and reskilling, yet there is further potential, and the degree of the challenge is underlined by the continuing strong impact of socio economic background on education outcomes, reflected in the OECD Programme for International Student Assessment (PISA) 2018 results where underachievement increased compared to 2015 in all disciplines, most importantly in reading. Germany increased in 2019 the investment in relevant research to improve educational justice. Whose impact on better education outcomes is still to materialise. Educational outcomes and skills levels of disadvantaged groups remained broadly unchanged.
Europe 2020 (national targets and progress)	
Employment rate of the population aged 20-64 years: 77%	79.9% in 2018 and 80.5% in the second quarter of 2019.
Employment rate of the population aged 55-64 years: 60%	71.4% in 2018 and 72.3% in the second quarter of 2019.
Employment rate of women: 73%	75.8% in 2018 and 76.2% in the second quarter of 2019.
R&D target: 3.0% of GDP by 2020 and 3.5% by 2025, of which one-third public and two-third private	3.13% in 2018 (preliminary data), of which about one-third public and two-third private.
Greenhouse gas (GHG) emissions target: -40% in 2020 compared with 1990, and by 80 to 95% by 2050 (in sectors not included in the EU emissions trading scheme)	In 2018, GHG emissions were 30.8% lower than in 1990.
Renewable energy target in gross final energy consumption 18% by 2020 and 60% by 2050	16.4% in 2018 (preliminary data)
Energy efficiency, indicative national: reduction of primary energy consumption by 20% by 2020, 30% by 2030, and by 50% by 2050, compared to 2008	Germany decreased its primary energy consumption between 2008 and 2018 by 9.9% (government estimation)
Early school leaving target: <10%.	At 10.3% in 2018, Germany is close to the European target and to the national target. Still, it has actually moved away from the target as in 2017 the early

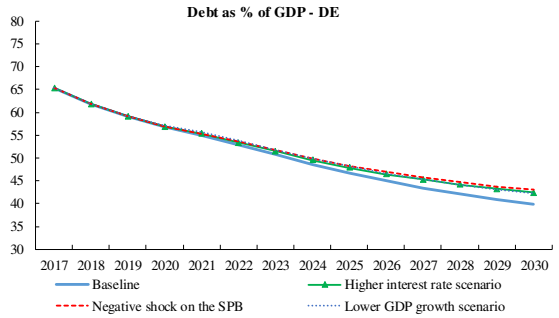
Commitments	Summary assessment ([48])
	school leaving rate was at 10.1%.
Tertiary education target: 40% (Europe 2020) or 42% (national target).	Germany is continuing to increase tertiary attainment, which stood at 34.9% in 2018 but remained below the EU average of 39.9% and the EU target of 40.7%. The national target of 42% also includes ISCED level 4 (unlike the EU target), and has thus been met (49.8% in 2018).
Target for reducing the number of people at risk of poverty or social exclusion, expressed as an absolute number of people: 20% reduction in the number of long-term unemployed by 2020 as compared with 2008 (i.e. reduction by 320,000 long-term unemployed).	The number of long-term unemployed people (LFS definition) fell from 1.63 million to 0.6 million between 2008 and 2018 (by about 63%).

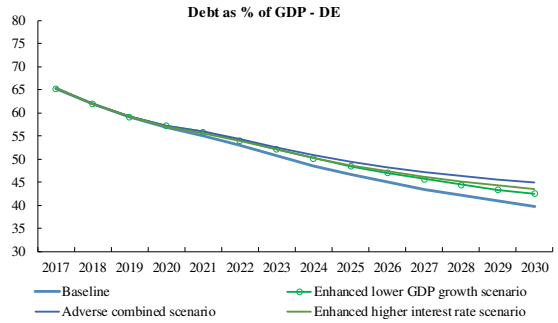
ANNEX B: COMMISSION DEBT SUSTAINABILITY ANALYSIS AND FISCAL RISKS

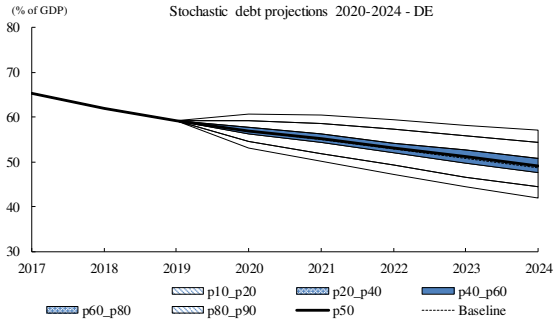
General government debt projections under baseline, alternative scenarios and sensitivity tests

DE - Debt projections baseline scenario	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Gross debt ratio	**61.9**	**59.2**	**56.8**	**55.0**	**52.9**	**50.8**	**48.6**	**46.7**	**45.0**	**43.5**	**42.1**	**40.9**	**39.8**
Changes in the ratio (-1+2+3)	*-3.4*	*-2.7*	*-2.4*	*-1.7*	*-2.1*	*-2.1*	*-2.2*	*-1.9*	*-1.7*	*-1.5*	*-1.4*	*-1.3*	*-1.1*
of which													
(1) Primary balance (1.1+1.2+1.3)	**2.8**	**2.1**	**1.4**	**0.9**	**0.9**	**0.9**	**0.9**	**0.8**	**0.6**	**0.5**	**0.4**	**0.3**	**0.1**
(1.1) Structural primary balance *(1.1.1-1.1.2+1.1.3)*	***2.4***	***2.0***	***1.5***	***1.2***	***1.1***	***1.0***	***0.9***	***0.8***	***0.6***	***0.5***	***0.4***	***0.3***	***0.1***
(1.1.1) Structural primary balance (bef. CoA)	*2.4*	*2.0*	*1.5*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*
(1.1.2) Cost of ageing					*0.2*	*0.4*	*0.5*	*0.7*	*1.0*	*1.2*	*1.4*	*1.6*	*1.7*
(1.1.3) Others (taxes and property incomes)					*0.1*	*0.1*	*0.2*	*0.3*	*0.4*	*0.5*	*0.5*	*0.6*	*0.6*
(1.2) Cyclical component	***0.6***	***0.1***	***-0.1***	***-0.3***	***-0.2***	***-0.1***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***
(1.3) One-off and other temporary measures	***-0.2***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***
(2) Snowball effect (2.1+2.2+2.3)	**-1.0**	**-0.6**	**-1.0**	**-0.8**	**-1.2**	**-1.2**	**-1.3**	**-1.1**	**-1.1**	**-1.0**	**-1.0**	**-1.0**	**-1.0**
(2.1) Interest expenditure	*0.9*	*0.9*	*0.8*	*0.7*	*0.6*	*0.5*	*0.4*	*0.3*	*0.3*	*0.2*	*0.2*	*0.2*	*0.2*
(2.2) Growth effect	*-1.0*	*-0.3*	*-0.6*	*-0.6*	*-0.8*	*-0.7*	*-0.7*	*-0.5*	*-0.4*	*-0.4*	*-0.3*	*-0.3*	*-0.3*
(2.3) Inflation effect	*-1.0*	*-1.2*	*-1.2*	*-1.0*	*-1.0*	*-1.0*	*-1.0*	*-1.0*	*-0.9*	*-0.9*	*-0.9*	*-0.8*	*-0.8*
(3) Stock-flow adjustments	**0.4**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**









Short term	Medium term	S1
LOW (S0 = 0.1)	LOW	LOW (S1 = -2.4)

Debt sustainability analysis (detail)

	Baseline	Historical SPB	Lower GDP growth	Higher interest rate	Negative shock on SPB	Stochastic projections
Risk category	LOW	LOW	LOW	LOW	LOW	LOW
Debt level (2030)	39.8	36.2	42.2	42.4	43.0	
Debt peak year	2019	2019	2019	2019	2019	
Percentile rank	35.0%	30.0%				
Probability debt higher						4.6%
Dif. between percentiles						15.2

DSA	S2	Long term
LOW	MEDIUM (S2 = 2.2)	MEDIUM

Note: For further information, see the European Commission Debt Sustainability Monitor (DSM) 2019.

[1] The first table presents the baseline no-fiscal policy change scenario projections. It shows the projected government debt dynamics and its decomposition between the primary balance, snowball effects and stock-flow adjustments. Snowball effects measure the net impact of the counteracting effects of interest rates, inflation, real GDP growth (and exchange rates in some countries). Stock-flow adjustments include differences in cash and accrual accounting, net accumulation of assets, as well as valuation and other residual effects.

[2] The charts present a series of sensitivity tests around the baseline scenario, as well as alternative policy scenarios, in particular: the historical structural primary balance (SPB) scenario (where the SPB is set at its historical average), the Stability and Growth Pact (SGP) scenario (where fiscal policy is assumed to evolve in line with the main provisions of the SGP), a higher interest rate scenario (+1 pp. compared to the baseline), a lower GDP growth scenario (-0.5 pp. compared to the baseline) and a negative shock on the SPB (calibrated on the basis of the forecasted change). An adverse combined scenario and enhanced sensitivity tests (on the interest rate and growth) are also included, as well as stochastic projections. Detailed information on the design of these projections can be found in the FSR 2018 and the DSM 2019.

[3] The second table presents the overall fiscal risk classification over the short, medium and long term.

a. For the short-term, the risk category (low/high) is based on the S0 indicator. S0 is an early-detection indicator of fiscal stress in the upcoming year, based on 25 fiscal and financial-competitiveness variables that have proven in the past to be leading indicators of fiscal stress. The critical threshold beyond which fiscal distress is signalled is 0.46.

b. For the medium term, the risk category (low/medium/high) is based on the joint use of the S1 indicator and of the DSA results. The S1 indicator measures the fiscal adjustment required (cumulated over the 5 years following the forecast horizon and sustained after that) to bring the debt-to-GDP ratio to 60 % by 2034. The critical values used are 0 and 2.5 pps of GDP. The DSA classification is based on the results of five deterministic scenarios (baseline, historical SPB, higher interest rate, lower GDP growth and negative shock on the SPB scenarios) and the stochastic projections. Different criteria are used such as the projected debt level, the debt path, the realism of fiscal assumptions, the probability of debt stabilisation, and the size of uncertainties.

c. For the long term, the risk category (low/medium/high) is based on the joint use of the S2 indicator and the DSA results. The S2 indicator measures the upfront and permanent fiscal adjustment required to stabilise the debt-to-GDP ratio over the infinite horizon, including the costs of ageing. The critical values used are 2 and 6 pps of GDP. The DSA results are used to further qualify the long term risk classification, in particular in cases when debt vulnerabilities are identified (a medium / high DSA risk category).

ANNEX C: STANDARD TABLES

Table C.1: **Financial market indicators**

	2014	2015	2016	2017	2018	2019
Total assets of the banking sector (% of GDP)(1)	266.5	253.0	248.6	237.6	232.5	249.5
Share of assets of the five largest banks (% of total assets)	32.1	30.6	31.4	29.7	29.1	-
Foreign ownership of banking system (% of total assets)(2)	4.4	4.4	7.1	6.9	11.0	12.3
Financial soundness indicators:(2)						
- non-performing loans (% of total loans)	3.9	3.0	2.6	1.8	1.4	1.3
- capital adequacy ratio (%)	17.3	17.9	18.1	18.8	18.4	18.0
- return on equity (%)(3)	2.5	1.7	2.2	2.9	2.4	3.8
Bank loans to the private sector (year-on-year % change)(1)	1.3	2.3	3.7	3.9	5.3	5.7
Lending for house purchase (year-on-year % change)(1)	2.4	3.5	3.7	4.0	4.6	5.0
Loan-to-deposit ratio(2)	97.5	94.6	92.6	89.4	90.2	87.6
Central bank liquidity as % of liabilities(1)	1.1	1.0	1.1	1.6	1.4	1.4
Private debt (% of GDP)	98.4	97.8	98.2	100.0	102.1	-
Gross external debt (% of GDP)(2) - public	48.9	43.9	40.1	34.4	31.4	32.5
- private	41.4	44.9	44.6	44.6	46.4	47.8
Long-term interest rate spread versus Bund (basis points)*	0.0	0.0	0.0	0.0	0.0	0.0
Credit default swap spreads for sovereign securities (5-year)*	12.7	7.7	11.5	8.1	5.7	5.9

(1) Latest data Q3 2019. Includes not only banks but all monetary financial institutions excluding central banks.
(2) Latest data Q2 2019.
(3) Quarterly values are annualized.
* Measured in basis points.
Source: European Commission (long-term interest rates); World Bank (gross external debt); Eurostat (private debt); ECB (all other indicators).

Table C.2: **Headline Social Scoreboard indicators**

	2014	2015	2016	2017	2018	2019 [5]
Equal opportunities and access to the labour market						
Early leavers from education and training (% of population aged 18-24)	9.5	10.1	10.3	10.1	10.3	:
Gender employment gap (pps)	9.1	8.7	8.2	7.9	8.1	8.1
Income inequality, measured as quintile share ratio (S80/S20)	5.1	4.8	4.6	4.5	5.1	:
At-risk-of-poverty or social exclusion rate(1) (AROPE)	20.6	20.0	19.7	19.0	18.7	:
Young people neither in employment nor in education and training (% of population aged 15-24)	6.4	6.2	6.7	6.3	5.9	:
Dynamic labour markets and fair working conditions						
Employment rate (20-64 years)	77.7	78.0	78.6	79.2	79.9	80.6
Unemployment rate(2) (15-74 years)	5.0	4.6	4.1	3.8	3.4	3.1
Long-term unemployment rate (as % of active population)	2.2	2.0	1.7	1.6	1.4	1.3
Gross disposable income of households in real terms per capita(3) (Index 2008=100)	104.5	105.9	107.7	109.1	111.1	:
Annual net earnings of a full-time single worker without children earning an average wage (levels in PPS, three-year average)	25935	26528	27040	:	:	:
Annual net earnings of a full-time single worker without children earning an average wage (percentage change, real terms, three-year average)	0.45	1.09	1.68	:	:	:
Public support / Social protection and inclusion						
Impact of social transfers (excluding pensions) on poverty reduction(4)	33.2	33.5	34.8	33.2	33.3	:
Children aged less than 3 years in formal childcare	27.5	25.9	32.6	30.3	29.8	:
Self-reported unmet need for medical care	1.6	0.5	0.3	0.3	0.2	:
Individuals who have basic or above basic overall digital skills (% of population aged 16-74)	:	67.0	68.0	68.0	:	:

(1) People at risk of poverty or social exclusion (AROPE): individuals who are at risk of poverty (AROP) and/or suffering from severe material deprivation (SMD) and/or living in households with zero or very low work intensity (LWI).
(2) Unemployed persons are all those who were not employed but had actively sought work and were ready to begin working immediately or within two weeks.
(3) Gross disposable household income is defined in unadjusted terms, according to the draft Joint Employment Report 2019.
(4) Reduction in percentage of the risk of poverty rate, due to social transfers (calculated comparing at-risk-of poverty rates before social transfers with those after transfers; pensions are not considered as social transfers in the calculation).
(5) Average of first three quarters of 2019 for the employment rate, unemployment rate and gender employment gap.
Source: Eurostat

Table C.3: **Labour market and education indicators**

Labour market indicators	**2014**	**2015**	**2016**	**2017**	**2018**	**2019** [5]
Activity rate (15-64)	77.7	77.6	77.9	78.2	78.6	79.1
Employment in current job by duration						
From 0 to 11 months	12.0	12.2	12.4	12.5	12.7	:
From 12 to 23 months	8.8	8.9	9.0	9.4	9.5	:
From 24 to 59 months	16.2	15.9	15.3	15.6	16.1	:
60 months or over	60.7	60.6	59.9	59.6	59.2	:
Employment growth* (% change from previous year)	0.9	0.9	1.2	1.4	1.4	1.0
Employment rate of women (% of female population aged 20-64)	73.1	73.6	74.5	75.2	75.8	76.5
Employment rate of men (% of male population aged 20-64)	82.2	82.3	82.7	83.1	83.9	84.6
Employment rate of older workers* (% of population aged 55-64)	65.6	66.2	68.6	70.1	71.4	72.3
Part-time employment* (% of total employment, aged 15-64)	26.5	26.8	26.7	26.9	26.8	27.2
Fixed-term employment* (% of employees with a fixed term contract, aged 15-64)	13.1	13.2	13.2	12.9	12.6	12.0
Transition rate from temporary to permanent employment (3-year average)	32.9	29.1	30.3	31.3	31.0	:
Youth unemployment rate (% active population aged 15-24)	7.7	7.2	7.1	6.8	6.2	5.8
Gender gap in part-time employment	37.8	38.0	37.9	37.5	37.4	37.7
Gender pay gap[2] (in undadjusted form)	22.3	22.0	21.5	21.0	:	:
Education and training indicators	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
Adult participation in learning (% of people aged 25-64 participating in education and training)	8.0	8.1	8.5	8.4	8.2	:
Underachievement in education[3]	:	17.2	:	:	21.1	:
Tertiary educational attainment (% of population aged 30-34 having successfully completed tertiary education)	31.4	32.3	33.2	34.0	34.9	:
Variation in performance explained by students' socio-economic status[4]	:	:	:	:	17.2	:

* Non-scoreboard indicator
(1) Long-term unemployed are people who have been unemployed for at least 12 months.
(2) Difference between the average gross hourly earnings of male paid employees and of female paid employees as a percentage of average gross hourly earnings of male paid employees. It is defined as "unadjusted", as it does not correct for the distribution of individual characteristics (and thus gives an overall picture of gender inequalities in terms of pay). All employees working in firms with ten or more employees, without restrictions for age and hours worked, are included.
(3) PISA (OECD) results for low achievement in mathematics for 15 year-olds.
(4) Impact of socio-economic and cultural status on PISA (OECD) scores. The value for 2018 refers to reading.
(5) Average of first three quarters of 2019. Data for youth unemployment rate is seasonally adjusted.
Source: Eurostat, OECD

Table C.4: **Social inclusion and health indicators**

	2013	2014	2015	2016	2017	2018
Expenditure on social protection benefits* (% of GDP)						
Sickness/healthcare	9.7	9.7	9.8	9.9	10.0	:
Disability	2.2	2.2	2.3	2.3	2.4	:
Old age and survivors	11.0	10.9	11.0	11.0	11.0	:
Family/children	3.2	3.1	3.2	3.2	3.3	:
Unemployment	1.1	1.1	1.0	1.0	1.0	:
Housing	0.6	0.6	0.6	0.6	0.6	:
Social exclusion n.e.c.	0.2	0.2	0.3	0.4	0.3	:
Total	28.0	27.9	28.1	28.4	28.5	:
of which: means-tested benefits	3.3	3.4	3.5	3.7	3.6	:
General government expenditure by function (% of GDP)						
Social protection	18.9	18.7	19.0	19.3	19.4	:
Health	7.0	7.1	7.1	7.1	7.1	:
Education	4.3	4.2	4.2	4.1	4.1	:
Out-of-pocket expenditure on healthcare	13.1	12.7	12.8	12.7	12.5	:
Children at risk of poverty or social exclusion (% of people aged 0-17)*	19.4	19.6	18.5	19.3	18.0	17.3
At-risk-of-poverty rate[1] (% of total population)	16.1	16.7	16.7	16.5	16.1	16.0
In-work at-risk-of-poverty rate (% of persons employed)	8.6	9.9	9.7	9.5	9.1	9.1
Severe material deprivation rate[2] (% of total population)	5.4	5.0	4.4	3.7	3.4	3.1
Severe housing deprivation rate[3], by tenure status						
Owner, with mortgage or loan	0.5	0.3	0.7	0.2	0.3	0.9
Tenant, rent at market price	3.0	3.6	3.2	3.8	3.5	4.1
Proportion of people living in low work intensity households[4] (% of people aged 0-59)	9.9	10.0	9.8	9.6	8.7	8.1
Poverty thresholds, expressed in national currency at constant prices*	10538	10447	10865	11106	11397	11612
Healthy life years						
Females	7.0	6.7	12.3	12.4	12.4	:
Males	7.0	6.8	11.4	11.5	11.4	:
Aggregate replacement ratio for pensions[5]	0.5	0.5	0.5	0.5	0.5	0.5
Connectivity dimension of the Digital Economy and Society Index (DESI)[6]	:	62.1	66.9	69.1	71.5	:
GINI coefficient before taxes and transfers*	51.7	51.6	51.5	50.8	50.0	:
GINI coefficient after taxes and transfers*	29.7	30.7	30.1	29.5	29.0	:

(1) At-risk-of-poverty rate (AROP): proportion of people with an equivalised disposable income below 60 % of the national equivalised median income.
(2) Proportion of people who experience at least four of the following forms of deprivation: not being able to afford to i) pay their rent or utility bills, ii) keep their home adequately warm, iii) face unexpected expenses, iv) eat meat, fish or a protein equivalent every second day, v) enjoy a week of holiday away from home once a year, vi) have a car, vii) have a washing machine, viii) have a colour TV, or ix) have a telephone.
(3) Percentage of total population living in overcrowded dwellings and exhibiting housing deprivation.
(4) People living in households with very low work intensity: proportion of people aged 0-59 living in households where the adults (excluding dependent children) worked less than 20 % of their total work-time potential in the previous 12 months.
(5) Ratio of the median individual gross pensions of people aged 65-74 relative to the median individual gross earnings of people aged 50-59.
(6) Fixed broadband take up (33%), mobile broadband take up (22%), speed (33%) and affordability (11%), from the Digital Scoreboard.
Source: Eurostat, OECD

Table C.5: **Product market performance and policy indicators**

Performance indicators	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Labour productivity per person[1] growth (t/t-1) in %						
Labour productivity growth in industry	-0.81	3.92	1.03	3.99	2.29	-0.42
Labour productivity growth in construction	-3.04	3.48	-0.26	0.93	-1.69	1.91
Labour productivity growth in market services	1.09	0.47	0.48	-0.50	0.89	0.45
Unit Labour Cost (ULC) index[2] growth (t/t-1) in %						
ULC growth in industry	4.24	-1.22	1.82	-1.68	-0.30	2.78
ULC growth in construction	2.78	-0.50	3.45	1.46	4.80	2.01
ULC growth in market services	0.38	3.21	3.20	3.43	2.70	3.23
Business environment	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Time needed to enforce contracts[3] (days)	394	459	479	499	499	499
Time needed to start a business[3] (days)	14.5	14.5	10.5	8.0	8.0	8.0
Outcome of applications by SMEs for bank loans[4]	0.17	0.58	0.35	0.38	0.18	0.34
Research and innovation	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
R&D intensity	2.84	2.88	2.93	2.94	3.07	3.13
General government expenditure on education as % of GDP	4.30	4.20	4.20	4.10	4.10	:
Employed people with tertiary education and/or people employed in S&T as % of total employment	43	43	44	45	45	45
Population having completed tertiary education[5]	25	23	24	24	25	25
Young people with upper secondary education[6]	77	77	77	78	78	77
Trade balance of high technology products as % of GDP	1.06	0.90	0.97	1.04	1.05	1.06
Product and service markets and competition	**2003**	**2008**	**2013**			**2018***
OECD product market regulation (PMR)[7], overall	1.80	1.41	1.29			1.08
OECD PMR[7], retail	3.38	2.88	2.71			0.48
OECD PMR[7], professional services[8]	3.03	2.82	2.65			2.41
OECD PMR[7], network industries[9]	1.87	1.33	1.27			1.08

***While the indicator values from 2003 to 2013 are comparable, the methodology has considerably changed in 2018. As a result, past vintages cannot be compared with the 2018 PMR indicators.**

(1) Value added in constant prices divided by the number of persons employed.
(2) Compensation of employees in current prices divided by value added in constant prices.
(3) The methodologies, including the assumptions, for this indicator are shown in detail here: http://www.doingbusiness.org/methodology.
(4) Average of the answer to question Q7B_a. "[Bank loan]: If you applied and tried to negotiate for this type of financing over the past six months, what was the outcome?". Answers were codified as follows: zero if received everything, one if received 75% and above, two if received below 75%, three if refused or rejected and treated as missing values if the application is still pending or don't know.
(5) Percentage population aged 15-64 having completed tertiary education.
(6) Percentage population aged 20-24 having attained at least upper secondary education.
(7) Index: 0 = not regulated; 6 = most regulated. The methodologies of the OECD product market regulation indicators are shown in detail here: http://www.oecd.org/competition/reform/indicatorsofproductmarketregulationhomepage.htm

(8) Simple average of the indicators of regulation for lawyers, accountants, architects and engineers.
(9) Aggregate OECD indicators of regulation in energy, transport and communications (ETCR).
Source: European Commission; World Bank — Doing Business (for enforcing contracts and time to start a business); OECD (for the product market regulation indicators); SAFE (for outcome of SMEs' applications for bank loans).

Table C.6: **Green growth**

Green growth performance		2013	2014	2015	2016	2017	2018
Macroeconomic							
Energy intensity	kgoe / €	0.12	0.11	0.11	0.11	0.11	-
Carbon intensity	kg / €	0.35	0.33	0.32	0.32	0.31	-
Resource intensity (reciprocal of resource productivity)	kg / €	0.49	0.50	0.46	0.45	0.45	0.44
Waste intensity	kg / €	-	0.14	-	0.14	-	-
Energy balance of trade	% GDP	-3.4	-2.8	-2.0	-1.5	-1.7	-2.0
Weighting of energy in HICP	%	12.40	11.94	11.78	10.36	10.47	10.37
Difference between energy price change and inflation	p.p.	3.2	-1.6	-6.1	-5.0	-0.2	1.3
Real unit of energy cost	% of value added	21.0	21.5	22.4	23.5	-	-
Ratio of environmental taxes to labour taxes	ratio	0.10	0.09	0.09	0.09	0.08	-
Environmental taxes	% GDP	2.1	2.0	1.9	1.9	1.8	1.8
Sectoral							
Industry energy intensity	kgoe / €	0.08	0.07	0.07	0.07	0.07	-
Real unit energy cost for manufacturing industry excl. refining	% of value added	17.6	18.3	19.4	20.5	-	-
Share of energy-intensive industries in the economy	% GDP	9.43	9.40	9.43	9.59	9.66	-
Electricity prices for medium-sized industrial users	€ / kWh	0.14	0.16	0.15	0.15	0.15	0.15
Gas prices for medium-sized industrial users	€ / kWh	0.05	0.04	0.04	0.03	0.03	0.03
Public R&D for energy	% GDP	0.05	0.05	0.04	0.04	0.04	0.05
Public R&D for environmental protection	% GDP	0.03	0.03	0.03	0.02	0.03	0.03
Municipal waste recycling rate	%	63.8	65.6	66.7	67.1	67.2	67.3
Share of GHG emissions covered by ETS*	%	51.1	51.4	50.6	49.9	48.4	48.9
Transport energy intensity	kgoe / €	0.57	0.59	0.58	0.60	0.61	-
Transport carbon intensity	kg / €	0.79	0.79	0.81	0.83	0.85	0.82
Security of energy supply							
Energy import dependency	%	63.0	61.9	62.2	63.7	63.9	-
Aggregated supplier concentration index	HHI	15.0	15.2	18.1	25.1	25.7	-
Diversification of energy mix	HHI	24.7	24.6	24.6	24.7	24.9	-

All macro intensity indicators are expressed as a ratio of a physical quantity to GDP (in 2010 prices)
Energy intensity: gross inland energy consumption (in kgoe) divided by GDP (in EUR)
Carbon intensity: greenhouse gas emissions (in kg CO2 equivalents) divided by GDP (in EUR)
Resource intensity: domestic material consumption (in kg) divided by GDP (in EUR)
Waste intensity: waste (in kg) divided by GDP (in EUR)
Energy balance of trade: the balance of energy exports and imports, expressed as % of GDP.
Weighting of energy in HICP: the proportion of 'energy' items in the consumption basket used for the construction of the HICP.
Difference between energy price change and inflation: energy component of HICP, and total HICP inflation (annual % change).
Real unit energy cost: real energy costs as % of total value added for the economy.
Industry energy intensity: final energy consumption of industry (in kgoe) divided by gross value added of industry (in 2010 EUR).
Real unit energy costs for manufacturing industry excluding refining: real costs as % of value added for manufacturing sectors.
Share of energy-intensive industries in the economy: share of gross value added of the energy-intensive industries in GDP.
Electricity and gas prices for medium-sized industrial users: consumption band 500–20 00MWh and 10 000 -100 000 GJ; figures excl. VAT.
Recycling rate of municipal waste: ratio of recycled and composted municipal waste to total municipal waste.
Public R&D for energy or for the environment: government spending on R&D for these categories as % of GDP.
Proportion of GHG emissions covered by EU emissions trading system (ETS) (excluding aviation): based on GHG emissions. (excl. land use, land use change and forestry) as reported by Member States to the European Environment Agency.
Transport energy intensity: final energy consumption of transport activity including international aviation (kgoe) divided by gross value added in transportation and storage sector (in 2010 EUR).
Transport carbon intensity: GHG emissions in transportation and storage sector divided by gross value added in transportation and storage sector (in 2010 EUR).
Energy import dependency: net energy imports divided by gross inland energy consumption incl. consumption of international bunker fuels.
Aggregated supplier concentration index: Herfindahl index covering oil, gas and coal. Smaller values indicate larger diversification and hence lower risk.
Diversification of the energy mix: Herfindahl index covering natural gas, total petrol products, nuclear heat, renewable energies and solid fuels. Smaller values indicate larger diversification.
* European Commission and European Environment Agency - 2018 provisional data.
Source: European Commission and European Environment Agency (Share of GHG emissions covered by ETS); European Commission (Environmental taxes over labour taxes and GDP); Eurostat (all other indicators).

ANNEX D: INVESTMENT GUIDANCE ON JUST TRANSITION FUND 2021-2027 FOR GERMANY

Building on the Commission proposal, this Annex ([49]) presents the preliminary Commission services' views on priority investment areas and framework conditions for effective delivery for the 2021-2027 Just Transition Fund investments in Germany. These priority investment areas are derived from a broader analysis of the territories facing serious socio-economic challenges deriving from the transition process towards a climate-neutral economy of the Union by 2050 in Germany, assessed in the report. This Annex provides the basis for a dialogue between Germany and the Commission services as well as the relevant guidance for the Member States in preparing their territorial just transition plans, which will form the basis for programming the Just Transition Fund. The Just Transition Fund investments complement those under Cohesion Policy funding for which guidance in the form of Annex D was given in the 2019 Country Report for Germany ([50]).

The area that will be most severely affected by the phasing-out of coal mining for electricity generation and the structural transition to a climate neutral and circular economy is the Lausitzer Revier, which is located in Eastern Germany. It is comprised of seven regions (Elbe-Elster, Oberspreewald-Lausitz, Dahme-Spreewald, Spree-Neiße, and Cottbus situated in the Land Brandenburg, as well as Bautzen and Görlitz situated in the Land Saxony). In these regions, around 8,300 people are directly employed in lignite mining. 1.24% of the region's employed population (4,900 people in 2016) could be indirectly affected by the structural change.

A second affected area will be the Mitteldeutsches Revier, which is comprised of eight regions (Leipzig, the City of Leipzig, and Nordsachsen situated in the Land Saxony, and Burgenlandkreis, Saalekreis, the City of Halle, Mansfeld-Südharz, and Anhalt-Bitterfeld situated in the Land Saxony-Anhalt). Even though the share of directly employed (0.32% or 2,400 workers in 2016) and indirectly employed (0.2% or 1,400 workers) in the lignite sector is smaller, the Mitteldeutsches Revier will face challenges due to very low innovation and research potential and a rapidly aging population.

Finally, another affected area will be the Rheinisches Revier in the Land North-Rhine-Westphalia. There, 8,960 people are directly employed in lignite mining (1.13% of the working population in 2016) and 5,380 people could be at risk indirectly. The three most impacted regions in the Revier are Düren, Rhein-Erft-Kreis, and Rhein-Kreis Neuss.

Based on this preliminary assessment, it appears warranted that the Just Transition Fund concentrates its intervention on these areas, areas, while taking into account that the Rheinisches Revier has a stronger intrinsic capacity to adjust to the transition challenges.

The phasing-out of coal will lead to increased unemployment challenges in the geographical areas concerned. In order to tackle these transition challenges, investment needs have been identified to use the growth potential of companies existing in the areas in order to provide a significant number of alternative industrial jobs. Nevertheless, the economic structure of the three areas would need to be transformed considerably.

In order to tackle these challenges, priority investment needs have been identified for diversifying and making the regional economy more knowledge and service-based. Furthermore, investment needs for alleviating the socio-economic costs of the transition have been identified. The smart specialisation strategy[51] of the Länder provides an important framework to set priorities for innovation in support of

([49]) This Annex is to be considered in conjunction with the European Commission's proposal for a Regulation of the European Parliament and of the Council on the Just Transition Fund 2021-2027 (COM(2020)22) and its proposal for a Regulation of the European Parliament and of the Council laying down common provisions on the European Regional Development Fund, the European Social Fund Plus, the Cohesion Fund, and the European Maritime and Fisheries Fund and financial rules for those and for the Asylum and Migration Fund, the Internal Security Fund and the Border Management and Visa Instrument (COM(2020)23).

([50]) SWD(2019) 1004 final

economic transformation in the three Reviere. The Just Transition Fund could complement these efforts by targeting its actions in particular on:

- Productive investments in SMEs, including start-ups, leading to economic diversification and reconversion;
- Investments in the creation of new firms, including through business incubators and consulting services;
- Investments in research and innovation activities and fostering the transfer of advanced technologies;
- Investments in the deployment of technology and infrastructures for affordable clean energy, in greenhouse gas emission reduction, energy efficiency and renewable energy;
- Investments in digitalisation and digital connectivity;
- Investments in enhancing the circular economy, including through waste prevention, reduction, resource efficiency, reuse, repair and recycling;
- Upskilling and reskilling of workers;
- Active inclusion of jobseekers;
- Investment in regeneration and decontamination of sites, land restoration and repurposing projects and;
- Technical assistance.

ANNEX E: PROGRESS TOWARDS THE SUSTAINABLE DEVELOPMENT GOALS (SDGS)

Assessment of Germany's short-term progress towards the SDGs ([52])

Table E.1 shows the data for Germany and the EU-28 for the indicators included in the EU SDG indicator set used by Eurostat for monitoring progress towards the SDGs in an EU context ([53]). As the short-term trend at EU-level is assessed over a 5-year period, both the value at the beginning of the period and the latest available value is presented. The indicators are regularly updated on the SDI dedicated section of the Eurostat website.

Table E.1: **Indicators measuring Germany's progress towards the SDGs**

SDG / Sub-theme	Indicator	Unit	Germany				EU-28			
			Starting		Latest		Starting		Latest	
			year	value	year	value	year	value	year	value
SDG 1 – No poverty										
Multidimensional poverty	People at risk of poverty or social exclusion	% of population	2013	20.3	2018	18.7	2013	24.6	2018	21.9
	People at risk of income poverty after social transfers	% of population	2013	16.1	2018	16.0	2013	16.7	2018	17.1
	Severely materially deprived people	% of population	2013	5.4	2018	3.1	2013	9.6	2018	5.8
	People living in households with very low work intensity	% of population aged 0 to 59	2013	9.9	2018	8.1	2013	11.0	2018	8.8
	In-work at-risk-of-poverty rate	% of population aged 18 or over	2013	8.6	2018	9.1	2013	9.0	2018	9.5
Basic needs	Population living in a dwelling with a leaking roof, damp walls, floors or foundation or rot in window frames or floor	% of population	2013	13.1	2018	13.4	2013	15.6	2018	13.9
	Self-reported unmet need for medical care	% of population aged 16 or over	2013	1.6	2018	0.2	2013	3.7	2018	2.0
	Population having neither a bath, nor a shower, nor indoor flushing toilet in their household	% of population	2012	0.0	2017	0.0	2013	2.2	2018	1.7
	Population unable to keep home adequately warm	% of population	2013	5.3	2018	2.7	2013	10.7	2018	7.3
	Overcrowding rate	% of population	2013	6.7	2018	7.4	2013	17.0	2018	15.5
SDG 2 – Zero hunger										
Malnutrition	Obesity rate	% of population aged 18 or over	2008	15.8	2014	16.9	2014	15.9	2017	15.2
Sustainable agricultural production	Agricultural factor income per annual work unit (AWU)	EUR, chain linked volumes (2010)	2012	31 146	2017	33 443	2012	14 865	2017	17 304
	Government support to agricultural research and development	million EUR	2014	728.2	2019	905.6	2013	3 048.6	2018	3 242.5
	Area under organic farming	% of utilised agricultural area	2013	6.0	2018	7.3	2013	5.7	2018	7.5
	Gross nitrogen balance on agricultural land	kg per hectare	2012	75	2017	62	2010	49	2015	51
Environmental impacts of agricultural production	Ammonia emissions from agriculture	kg per ha of utilised agricultural area	2012	37.4	2017	38.3	2011	19.7	2016	20.3
	Nitrate in groundwater	mg NO_3 per litre	2012	23.2	2017	25.8	2012	19.2	2017	19.1
	Estimated soil erosion by water	km^2	2010	4 391.7	2016	4 150.5	2010	207 232.2	2016	205 294.5
	Common farmland bird index	index 2000 = 100	N/A	:	N/A	:	2013	83.9	2018	80.7
SDG 3 – Good health and well-being										
Healthy lives	Life expectancy at birth	years	2012	80.7	2017	81.1	2012	80.3	2017	80.9
	Share of people with good or very good perceived health	% of population aged 16 or over	2013	64.9	2018	65.5	2013	67.3	2018	69.2
Health determinants	Smoking prevalence	% of population aged 15 or over	2012	26	2017	25	2014	26	2017	26
	Obesity rate	% of population aged 18 or over	2008	15.8	2014	16.9	2014	15.9	2017	15.2
	Population living in households considering that they suffer from noise	% of population	2013	26.1	2018	27.8	2013	18.8	2018	18.3
	Exposure to air pollution by particulate matter ($PM_{2.5}$)	$\mu g/m^3$	2012	14.3	2017	12.7	2012	16.8	2017	14.1
Causes of death	Death rate due to chronic diseases	number per 100 000 persons aged less than 65	2011	121.4	2016	112.0	2011	132.5	2016	119.0
	Death rate due to tuberculosis, HIV and hepatitis	number per 100 000 persons	2011	2.2	2016	1.6	2011	3.4	2016	2.6
	People killed in accidents at work	number per 100 000 employed persons	2012	1.18	2017	0.89	2012	1.91	2017	1.65
	People killed in road accidents	number of killed people	2012	3 600	2017	3 180	2012	28 231	2017	25 257
Access to health care	Self-reported unmet need for medical care	% of population aged 16 or over	2013	1.6	2018	0.2	2013	3.7	2018	2.0

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([52]) Data extracted on 9 February 2020 from the Eurostat database (official EU SDG indicator set; see https://ec.europa.eu/eurostat/web/sdi/main-tables).

([53]) The EU SDG indicator set is aligned as far as appropriate with the UN list of global indicators, noting that the UN indicators are selected for global level reporting and are therefore not always relevant in an EU context. The EU SDG indicators have strong links with EU policy initiatives.

Table (continued)

SDG / Sub-theme	Indicator	Unit	Germany				EU-28			
			Starting		Latest		Starting		Latest	
			year	value	year	value	year	value	year	value
SDG 4 – Quality education										
Basic education	Early leavers from education and training	% of the population aged 18 to 24	2013	9.8	2018	10.3	2013	11.9	2018	10.6
	Participation in early childhood education	% of the age group between 4-years-old and the starting age of compulsory education	2012	96.5	2017	96.4	2012	94.0	2017	95.4
	Underachievement in reading	% of 15-year-old students	2015	16.2	2018	20.7	2015	19.7	2018	21.7
	Young people neither in employment nor in education and training	% of population aged 15 to 29	2013	8.7	2018	7.9	2013	15.9	2018	12.9
Tertiary education	Tertiary educational attainment	% of the population aged 30 to 34	2013	32.9	2018	34.9	2013	37.1	2018	40.7
	Employment rate of recent graduates	% of population aged 20 to 34	2013	89.7	2018	92.1	2013	75.4	2018	81.7
Adult education	Adult participation in learning	% of population aged 25 to 64	2013	7.9	2018	8.2	2013	10.7	2018	11.1
SDG 5 – Gender equality										
Gender-based violence	Physical and sexual violence to women experienced within 12 months prior to the interview	% of women	N/A	:	2012	8	N/A	:	2012	8
Education	Gender gap for early leavers from education and training	percentage points, persons aged 18–24	2013	0.9	2018	2.4	2013	3.4	2018	3.3
	Gender gap for tertiary educational attainment	percentage points, persons aged 30–34	2013	1.5	2018	0.9	2013	8.5	2018	10.1
	Gender gap for employment rate of recent graduates	percentage points, persons aged 20–34	2013	3.2	2018	4.1	2013	4.4	2018	3.4
Employment	Gender pay gap in unadjusted form	% of average gross hourly earnings of men	2012	22.7	2017	21.0	2012	17.4	2017	16.0
	Gender employment gap	percentage points, persons aged 20–64	2013	9.6	2018	8.1	2013	11.7	2018	11.6
	Gender gap in inactive population due to caring responsibilities	percentage points, persons aged 20–64	2013	27.9	2018	25.6	2013	25.5	2018	27.1
Leadership positions	Seats held by women in national parliaments and governments	% of seats	2014	36.6	2019	31.6	2014	27.2	2019	31.5
	Positions held by women in senior management	% of board members	2014	24.4	2019	33.3	2014	20.2	2019	27.8
SDG 6 – Clean water and sanitation										
Sanitation	Population having neither a bath, nor a shower, nor indoor flushing toilet in their household	% of population	2012	0.0	2017	0.0	2013	2.2	2018	1.7
	Population connected to at least secondary wastewater treatment	% of population	2011	95.5	2016	96.0	N/A	:	N/A	:
Water quality	Biochemical oxygen demand in rivers	mg O_2 per litre	N/A	:	N/A	:	2012	2.06	2017	2.00
	Nitrate in groundwater	mg NO_3 per litre	2012	23.2	2017	25.8	2012	19.2	2017	19.1
	Phosphate in rivers	mg PO_4 per litre	2012	0.068	2017	0.061	2012	0.096	2017	0.093
	Inland water bathing sites with excellent water quality	% of bathing sites with excellent water quality	2013	92.0	2018	94.1	2013	76.5	2018	80.8
Water use efficiency	Water exploitation index	% of long term average available water (LTAA)	2013	13.5	2016	13.0	N/A	:	N/A	:
SDG 7 – Affordable and clean energy										
Energy consumption	Primary energy consumption	million tonnes of oil equivalent (Mtoe)	2013	308.3	2018	291.8	2013	1 577.4	2018	1 551.9
	Final energy consumption	million tonnes of oil equivalent (Mtoe)	2013	221.0	2018	215.4	2013	1 115.5	2018	1 124.1
	Final energy consumption in households per capita	kgoe	2013	775	2018	667	2013	605	2018	552
	Energy productivity	EUR per kgoe	2013	8.1	2018	9.4	2013	7.6	2018	8.5
	Greenhouse gas emissions intensity of energy consumption	index 2000 = 100	2012	95.4	2017	93.6	2012	91.5	2017	86.5
Energy supply	Share of renewable energy in gross final energy consumption	%	2013	13.8	2018	16.5	2013	15.4	2018	18.0
	Energy import dependency	% of imports in gross available energy	2013	62.4	2018	63.6	2013	53.2	2018	55.7
Access to affordable energy	Population unable to keep home adequately warm	% of population	2013	5.3	2018	2.7	2013	10.7	2018	7.3

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Table (continued)

SDG / Sub-theme	Indicator	Unit	Germany				EU-28			
			Starting		Latest		Starting		Latest	
			year	value	year	value	year	value	year	value
SDG 8 – Decent work and economic growth										
Sustainable economic growth	Real GDP per capita	EUR per capita, chain-linked volumes (2010)	2014	33 930	2019	35 980	2013	25 750	2018	28 280
	Investment share of GDP	% of GDP	2013	19.9	2018	21.2	2013	19.5	2018	20.9
	Resource productivity	EUR per kg, chain-linked volumes (2010)	2013	2.06	2018	2.27	2013	1.98	2018	2.04
Employment	Young people neither in employment nor in education and training	% of population aged 15 to 29	2013	8.7	2018	7.9	2013	15.9	2018	12.9
	Employment rate	% of population aged 20 to 64	2013	77.3	2018	79.9	2013	68.4	2018	73.2
	Long-term unemployment rate	% of active population	2013	2.3	2018	1.4	2013	5.1	2018	2.9
	Gender gap in inactive population due to caring responsibilities	percentage points, persons aged 20–64	2013	27.9	2018	25.6	2013	25.5	2018	27.1
Decent work	People killed in accidents at work	number per 100 000 employed persons	2012	1.18	2017	0.89	2012	1.91	2017	1.65
	In-work at-risk-of-poverty rate	% of population	2013	8.6	2018	9.1	2013	9	2018	9.5
SDG 9 – Industry, innovation and infrastructure										
R&D and innovation	Gross domestic expenditure on R&D	% of GDP	2013	2.84	2018	3.13	2013	2.01	2018	2.12
	Employment in high- and medium-high technology manufacturing and knowledge-intensive services	% of total employment	2013	49.2	2018	50.6	2013	45.0	2018	46.1
	R&D personnel	% of active population	2013	1.44	2018	1.68	2013	1.15	2018	1.36
	Patent applications to the European Patent Office (EPO)	number	2012	21 930	2017	18 882	2012	56 772	2017	54 649
Sustainable transport	Share of buses and trains in total passenger transport	% of total inland passenger-km	2012	14.6	2017	14.4	2012	17.2	2017	16.7
	Share of rail and inland waterways in total freight transport	% of total inland freight tonne-km	2012	29.2	2017	26.6	2012	25.4	2017	23.3
	Average CO2 emissions per km from new passenger cars	g CO_2 per km	2013	136.1	2018	129.5	2014	123.4	2018	120.4
SDG 10 – Reduced inequalities										
Inequalities within countries	Relative median at-risk-of-poverty gap	% distance to poverty threshold	2013	20.4	2018	22.0	2013	23.8	2018	24.6
	Income distribution	income quintile share ratio	2013	4.6	2018	5.1	2013	5.0	2018	5.2
	Income share of the bottom 40 % of the population	% of income	2013	21.8	2018	21.2	2013	21.1	2018	21.0
	People at risk of income poverty after social transfers	% of population	2013	16.1	2018	16.0	2013	16.7	2018	17.1
Inequalities between countries	Purchasing power adjusted GDP per capita	Real expenditure per capita (in PPS)	2013	33 100	2018	37 800	2013	26 800	2018	31 000
	Adjusted gross disposable income of households per capita	Purchasing power standard (PPS) per inhabitant	2013	25 848	2018	29 258	2013	20 392	2018	22 824
	Financing to developing countries	million EUR, current prices	2012	27 021	2017	43 832	2012	147 962	2017	155 224
	Imports from developing countries	million EUR, current prices	2013	144 909	2018	178 029	2013	817 475	2018	1 013 981
Migration and social inclusion	Asylum applications	Positive first instance decisions, per million inhabitants	2013	250	2018	916	2013	213	2018	424
SDG 11 – Sustainable cities and communities										
Quality of life in cities and communities	Overcrowding rate	% of population	2013	6.7	2018	7.4	2013	17.0	2018	15.5
	Population living in households considering that they suffer from noise	% of population	2013	26.1	2018	27.8	2013	18.8	2018	18.3
	Exposure to air pollution by particulate matter ($PM_{2.5}$)	$\mu g/m^3$	2012	14.3	2017	12.7	2012	16.8	2017	14.1
	Population living in a dwelling with a leaking roof, damp walls, floors or foundation or rot in window frames or floor	% of population	2013	13.1	2018	13.4	2013	15.6	2018	13.9
	Population reporting occurrence of crime, violence or vandalism in their area	% of population	2013	13.5	2018	13.3	2013	14.5	2018	12.7
Sustainable mobility	People killed in road accidents	number of killed people	2012	3 600	2017	3 180	2012	28 231	2017	25 257
	Share of buses and trains in total passenger transport	% of total inland passenger-km	2012	14.6	2017	14.4	2012	17.2	2017	16.7
Adverse environmental impacts	Settlement area per capita	m^2	2009	526.6	2015	564.8	2012	625.0	2015	653.7
	Recycling rate of municipal waste	% of total waste generated	2013	63.8	2018	67.3	2013	41.7	2018	47.0
	Population connected to at least secondary wastewater treatment	% of population	2011	95.5	2016	96.0	N/A	:	N/A	:

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Table (continued)

SDG / Sub-theme	Indicator	Unit	Germany				EU-28			
			Starting		Latest		Starting		Latest	
			year	value	year	value	year	value	year	value
SDG 12 – Responsible consumption and production										
Decoupling environmental impacts from economic growth	Consumption of toxic chemicals	million tonnes	N/A	:	N/A	:	2013	300.3	2018	313.9
	Resource productivity	EUR per kg, chain-linked volumes (2010)	2013	2.06	2018	2.27	2013	1.98	2018	2.04
	Average CO2 emissions per km from new passenger cars	g CO_2 per km	2013	136.1	2018	129.5	2014	123.4	2018	120.4
	Energy productivity	EUR per kgoe	2013	8.1	2018	9.4	2013	7.6	2018	8.5
Energy consumption	Primary energy consumption	million tonnes of oil equivalent (Mtoe)	2013	308.3	2018	291.8	2013	1 577.4	2018	1 551.9
	Final energy consumption	million tonnes of oil equivalent (Mtoe)	2013	221.0	2018	215.4	2013	1 115.5	2018	1 124.1
	Share of renewable energy in gross final energy consumption	%	2013	13.8	2018	16.5	2013	15.4	2018	18.0
Waste generation and management	Circular material use rate	% of material input for domestic use	2012	10.7	2017	11.6	2012	11.5	2017	11.7
	Generation of waste excluding major mineral wastes	kg per capita	2012	1 810	2016	1 897	2012	1 716	2016	1 772
	Recycling rate of waste excluding major mineral wastes	% of total waste treated	2010	55	2014	53	2012	55	2016	57
SDG 13 – Climate action										
Climate mitigation	Greenhouse gas emissions	index 1990 = 100	2012	75.2	2017	74.1	2012	82.1	2017	78.3
	Greenhouse gas emissions intensity of energy consumption	index 2000 = 100	2012	95.4	2017	93.6	2012	91.5	2017	86.5
	Primary energy consumption	million tonnes of oil equivalent (Mtoe)	2013	308.3	2018	291.8	2013	1 577.4	2018	1 551.9
	Final energy consumption	million tonnes of oil equivalent (Mtoe)	2013	221.0	2018	215.4	2013	1 115.5	2018	1 124.1
	Share of renewable energy in gross final energy consumption	%	2013	13.8	2018	16.5	2013	15.4	2018	18.0
	Average CO2 emissions per km from new passenger cars	g CO_2 per km	2013	136.1	2018	129.5	2014	123.4	2018	120.4
Climate impacts	European mean near surface temperature deviation	temperature deviation in °C, compared with the 1850–1899 average	N/A	:	N/A	:	2013	1.4	2018	2.1
	Climate-related economic losses	EUR billion, in 2017 values	N/A	:	N/A	:	2012	2 719	2017	2 649
	Mean ocean acidity	pH value	N/A	:	N/A	:	2013	8.06	2018	8.06
Support to climate action	Contribution to the international 100bn USD commitment on climate related expending	EUR million, current prices	N/A	:	2017	6 729.6	N/A	:	2017	20 388.7
SDG 14 – Life below water										
Ocean health	Coastal water bathing sites with excellent water quality	% of bathing sites with excellent water quality	2013	79.0	2018	85.5	2013	85.5	2018	87.1
	Mean ocean acidity	pH value	N/A	:	N/A	:	2013	8.06	2018	8.06
Marine conservation	Surface of marine sites designated under NATURA 2000	km^2	2013	25 604	2018	25 603	2013	251 566	2018	551 899
Sustainable fisheries	Estimated trends in fish stock biomass	index 2003 = 100	N/A	:	N/A	:	2012	110.0	2017	136.0
	Assessed fish stocks exceeding fishing mortality at maximum sustainable yield (Fmsy)	% of stocks exceeding fishing mortality at maximum sustainable yield ($F>F_{MSY}$)	N/A	:	N/A	:	2012	52.9	2017	42.7
SDG 15 – Life on land										
Ecosystems status	Share of forest area	% of total land area	2009	30.9	2015	32.2	2012	40.3	2015	41.6
	Biochemical oxygen demand in rivers	mg O_2 per litre	N/A	:	N/A	:	2012	2.06	2017	2.00
	Nitrate in groundwater	mg NO_3 per litre	2012	23.2	2017	25.8	2012	19.2	2017	19.1
	Phosphate in rivers	mg PO_4 per litre	2012	0.068	2017	0.061	2012	0.096	2017	0.093
Land degradation	Soil sealing index	index 2006 = 100	2009	101.2	2015	103.2	2009	101.7	2015	104.2
	Estimated soil erosion by water	km^2	2010	4 391.7	2016	4 150.5	2010	207 232.2	2016	205 294.5
	Settlement area per capita	m^2	2009	526.6	2015	564.8	2012	625.0	2015	653.7
Biodiversity	Surface of terrestrial sites designated under NATURA 2000	km^2	2013	55 142	2018	55 214	2013	787 766	2018	784 252
	Common bird index	index 2000 = 100	N/A	:	N/A	:	2013	94.7	2018	93.5
	Grassland butterfly index	index 2000 = 100	N/A	:	N/A	:	2012	72.2	2017	74.1

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Table (continued)

SDG / Sub-theme	Indicator	Unit	Germany				EU-28			
			Starting		Latest		Starting		Latest	
			year	value	year	value	year	value	year	value
SDG 16 – Peace, justice and strong institutions										
Peace and personal security	Death rate due to homicide	number per 100 000 persons	2011	0.5	2016	0.5	2011	0.9	2016	0.6
	Population reporting occurrence of crime, violence or vandalism in their area	% of population	2013	13.5	2018	13.3	2013	14.5	2018	12.7
	Physical and sexual violence to women experienced within 12 months prior to the interview	% of women	N/A	:	2012	8	N/A	:	2012	8
Access to justice	General government total expenditure on law courts	million EUR	2012	11 037	2017	12 914	2012	48 381	2017	51 027
	Perceived independence of the justice system	% of population	2016	69	2019	74	2016	52	2019	56
Trust in institutions	Corruption Perceptions Index	score scale of 0 (highly corrupt) to 100 (very clean)	2013	78	2018	80	N/A	:	N/A	:
	Population with confidence in the EU Parliament	% of population	2013	41	2018	60	2013	39	2018	48
SDG 17 – Partnerships for the goals										
Global partnership	Official development assistance as share of gross national income	% of GNI	2013	0.38	2018	0.63	2013	0.43	2018	0.48
	EU financing to developing countries	million EUR, current prices	2012	27 021	2017	43 832	2012	147 962	2017	155 224
	EU imports from developing countries	million EUR, current prices	2013	144 909	2018	178 029	2013	817 475	2018	1 013 981
Financial governance within the EU	General government gross debt	% of GDP	2013	78.7	2018	61.9	2013	86.3	2018	80.4
	Shares of environmental and labour taxes in total tax revenues	% of total tax revenues	2013	5.4	2018	4.5	2013	6.4	2018	6.1

Source: Eurostat

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