Outlook for the German economy for 2022 to 2024

The German economy is withstanding the headwinds of Russia's war against Ukraine, high inflation and supply bottlenecks. Even so, owing to these factors, its recovery is considerably more muted than was assumed in the December projection. In the baseline scenario of the projection, it is assumed, that the conflict with Russia will not intensify any further. In an adverse risk scenario including a cessation of Russian energy supplies, by contrast, economic activity would experience a pronounced decline.

The German economy is caught between opposing forces. As the pandemic containment measures have largely been rolled back, service providers and private consumption are receiving a strong boost. On the other hand, the steep rise in energy prices resulting from the war in Ukraine is driving up the already high inflation rate, eroding households' purchasing power. Increased supply bottlenecks are throttling production and exports are also suffering from weaker demand. Upward forces gain more of an upper hand from the second half of 2022. Energy commodity prices decrease somewhat, supply bottlenecks gradually ease, foreign demand increases again and private consumption is buoyed by the depletion of some of the savings accumulated during the coronavirus pandemic. Additional government defence spending provides consistent stimulus.

Under these conditions, the German economy is projected to grow by around 2% in 2022, by approximately 2½% in 2023 and by just under 2% in 2024, the year in which it will thus reach its potential output. The labour market will remain on an upward trajectory, with wages rising sharply, but the high level of inflation only being partially offset initially.

At around 7% in the current year, inflation as measured by the Harmonised Index of Consumer Prices (HICP) will even be somewhat higher still than at the start of the 1980s. This is mainly due to the rapid rise in the prices of energy and food commodities. However, the core rate (excluding energy and food) could also come in well above average, at around 3½%. Alongside sharply higher commodity prices, supply bottlenecks are the main factor driving prices. These effects are expected to diminish over the projection horizon. At the same time, though, pressure from labour costs will remain high, and the transition to a climate-neutral economy will generate further costs. On balance, inflation will decline markedly. However, headline and core inflation rates are likely to remain elevated at around 2½% even into 2024. Compared with the December 2021 outlook, the inflation rate has been revised upwards for all of the years under review.

General government deficit and debt ratios will decline distinctly over the projection horizon, largely because coronavirus-related fiscal burdens will expire. These will outweigh deficit-increasing fiscal policy measures related to the high energy costs, the war in Ukraine and climate change.

The risks to economic activity are tilted to the downside, chiefly due to the uncertainties surrounding the war in Ukraine. With regard to inflation, the upside risks predominate. These risks already partly materialised after the projection was finalised. On account of the surprisingly high inflation momentum in May, the annual average HICP rate for 2022 could amount to 7¾%, as things currently stand.

Economic outlook[1]

German economy proved surprisingly robust in Q4 2021 and Q1 2022

The German economy contracted marginally in the last quarter of 2021 and the first quarter of 2022, proving itself to be more robust than anticipated in the December projection[2] – all the more so considering the additional strains posed by the surprisingly high level of inflation and the Russian war of aggression against Ukraine. The exact repercussions of the Omicron wave of the coronavirus were still barely predictable, especially as little was known about its characteristics when the projection was finalised at the start of December.[3] Overall, the pandemic is likely to have had somewhat less of a dampening effect on economic activity than assumed at the time. Industry, which managed to expand production considerably before the outbreak of the war, also fared surprisingly well, benefiting from an initial easing of restrictions imposed by supply bottlenecks for intermediate products. Construction, too, saw stronger growth than expected, receiving a large boost in the winter months on account of the mild weather.

At present, the German economy is caught between opposing forces. The large-scale rollback of pandemic containment measures is unleashing strong upward forces that are benefiting the previously beleaguered service providers in particular and thus giving related consumer spending a strong boost. This is being counteracted by multiple headwinds: the sharply higher energy prices resulting from the war in Ukraine are fuelling the already high level of inflation and weighing on both output at energy-intensive enterprises and households' purchasing power. The supply bottlenecks have already flared up again due to the impact of the war and arguably also because of how the pandemic is playing out in China. This is likely to have ripple effects on exports, amongst other things, which are facing the additional burdens of the sanctions imposed on Russia and weaker foreign demand. Lastly, there is no telling how the conflict will unfold and what impact it will have in future on consumers' lives and the economic environment. This uncertainty is weighing on the propensity to consume and invest. Additional government measures are buoying demand, meanwhile.

Boost to economy following rollback of pandemic containment measures; headwinds from effects of war, high inflation and exacerbated supply bottlenecks

All in all, the upward forces are likely to predominate slightly in the second quarter, and economic output could rise a little. This is indicated by the ifo Institute's latest survey results, which show that enterprises overall were distinctly more satisfied with their current business on average in April and May than they had been in the first quarter. The Bundesbank's weekly activity index (WAI), which includes high-frequency indicators such as the toll index and credit card payments available up to at least the end of May, points in the same direc-

Economic output likely to grow only slightly in second quarter …

June 2022 projection

Year-on-year percentage change

Item	2021	2022	2023	2024
Real GDP, calendar adjusted	2.9	1.9	2.4	1.8
Real GDP, unadjusted	2.9	1.8	2.2	1.8
Harmonised Index of Consumer Prices	3.2	7.1	4.5	2.6
Excluding energy and food	2.2	3.6	3.2	2.4

Source: Federal Statistical Office. Annual figures for 2022 to 2024 are Bundesbank projections.
Deutsche Bundesbank

1 This projection for Germany was finalised on 24 May 2022. It was incorporated into the projections for the euro area published by the ECB on 9 June 2022. As the new national accounts figures for the first quarter of 2022 were not published until 25 May 2022, the projections are based on the national accounts data of 25 February 2022. The gross domestic product (GDP) flash estimate of 29 April 2022 for the first quarter of 2022 is included, however.
2 The December 2021 projection had expected a somewhat clearer decline in real GDP. As the previous quarters of 2021 had been revised upwards as well, the observed lag in economic activity compared with the pre-pandemic level from the fourth quarter of 2019 was reduced to only 0.9% in the first quarter of 2022, while the December projection had assumed a level of 1.5%; see Deutsche Bundesbank (2021a).
3 At that time, it was therefore assumed that the Omicron variant would not have any material economic consequences beyond those already estimated for the pandemic.

tion.[4] By contrast, enterprises were still very gloomy about their expectations in May, which suggests that economic activity could come in significantly weaker. The discrepancy between firms' assessment of their expectations and the current situation does, however, reflect concerns about the impact of the war in Ukraine which have not fully materialised, at least not yet. As the baseline scenario of this projection builds on the assumption that the conflict does not intensify any further, the forward-looking indicators have only a limited effect. An alternative scenario assuming a significant exacerbation of the conflict with Russia – including a complete stoppage of Russian energy supplies – is described in the box on pp. 23 ff.

… before upward forces regain more of an upper hand and the economy sees stronger growth

From the second half of the year onwards, the upward forces under the assumptions made for this projection are likely to gain more of an upper hand again. The economy should therefore expand more robustly over the remainder of the projection horizon. Energy commodity prices, for example, will decline somewhat over the projection horizon, and the high inflation rate will decrease little by little. The headwinds caused by supply bottlenecks will gradually diminish as well. This will give a boost to exports, especially as foreign demand is once again on an expansionary path. It will also provide tailwinds for business investment, which – like private consumption – will benefit additionally from the decreasing uncertainty. At the same time, households are likely to spend at least some of the savings they involuntarily accumulated during the pandemic for additional consumption purposes.[5] Additional defence spending will provide stimulus over the entire projection horizon.

Economic recovery to continue in spite of headwinds, but considerably weaker than expected in December projection

Under these conditions, the German economy is projected to grow by 1.9% this year, 2.4% next year and 1.8% the year after. This means that the economic recovery will continue despite the considerable headwinds, albeit considerably more weakly than expected in the December 2021 projection. Real GDP will only exceed the pre-pandemic level from the final quarter of 2019 at the end of the current year, which is six months later than previously expected. Over the remainder of the projection horizon, too, the anticipated level of activity will be significantly lower than expected in the December projection. This downward revision is mainly due to the effects of the war on Ukraine, the already higher than expected rate of inflation and the more severe supply bottle-

Business situation and expectations in the economy as a whole

Balances, seasonally and calendar adjusted

Source: ifo Institute.
Deutsche Bundesbank

Revisions since the December 2021 projection

Year-on-year percentage change

Item	2022	2023	2024
GDP (real, calendar adjusted)			
June 2022 projection	1.9	2.4	1.8
December 2021 projection	4.2	3.2	0.9
Difference (in percentage points)	– 2.3	– 0.8	0.9
Harmonised Index of Consumer Prices			
June 2022 projection	7.1	4.5	2.6
December 2021 projection	3.6	2.2	2.2
Difference (in percentage points)	3.5	2.3	0.4

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4 See Deutsche Bundesbank (2022a). The WAI-implied GDP growth rate for the last 13 weeks shifted from negative values into slightly positive territory at the beginning of May.
5 With regard to the pandemic, it is assumed that there will be no setbacks over the projection horizon that impact significantly again on the aggregate economy.

Aggregate output and output gap

Price, seasonally and calendar adjusted

Source: Federal Statistical Office and Bundesbank calculations. 2022 to 2024 Bundesbank projections. **1** Deviation of annual average GDP from estimated potential output.

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Technical components of the GDP growth projection

% or percentage points

Item	2021	2022	2023	2024
Statistical carry-over at the end of the previous year[1]	2.2	1.1	0.9	0.7
Fourth-quarter rate[2]	1.8	1.7	2.2	1.7
Average annual GDP growth rate, calendar adjusted	2.9	1.9	2.4	1.8
Calendar effect[3]	0.0	– 0.1	– 0.2	0.0
Average annual GDP growth rate[4]	2.9	1.8	2.2	1.8

Source: Federal Statistical Office. Annual figures for 2022 to 2024 are Bundesbank projections. **1** Seasonally and calendar-adjusted index level in the fourth quarter of the previous year in relation to the calendar-adjusted quarterly average of the previous year. **2** Annual rate of change in the fourth quarter, seasonally and calendar adjusted. **3** As a percentage of GDP. **4** Discrepancies in the totals are due to rounding.

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necks, which arguably also relate to the renewed flare-up of the pandemic in China.

Economy likely to reach potential output at end-2023; macroeconomic capacity utilisation will only reach average level in 2024

The economy is likely to catch up with its potential output towards the end of next year. Accordingly, macroeconomic capacity utilisation will only return to more or less average levels in 2024. The growth rate of potential output is estimated at 0.9% for the current year, 1.0% for 2023 and 1.1% for 2024. These rates have thus been revised downwards for the period up to 2023. However, there is currently heightened uncertainty as to the extent to which the changed geopolitical and global economic conditions will also damage the performance of the German economy over the longer term as well.

Exports significantly burdened at first; strong catch-up effects once supply bottlenecks ease

Until February, exports were performing far better than expected in the December projection, especially as supply bottlenecks were easing more quickly. However, the outbreak of the war in Ukraine brought that development to an abrupt halt. Foreign demand weakened and exports to Russia plummeted in the wake of sanctions. In addition, the supply bottlenecks flared up again. According to business surveys, they will arguably dampen output more strongly in the second quarter.[6] This will presumably have ripple effects on exports, pushing them markedly below their winter level. From the second half of the year, though, enterprises are expecting the burdens caused by the supply bottlenecks to ease gradually.[7] Moreover, demand in German exporters' sales markets will begin to pick up again. This means that exports, too, will be back on an expansionary path – only tentatively at first, but then quite

6 Firms from the manufacturing sector were surveyed in March on the current and expected impact of supply bottlenecks on their production as part of the Bundesbank Online Panel Firms (BOP-F). See Deutsche Bundesbank (2022b).

7 See Deutsche Bundesbank (2022b). The assumption here is that the resultant dampening effects on production and exports will tail off by the end of 2023. In the survey of firms, participants expected on average that production would still be depressed by supply bottlenecks in 2024. However, they also anticipated catch-up effects from previous production losses, thus making a neutral effect overall seem plausible.

Underlying conditions for macroeconomic projections

This projection is based on assumptions made by Eurosystem experts about the global economy, exchange rates, commodity prices and interest rates. These were made on the basis of information available as at 17 May 2022. The assumptions regarding economic activity in the euro area are derived from projections from the national central banks of the euro area countries.[1] These projections incorporate those fiscal policy measures that have been either adopted or adequately specified and are deemed likely to be implemented.

With regard to the war in Ukraine and its ramifications, it is assumed that the conflict will not escalate further, but that existing sanctions will remain in force over the projection horizon.[2] Moreover, it is assumed that bottlenecks in the supply of intermediate inputs, caused in part by coronavirus containment measures and weighing on industry and world trade, will largely be resolved by the end of next year.

Global economic recovery dampened significantly by the ramifications of the war in Ukraine, amid high global price pressures

In the fourth quarter of last year, global economic growth was initially higher than expected in the December projection. By contrast, it was significantly weaker in the first quarter of this year. First, economic activity was throttled by the Russian war of aggression against Ukraine that was launched at the end of February, which pushed up numerous commodity prices and raised uncertainty. There was a lack of intermediate inputs due to production stoppages in Ukraine, and there were signs of shortages of some industrial raw materials produced there and in Russia. Owing to the sanctions that have been imposed, a sharp slump in Russian economic output is expected for the current year, and the war in Ukraine is likely to considerably weaken the Russian economy in the period thereafter, too.[3] Against this backdrop, the outlook for countries in geographical proximity to or that are highly dependent on energy imports from Russia also deteriorated significantly. Second, the spread of the Omicron variant of the coronavirus had a dampening effect. In China, strict containment measures were imposed starting in March. Business closures and the resulting logistical problems are likely to have a negative impact on global economic activity, especially in the current quarter.

In many countries around the world, the sharply rising prices of energy and other commodities as well as food are weighing on consumers and enterprises alike. While price pressures are expected to ease again over the projection horizon, the turmoil will, overall, contribute to a significant dampening of global economic activity both this year and next year compared with the December projection. The global economy excluding the euro area looks set to expand by 3½% in 2023 and 2024, respectively, following growth of 3% in 2022. At 4¼% this year, the uptick in international trade (excluding the euro area) will be slightly higher than the rise in global gross domestic product (GDP) and what had been

1 The projections made by the national central banks of the euro area countries were completed on 24 May 2022.
2 It is likely that the assumptions derived from crude oil futures prices already reflect certain expectations regarding import restrictions for Russian oil in the European Union, which recently reached an agreement to ban Russian oil imports by sea.
3 For information on the economic impact of the war in Ukraine on Russia, see Deutsche Bundesbank (2022c).

Major assumptions of the projection

Item	2021	2022	2023	2024
Exchange rates of the euro				
US dollar/euro	1.18	1.07	1.05	1.05
Effective[1]	120.8	116.7	116.1	116.1
Interest rates				
Three-month EURIBOR	– 0.6	0.0	1.3	1.6
Yield on government bonds outstanding[2]	– 0.3	0.8	1.2	1.2
Commodity prices				
Crude oil[3]	71.1	105.8	93.4	84.3
Natural gas[4]	46.6	98.8	80.9	62.9
Other commodities[5,6]	42.1	14.4	– 4.9	– 6.3
Food[6,7]	14.3	41.4	2.9	– 2.9
German exporters' sales markets[6,8]	10.4	3.5	2.9	3.7

1 Compared with 42 currencies of major trading partners of the euro area (EER-42 group of currencies); Q1 1999 = 100. **2** Yield on German government bonds outstanding with a residual maturity of over nine and up to ten years. **3** US dollars per barrel of Brent crude oil. **4** Euro per MWh. **5** In US dollars. **6** Year-on-year percentage change. **7** Producer prices for food in the euro area based on data from the European Commission. In euro. **8** Calendar adjusted.

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projected in the December outlook. However, this can be attributed to growth in the second half of last year. Expanding by 3% and 3¾% in 2023 and 2024, respectively, growth will subsequently lag behind December expectations.

War in Ukraine weighing heavily on the euro area recovery, high inflation rates eroding purchasing power

As expected, the economic recovery in the euro area slowed significantly in the last quarter of 2021 and the first quarter of 2022. The main factors straining the recovery were measures aimed at limiting the rapid spread of COVID-19, bottlenecks in the supply of intermediate inputs in the manufacturing sector and sharply rising energy and food prices. Uncertainty also increased in the context of the Ukraine war, which is likely to continue to cause enterprises and households to plan their spending cautiously. Given this overall situation, economic growth in the second and third quarters of 2022 is expected to be significantly weaker than assumed in the December projection. Macroeconomic momentum is likely to pick up again only as uncertainty decreases, supply bottlenecks are resolved and inflation rates go down. With growth rates of 3.2% in 2022 and 1.9% in 2023, economic growth in the euro area (excluding Germany) is expected to be significantly lower this year and next year than assumed in the December outlook. At 2.2%, the rate projected for 2024 is then slightly higher.

German exporters' sales markets are likely to see slower growth than world trade this year and next year. This is due, first, to the fairly major importance – relatively speaking – of the Russian and Ukrainian markets. Second, the EU economies that have close ties with Germany, in particular the eastern European EU Member States, are also being more adversely affected by the war in Ukraine.

Technical assumptions of the projection

Concerns surrounding supply tensions in the global oil market, coupled with robust demand, had caused crude oil prices to rise further as early as January and February. In January, gas prices initially decreased slightly from the peaks reached in December 2021 owing to mild weather conditions and increased imports of liquid gas from the United States. Following the start of the war in Ukraine, the prices of fossil fuels, some industrial metals and food commodities, such as wheat and corn, then soared. Russia and Ukraine are major exporters of these goods, meaning that fears of potential supply disruptions pushed prices to record highs. In the meantime, the prices of fossil fuels have dropped back down considerably. The assumptions derived from futures prices indicate that prices of energy and other commodities will fall over the

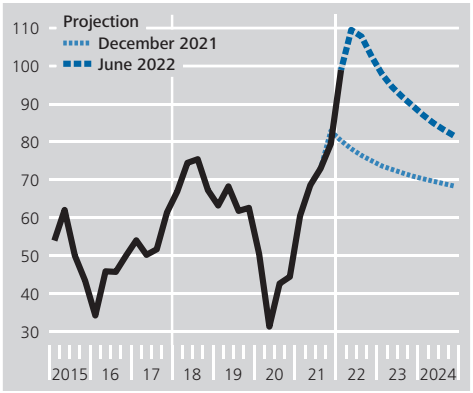
projection horizon. Nevertheless, they will remain significantly higher than the prices projected in December. Following their huge increase this year, agricultural producer prices in the euro area will continue to climb somewhat on average next year, before declining again in 2024.

The Eurosystem discontinued its net asset purchases under the pandemic emergency purchase programme (PEPP) at the end of March. In the same month, the ECB Governing Council also decided to scale back net asset purchases under the asset purchase programme (APP) at a faster pace than initially envisaged until they are discontinued in the third quarter of 2022. In addition, given that inflation rates are expected to remain high, the Governing Council will make any adjustments to the key ECB interest rates some time after the end of net purchases under the APP. In the money market, interest rates have risen in recent months, and EURIBOR futures are on a far steeper upward trajectory over the projection horizon than had been assumed in the December outlook. Against the backdrop of the higher short-term interest rates expected by market participants, yields on ten-year Federal bonds (Bunds) also went up significantly compared with December. In addition, the yield trajectory derived from futures prices will continue to increase over the projection horizon – similar to what was assumed in the December outlook but at a higher level. Higher financing costs are also expected for bank loans.

Expectations of an accelerated process of monetary policy normalisation in the United States and the anticipated economic consequences of the war in Ukraine for the euro area have caused the euro to depreciate since the start of the year. In the period underlying the exchange rate assumptions, the euro was trading at US$1.05, 7% lower than assumed in the December projection.

Oil price

US$ per barrel of Brent, quarterly averages



Sources: Bloomberg and ECB staff. Projections derived from forward quotations.

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Compared with 42 currencies of major trading partners, the euro depreciated by 2%.

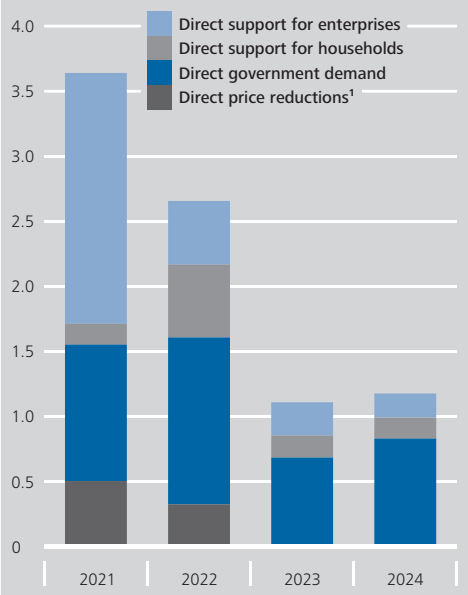
Fiscal policy responds to high energy prices and the war in Ukraine

On balance, fiscal policy measures will ease the burden on government finances over the projection horizon. On the one hand, government assistance measures adopted over the course of the pandemic and in view of high energy costs will gradually diminish in significance. On the other, spending on defence and climate change mitigation, in particular, will increase. It is also assumed that the bracket creep in income tax will continue to be offset in the coming years. The Federal Government has announced as much.

Expiring coronavirus measures will ease the pressure on the government budget this year. They will amount to only 1¼% of GDP, compared with 3¾% in 2021. This is because support measures for enterprises and households will be of only minor significance this year. By contrast, coronavirus-related healthcare expenditure will remain high. This mainly relates to spending on testing and vaccinations as well as compen-

Measures affecting the deficit that are directly linked to the COVID-19 pandemic, high energy costs and the Ukraine war*

As a percentage of GDP



* Bundesbank estimate. **1** VAT rate and energy tax rate cuts, stabilisation/abolishment of the renewable energy levy, and ticket price cut for local public transport.

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sation payments to hospitals. In 2023, this expenditure will have largely tapered off.

By contrast, new measures will put pressure on the general government budget. The aid provided to cushion the impact of higher energy costs will be reflected primarily in this year's budget, after which it will feature only minimally. The main forms of support that households will receive are a one-off energy price allowance, a bonus child benefit payment and means-tested one-off payments. Enterprises that are particularly affected by the high energy costs can, amongst other things, apply for financial support. In addition, fuel taxes and ticket prices for local public transport have been cut for three months. The renewable energy levy on the price of electricity will be abolished around the middle of the year. However, due to electricity prices remaining high and a sizeable amount of levy funds being available, this will not adversely affect the general government budget over the projection horizon.

The projection also includes significant hikes in expenditure in various areas. It is assumed that there will increasingly be outflows from the Armed Forces Special Fund – chiefly for the purchase of weapons. As a result, investment in machinery and equipment, in particular, is set to see strong growth over the projection horizon. In addition, expenditure on refugees as well as reconstruction assistance in Ukraine is envisaged. Spending on climate change mitigation will also rise significantly. Finally, pension expenditure will climb markedly over the projection horizon – despite various measures to curb spending.[4]

On the revenue side, accelerated write-offs of capital equipment and adjustments to the income tax scale will lower wage and income tax. In order to compensate for bracket creep, the income tax brackets (including the basic income tax allowance) will be shifted in 2023 and 2024 by the projected inflation rate of the respective previous year. In addition, revenue from the EU programme NextGenerationEU (NGEU) will decrease over the projection horizon.[5] By contrast, rising contribution rates for the social security funds will boost revenue: they will be raised by just over 1 percentage point in 2023 and 2024 combined. Health insurance scheme rates will increase, in particular. This will close the structural financing gap that was largely filled by central government recently. A small amount of additional revenue will come from trading CO_2 certificates and from this year's tobacco tax hike.

4 See Deutsche Bundesbank (2022d), pp. 81-82.
5 In Germany, NGEU is primarily used to finance existing programmes, thus reducing the general government deficit in this respect.

robustly as from the fourth quarter – on the back of the increasing normalisation of primary product procurement. These catch-up effects will expire in 2024, causing exports to lose momentum again. Over the projection horizon as a whole, German enterprises will have to tolerate certain losses in market share. Particularly in trade with its euro area partner countries, Germany will see its price competitiveness decline to some extent because its labour costs and prices will increase more steeply by comparison.

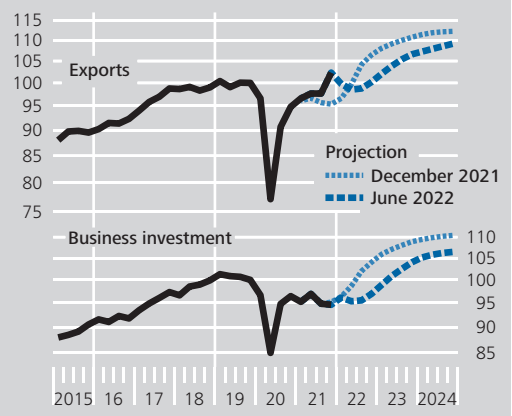
War in Ukraine, supply bottlenecks and higher interest rates delaying and dampening recovery of business investment

Business investment, too, was trending upwards until the outbreak of the war in Ukraine. In the first quarter, the previously upbeat output expectations and diminishing supply bottlenecks probably still outweighed the gloomier outlook at the start of the war and the associated uncertainty. However, there is likely to be a marked setback in the second quarter. This is indicated by forward-looking indicators such as the business climate of capital goods manufacturers, which deteriorated considerably in April and May, or the distinct decline in domestic orders they registered in March. Over the further course of the projection horizon, firms' propensity to invest should pick up again significantly as uncertainty recedes, supply bottlenecks gradually unwind, foreign demand rises and capacity utilisation increases. Moreover, investment projects related to the transition to a climate-neutral economy could bolster commercial investment. The less favourable financing conditions will be a source of headwinds throughout, however. All in all, the recovery in business investment will be noticeably delayed, with expected investment volumes constantly lagging behind the level anticipated in the December projection.

Private consumption declined markedly in the last quarter of 2021 and the first quarter of 2022 on account of pandemic-related burdens and high inflation. Although inflation came in considerably higher than had been anticipated in the December projection and did more to dampen households' purchasing power, the

Exports and business investment

Q4 2019 = 100, log scale,
price, seasonally and calendar adjusted



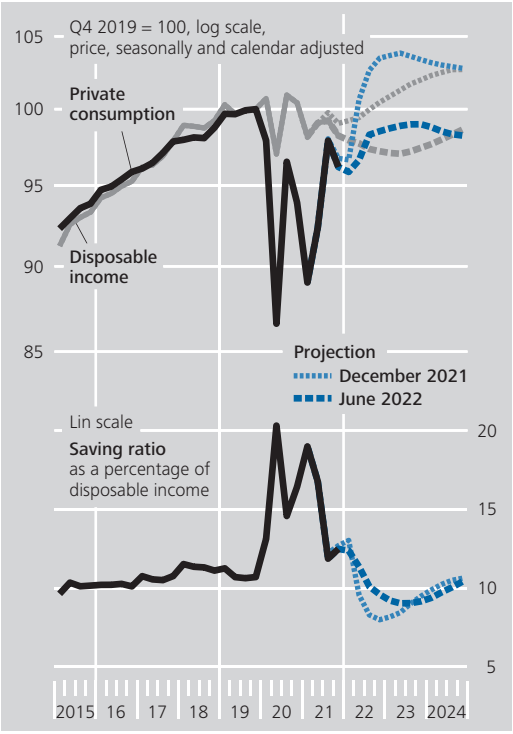
Sources: Federal Statistical Office and Bundesbank projections.
Deutsche Bundesbank

decline was roughly in line with the projection.[8] With the containment measures now largely lifted, private consumption should receive a strong boost from the second quarter onwards.[9] Consumption opportunities are now largely available without restrictions and are evidently also being utilised. This is indicated by, for example, the sharp rise in real sales in the hospitality industry in March and the further considerable improvement in the business situation in this sector in April and May. At the same time, however, the persistent high inflation represents a strong headwind. Not only is it reducing households' purchasing power. It is also weighing on their consumption sentiment, which is also being hurt by the uncertainties about how the war in Ukraine will play out.[10] Overall, however, the upward forces are likely to predominate and private consumption is likely to pick up significantly in the second and third quarters, albeit to a considerably lesser

Significant uptick in private consumption in Q2 and Q3 thanks to rollback of coronavirus containment measures, even if price-related losses in purchasing power and uncertainty have dampening effect

8 The repercussions of the pandemic were arguably somewhat less severe than previously feared.
9 Private consumption also recovered strongly over the past two years as the number of infections declined. As households' real disposable income has remained broadly stable during the pandemic so far – partly owing to government support – the saving ratio rose sharply during the previous waves of infection. Survey results indicate that involuntary savings were built up chiefly for pandemic-related reasons, i.e. the fear of infection and, in particular, the lack of opportunities for consumption. See Deutsche Bundesbank (2020, 2021b).
10 See Gesellschaft für Konsumforschung (2022).

Private consumption and saving ratio



Sources: Federal Statistical Office, Bundesbank calculations and Bundesbank projections.
Deutsche Bundesbank

extent than expected in the December projection.

Only modest private consumption growth envisaged thereafter

Growth in private consumption is expected to continue thereafter, though only at a moderate pace. Real disposable income will keep declining initially owing to the high inflation, only rising again gradually as inflation eases. Private consumption will be given a boost, by contrast, in the coming quarters from the further decline in the saving ratio. New survey results from the Bundesbank's Online Panel Households (BOP-HH) indicate that households still want to use part of the money they were forced to save during the pandemic for additional consumption expenditure (see the box on pp. 11 f.). However, the results also show that they will arguably treat these savings with greater caution. The resulting stimulus for private consumption is therefore significantly smaller than assumed in previous projections. In a reflection of this, the saving ratio will not drop as far below its pre-pandemic level, bottoming out in the middle of coming year before rising again.[11] This will counteract rising real income, leaving private consumption virtually unchanged at the end of the projection horizon.

Housing construction investment remains at a high level

Housing construction investment exceeded the expectations of the December projection markedly. In addition to the easing of materials shortages until February, it received a strong boost from the mild weather in the winter months. A return to the usual seasonal weather conditions in the second quarter is likely to cause a setback. Stiff headwinds also came from the renewed flare-up of supply bottlenecks for materials and raw materials as well as the very sharply increased construction prices. Demand was still brisk at the time of writing and should be bolstered by a robust labour market, also over the projection horizon. In addition, some of the savings built up involuntarily during the pandemic will be used to invest in real estate.[12] Lastly, housing construction investment, too, should benefit from the gradual easing of supply bottlenecks. However, with interest rates for construction at higher levels and households' purchasing power being eroded by the high inflation, household investment activity will face considerable headwinds over the projection horizon. The number of new households being formed is also rising at a slower rate (in net terms) due to demographic factors. Overall, having made a strong start to the year, housing construction investment is likely to continue to increase markedly this year. It should more or less maintain this high

11 According to the new BOP-HH survey results from March 2022, the saving ratio is likely to more or less return to its pre-pandemic level over the long run. The almost 5,400 survey participants, having been told to imagine that the pandemic was over for good, were then asked whether they would spend a similar share of their income on consumption in the long term as they did before the pandemic; see Deutsche Bundesbank (2022e). Three-quarters replied in the affirmative, while the remaining one-quarter were split almost equally, with 13% planning to increase their consumption ratio in the long term and 12% intending to reduce it. This therefore suggests the pandemic is unlikely to have a lasting impact on households' saving and consumption behaviour. Nevertheless, the projection assumes that the saving ratio will only return to its pre-pandemic level after the end of the projection horizon.
12 See the charts on pp. 12.

What are households using the additional savings accumulated during the coronavirus pandemic for?

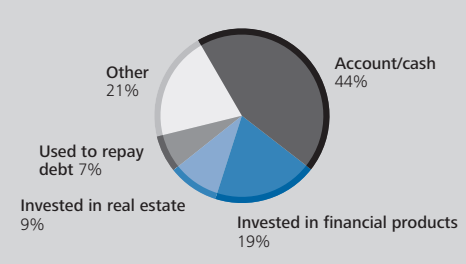
Private consumption has fluctuated significantly since the onset of the coronavirus pandemic. The waves of infection and the resulting protective measures caused consumers to scale back their consumption, mainly either for fear of contagion or because opportunities to consume were unavailable.[1] Because real disposable income remained broadly stable during this period – partly owing to government support measures – the household saving ratio rose exceptionally strongly. Until recently, it was still above its level before the outbreak of the pandemic. Since the first quarter of 2020, households have saved more each quarter than they probably would have done without the pandemic. These additional accumulated savings ("coronavirus savings") can be quantified by way of a comparison with the expectations from the December 2019 projection. This suggests that they now amount to roughly €185 billion.

Given that the measures taken to contain the pandemic were largely rolled back from the second quarter of 2022, private consumption should actually receive a major boost as the elevated saving ratio returns to normal and coronavirus savings are subsequently used up – at least to some extent.[2] This assessment has been backed up in the past by survey results from the Bundesbank Online Panel Households (BOP-HH).[3] However, the changes in the underlying conditions resulting from high inflation and the further impact of the war in Ukraine are placing a considerable strain on households and their consumption plans. And it is possible that consumers may have altered their plans above and beyond those factors, too. In order to assess the evolution of these savings and their impact on the projection for private consumption, households were once again asked about their consumption behaviour as part of the BOP-HH.[4] The results are based on responses received from 5,380 people between 15 and 30 March 2022, i.e. after the start of the war in Ukraine.

Just under one-third of respondents reported that, on average, they consumed a smaller share of their household income in the last two years during the coronavirus pandemic than in 2018 and 2019.[5] The coronavirus savings are therefore probably attributable to these households. When asked about the use of this additional disposable money, the majority of the respondents (weighted by household income) answered that they held it in the form of liquid funds (44%). This means that these funds are deposited in a current account or instant access savings account or held in cash. Respondents also used a total of 26% of the coronavirus savings for investment in

1 See Deutsche Bundesbank (2020, 2021b).
2 See Deutsche Bundesbank (2021a).
3 See Deutsche Bundesbank (2020, 2021b). For more information on the methodology of the BOP-HH, see Beckmann and Schmidt (2020). An updated version is being prepared for future publication as a Bundesbank Technical Paper.
4 See Deutsche Bundesbank (2022e).
5 One year ago, half of the respondents reported that they had, on average, more money left over at the end of the month in the past 12 months than before the pandemic; see Deutsche Bundesbank (2021b). Some households have therefore not accumulated any additional savings over the longer term, because of either increased consumption or reduced income since the last survey. In the current survey, the majority (55%) of respondents stated that, on average, they had consumed a similar share of their household income as before the pandemic; the saving ratio of the remaining 14% of respondents even declined.

Current uses of leftover coronavirus savings*



Source: Bundesbank Online Panel Households, March 2022. * Based on responses from 1,509 survey participants who stated that they spent, on average, a smaller share of their household income on consumption and were then asked "Please give a rough estimate of how you have spent this additional disposable money thus far." The responses were weighted by household income.

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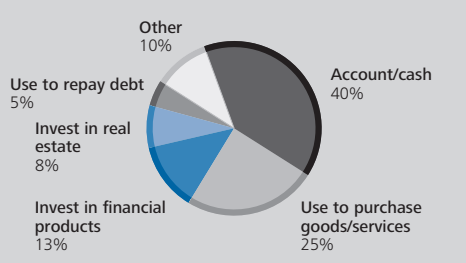
real estate or financial products and 9% for debt repayments.[6]

People who stated that their household held at least part of the additional leftover money in the form of liquid funds[7] were asked how they thought they would use this money over the next 12 months. The respondents replied that they intended to keep a large portion of these coronavirus savings (39%) in the form of liquid funds.[8] However, households are still also planning to spend one-quarter of this money on the purchase of goods and services. Roughly speaking, they are therefore likely to consume a total of around 11% (44% multiplied by 25%) of their remaining coronavirus savings held in the form of liquid funds between April 2022 and March 2023. If these consumption and saving preferences are extrapolated – i.e. over the next rolling 12-month period, one-quarter of the coronavirus savings available as liquid funds are always consumed and 39% are held in the form of liquid funds – households will consume around 16½% of coronavirus savings by the end of 2024.

Although this quantification confirms the assumption made in previous projections that private consumption will be given an additional boost by the depletion of coronavirus savings, the projected share has fallen by more than one-half compared with the estimate based on the last survey.[9] The results therefore suggest a certain, albeit limited, upward revision of the saving ratio over the projection horizon. Nevertheless, the ratio still looks set to temporarily "undershoot" its pre-pandemic level.

Future uses of leftover coronavirus savings*



Source: Bundesbank Online Panel Households, March 2022. * Based on responses from 1,076 survey participants who stated that they held at least part of their additional leftover money in cash or in a current/instant access savings account and were then asked "How do you think you will use this money over the next twelve months?" The responses were weighted by household income.

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6 "Other uses", which still accounted for 21% of the coronavirus savings, include gifts and donations, for example.
7 This applies to one-fifth of the respondents.
8 Against the backdrop of the war in Ukraine and the associated uncertainties – also with regard to the already high levels of inflation – this could indicate a certain tendency towards "precautionary saving". Ultimately, some cost increases, especially for energy expenditure (e.g. heating and electricity), will only take effect in the future.
9 Back then, this share was sandwiched between a lower bound of 25% and an upper bound of 45%; the midpoint of this range, 35%, was set as the baseline for the projection. See Deutsche Bundesbank (2021b).

level in the coming year. From the current perspective, it could rise again slightly, if at all, in 2024.

Government investment rising exceptionally sharply owing to military procurement

Real government investment is expected to rise at a very exceptionally strong rate in the projection due to increasing investment in military machinery and equipment.[13] In view of the sharp rise in prices, the nominal growth rates are higher still, especially in the current year.

Real government consumption dampened by waning COVID-19-related spending

Real government consumption for the current year is expected to remain virtually unchanged compared with 2021, as declining coronavirus-related health expenditure is offset, amongst other things, by rising current military spending, payments for topping up gas reserves and expenditure on refugees.[14] The year 2023 sees real government consumption drop significantly, with health spending in connection with coronavirus largely tapering off and war-related spending declining somewhat. In 2024, real government consumption will, predominantly, increase in step with the economy as a whole.

Considerable rise in imports

Imports rise significantly over the projection horizon, in line with total demand. To begin with, though, they are likely to suffer a noticeable setback in the current second quarter in the wake of declining exports and business investment. From the second half of the year onwards, the signs will again be pointing towards expansion, on the back of a renewed rise in export business and more vigorous investment, notably – though not only – in government machinery and equipment. Both of those things involve high import intensity intermediate goods, meaning that imports, too, will then see renewed strong growth. In addition, house-

13 In the projection, investment in machinery and equipment already rises steeply in the current year. However, the Armed Forces Special Fund, which was approved by the Bundestag after the projection was finalised, anticipates only very minimal expenditure in its economic plan for 2022. This suggests that compared with the projection, expenditure growth will be delayed. Overall, uncertainty is high about how the investment in machinery and equipment will evolve.

14 Nominal government consumption goes up substantially in 2022, its deflator growing to more than 4%.

Key figures of the macroeconomic projection

Year-on-year percentage change, calendar adjusted[1]

Item	2021	2022	2023
GDP (real)	2.9	1.9	2.4
GDP (real, unadjusted)	2.9	1.8	2.2
Components of real GDP			
Private consumption	0.1	3.7	1.6
Memo item: Saving ratio	15.0	10.9	9.1
Government consumption	3.1	0.1	– 2.4
Gross fixed capital formation	1.3	1.6	4.5
Business investment[2]	2.3	0.6	5.8
Private housing construction investment	1.1	1.1	0.0
Exports	9.8	0.8	5.2
Imports	9.1	2.8	3.1
Memo item: Current account balance[3]	7.5	4.1	4.8
Contributions to GDP growth[4]			
Domestic final demand	1.1	2.2	1.3
Changes in inventories	1.0	0.5	0.0
Exports	4.2	0.4	2.6
Imports	– 3.4	– 1.2	– 1.5
Labour market			
Total number of hours worked[5]	1.8	1.8	1.7
Employed persons[5]	0.0	1.3	0.3
Unemployed persons[6]	2.6	2.3	2.3
Unemployment rate[7]	5.7	5.0	4.9
Memo item: ILO unemployment rate[8]	3.6	3.0	3.0
Wages and wage costs			
Negotiated pay rates[9]	1.6	2.7	2.8
Gross wages and salaries per employee	3.5	4.3	4.5
Compensation per employee	3.4	4.0	4.5
Real GDP per employed person	2.8	0.6	2.1
Unit labour costs[10]	0.6	3.4	2.4
Memo item: GDP deflator	3.1	3.8	3.2
Consumer prices[11]	3.2	7.1	4.5
Excluding energy	2.4	4.4	3.9
Energy component	10.1	27.2	8.5
Excluding energy and food	2.2	3.6	3.2
Food component	3.0	7.8	6.5

Sources: Federal Statistical Office; Federal Employment Agency; Eurostat. 2022 to 2023, Bundesbank projections. **1** If calendar effects present. For unadjusted data, see the table on p. 30. **2** Private non-residential fixed capital formation. **3** As a percentage of nominal GDP. **4** In arithmetical terms, in percentage points. Discrepancies in the totals are due to rounding. **5** Domestic concept. **6** In millions of persons (Federal Employment Agency definition). **7** As a percentage of the civilian labour force. **8** Internationally standardised as per ILO definition, Eurostat differentiation. **9** Unadjusted figures, monthly basis. Pursuant to the Bundesbank's negotiated wage index. **10** Ratio of domestic compensation per employee to real GDP per employed person. **11** Harmonised Index of Consumer Prices (HICP), unadjusted figures.

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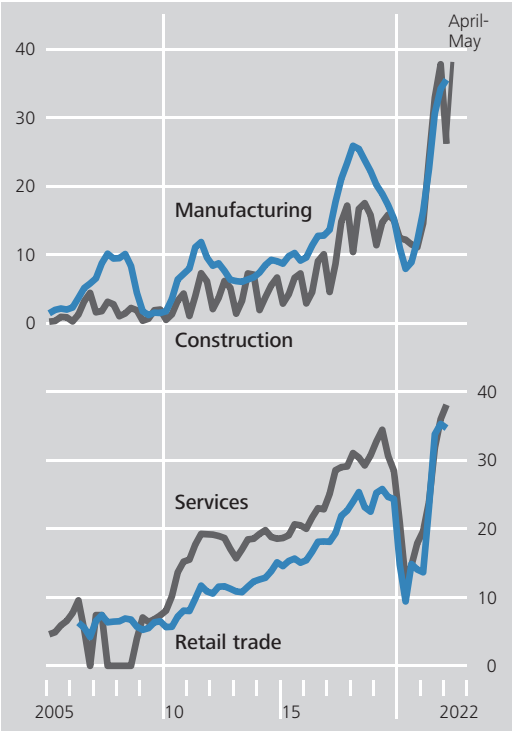
Production limited by labour shortages*

As a percentage of enterprises, quarterly



Source: ifo Institute and Bundesbank calculations. * Results based on the ifo Business Survey.
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hold demand will provide an added positive stimulus this year and a somewhat weaker one the next. Some of the additional savings accumulated during the pandemic are likely to give a boost to imports of services, for instance through higher spending on foreign travel. However, this effect is now assessed to be weaker than expected in the December projection. In 2024, import growth will slacken again somewhat.

Current account surplus to fall significantly below 5% of GDP

Germany's current account surplus will dwindle substantially this year, potentially coming in at just over 4% of GDP on an annual average, down from 7½% in 2021. This reflects, first and foremost, the hugely deteriorated terms of trade resulting from the sharply increased prices of energy and other imported raw materials. Looking at real trade flows, however, growth in exports, which is more depressed than imports, is also playing a part. This development will reverse to some extent over the remainder of the projection horizon, especially with exports rising steeply as supply bottlenecks ease. By contrast, in view of the assumptions made in the projection with regard to commodity prices and exchange rates, no recovery to speak of is expected when it comes to the terms of trade. As a result, the current account surplus will grow only slightly from its lower level in 2023. It could still be noticeably below 5%, but then somewhat higher than that in 2024 from today's perspective.

Labour market

Strong recovery in labour market in Q4 2021 and Q1 2022, despite weak economic activity

The labour market recovered strongly in the fourth quarter of 2021 and the first quarter of 2022, after the last projection had expected the recovery process to be interrupted due to the drop-off in economic activity. However, employment and unemployment improved unabated and were recently back at pre-pandemic levels. The number of vacancies rose substantially, and more firms are currently reporting difficulties in recruiting suitable staff than before the pandemic. Even so, recourse to short-time work rose moderately again around the turn of the year. Average hours worked per person in employment have arguably fallen in the past six months and are still markedly below the pre-pandemic level.

Weakness in the manufacturing sector and a shortage of labour supply among service providers will restrict further improvement in Q2 and Q3

The opposing forces currently affecting economic activity are also shaping the short-term outlook in the labour market and making it more uncertain. Now that most of the pandemic containment measures have been rolled back, the outlook in the services sector will improve, with short-time work likely to fall steeply there and hours worked expected to rise. However, labour shortages will prove an obstacle to a rapid expansion of employment. In addition, resurgent supply chain problems, the elevated uncertainty surrounding the war in Ukraine and high energy prices are dampening labour demand in the manufacturing sector. Employment growth is therefore expected to weaken overall in the second and third quarters of 2022

overall. Unemployment will arguably barely fall any further.

Substantial increase to the minimum wage in Q3 and Q4 2022 will exert moderate effect on employment

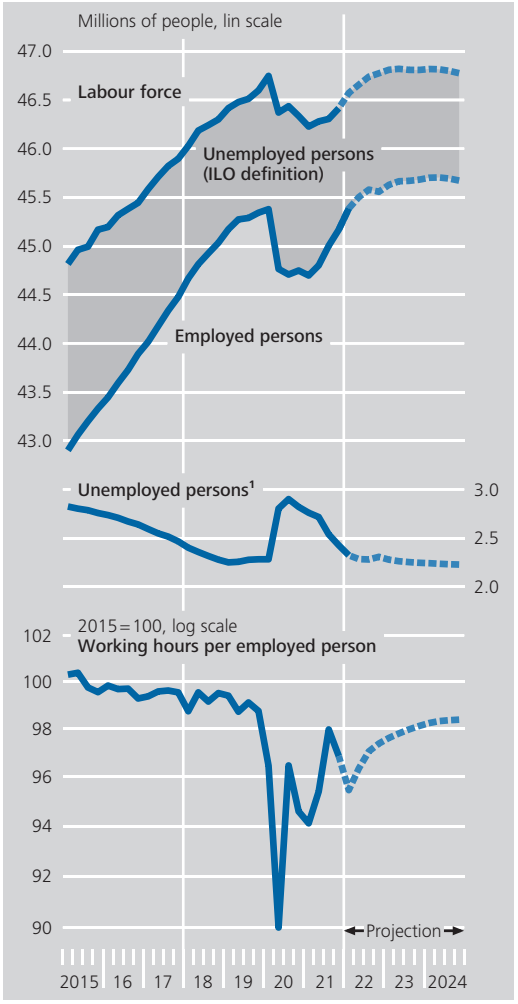
July and October 2022 will see the general statutory minimum wage rise in two stages to €12 per hour, leaving it around one-quarter higher in the fourth quarter than one year ago. This means that the fourth quarter alone will probably see the wage bill increase almost as sharply as it did when the minimum wage was introduced in 2015.[15] Back then, the adverse effects on employment were concentrated in the low-paid part-time employment segment. This group is likely to be affected most by adjustment responses this time around, too. However, there is reason to believe that fewer part-time casual positions ("mini-jobs") will be lost than in 2015. Labour shortages now extend into the unskilled labour segment. Furthermore, with major structural change under way in more productive sectors, even people who lose their jobs are quickly able to find a new one.[16] Moreover, entrepreneurs are arguably finding it easier in the current setting to push through price increases than it was in 2015. Nevertheless, there is likely to be a short-term blip in employment growth in the fourth quarter of 2022. Even so, unemployment will rise only marginally, as the people working in mini-jobs – who will bear the brunt – are either already registered as unemployed or are not seeking employment subject to social security contributions at all.

Immigration buoying labour supply

The labour force participation rate of the German population ought to recover quickly from its pandemic-induced dip.[17] Of late, the labour force was back to almost its pre-pandemic size. Demographic shifts in the domestic population, which have been under way for some time now, will continue to weigh on the labour supply over the projection horizon. Increased immigration could mitigate the high degree of labour market tightness that this entails. After the reduction in immigration brought about by the pandemic, certain catch-up effects were already in play in the second half of 2021. At 207,000, net immigration to Germany was around 60% higher than the reference figure from the pre-pandemic year of 2019.[18] Following the Russian military's invasion of Ukraine,

Labour market

Quarterly data, seasonally and calendar adjusted



Sources: Federal Statistical Office, Federal Employment Agency and Bundesbank projections. **1** Unemployment according to national definition (in accordance with Section 16 of the Third Book of the German Social Security Code *(Sozialgesetzbuch)*.

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15 See Deutsche Bundesbank (2022f).
16 See Dustmann et al. (2022).
17 During the pandemic, some workers exited the labour market (temporarily), remained in the education system for longer or ended their working life somewhat earlier than planned. It is to be assumed that this effect will disappear fairly quickly, as there has been no long-term, structural deterioration in the underlying labour market conditions. See Deutsche Bundesbank (2021c).
18 Immigration was thus also markedly higher than expected in the previous projection. Refugees, particularly from Syria and Afghanistan, accounted for a very considerable proportion of that increase, however. Labour-market integration is considerably less straightforward for such arrivals than in the case of labour-market oriented immigration, from other EU Member States for instance.

Germany is one of the countries where many Ukrainians are now seeking refuge. Whether this will produce a substantial increase in the labour supply is uncertain, however.[19] This projection reckons with a net total of 700,000 immigrants to Germany this year, and 300,000 persons per year from 2023.[20] Overall, the labour force is expected to grow further in 2023. From 2024 onwards, however, the negative demographic trend will regain the upper hand and the labour supply will shrink.

Little movement in employment and unemployment in 2023 and 2024; capacity remaining in terms of working hours per employed person

As early as 2023, labour supply is likely to be the limiting factor for employment growth. The number of people in employment will then increase only slightly and could peak in the course of 2024. Unemployment will barely get any lower over those two years. The integration of the many immigrants will counteract the reduction in worker unemployment. Moreover, the accelerated structural change brought about by digitalisation and shifts to other energy sources will generate frictions in the labour market. In terms of working hours per person in employment, in particular, there is capacity for expanding the number of hours worked. The volume of overtime hours is likely to increase further as the economy recovers. The weekly working hours of part-time workers have been on the rise for several years now and the figure for those in full-time employment is stable. The slight increase in part-time employment as a share of total employment continues to exert a counteractive effect. Given the tight labour market, however, hours worked are liable to rise in the medium term, too. With expanded opportunities for working from home and increasing childcare capacity, many employees could up their working hours.

Labour costs and prices

Wage settlements concluded since the beginning of the year have been comparatively moderate overall, when measured against the high rates of inflation. However, as the economy rebounds, wage bargainers are likely to agree on distinctly higher new settlements over the remainder of the year. New collective wage agreements for important sectors are due from the fourth quarter onwards, as wage bargainers in the chemicals and metal-working and electrical engineering industries negotiate salary increases. While the trade unions are looking for deals that fully offset the high rates of inflation, they will probably only come away with partial compensation at first.[21] Next year, too, when a major pay round is due, the continued high rates of inflation, along with the economic recovery and mounting labour shortages, are likely to contribute to stronger wage increases. On top of this, there is the potential for catch-up effects making up for the subdued wage increases contained in the collective wage agreements concluded during the pandemic. The year 2024 could see wage growth increase further still, mainly as a result of the intensifying labour market tightness. This means that negotiated pay rates will increase almost as steeply this year and next as they did in the economic boom before the pandemic, and even more sharply at the end of the projection horizon.[22]

Negotiated pay rates are rising and, at the end of the projection horizon, will even climb more strongly than they did during the last economic high

Actual earnings will arguably once again rise considerably more steeply this year than negotiated wages. This is largely due to the further

19 It has initially been primarily women with children who have fled to Germany. Although it can generally be assumed that these women possess a high readiness to work and are well-qualified, they often have childcare responsibilities. Furthermore, there are language barriers to be overcome and it is difficult to foresee how long arrivals will stay on in Germany, depending on how the war progresses and given that those affected are very keen to return.
20 Together with the increased immigration in 2021, this will mean around 300,000 more members of the labour force are expected over the projection horizon than assumed in the December projection.
21 There have been times in the past, too, when the trade unions only managed to have their demands partially met. It is also important to bear the current situation in mind: taken in isolation, the higher prices for fossil fuels – which are largely imported – narrow the scope for income distribution within Germany.
22 All past pay agreements included in the Bundesbank's negotiated pay rate statistics (around 500 collective wage agreements and provisions governing civil servant pay) are factored into the projections of negotiated wage increases. They are extrapolated beyond their contractual term, taking into account the overall economic situation and industry-specific idiosyncrasies.

Actual earnings to grow strongly throughout, but cannot fully offset high inflation to begin with

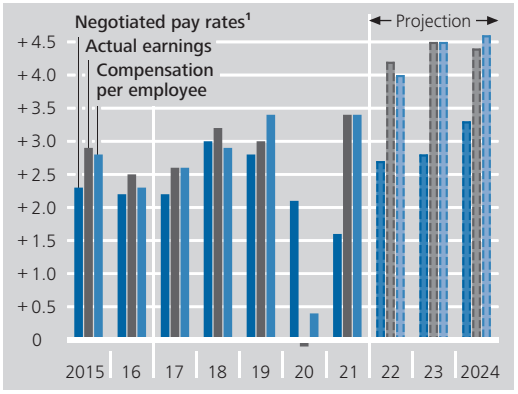
decline in short-time work and rising working hours. Another factor are higher performance-based bonuses on the part of industrial groups. In addition, the increase in the general statutory minimum wage to €12 per hour in the fourth quarter of 2022 will trigger a robust boost to wages, albeit one which will not fully come to bear in annual average terms until 2023.[23] Furthermore, over the remainder of the projection horizon, more paid overtime and, above all, the mounting labour market tightness are likely to contribute to stronger wage increases. Wage drift is therefore set to be consistently positive. Nominal wage increases are at almost 4½% over all three years in the projection horizon, a phenomenon which has not been seen since German reunification. Nevertheless, these strong increases will not suffice initially to fully compensate for the high inflation rate. The year 2024 is likely to be the first to see any marked rise in real wages as measured by the HICP.

Steep rise in unit labour costs; domestic inflation measured in terms of the GDP deflator to remain elevated in 2024

Compensation per employee will rise at similarly high rates as actual earnings over the projection horizon, even exhibiting a somewhat steeper increase in 2024, as employers' significantly rising social contributions will have an impact here. In terms of unit labour costs, this means that – following their subdued growth last year – they will see a particularly substantial rise of roughly 3½% this year. The fact that the increased economic headwinds will temporarily dampen growth in labour productivity (per employed person) is the key factor here. This is a reflection of the comparatively robust recovery in the labour market. In the coming year, labour productivity will return to a course of stronger growth, meaning that unit labour costs will rise more moderately, by around 2½%. From today's perspective, they are likely to climb somewhat more strongly again in 2024, however. The price pressure exerted by labour costs will therefore be consistently high over the projection horizon. Taken in isolation, this limits the scope for higher profit margins, which were widened to a considerable degree last year. At the same time, the sharp rise in energy prices is putting pressure on firms' profitability. Having said that, the current setting is still characterised by high demand, making it easy to pass on rising costs.[24] Overall, the rise in the GDP deflator in the current and coming

Negotiated pay rates, actual earnings and compensation of employees

Year-on-year percentage change, monthly basis



Source: Federal Statistical Office and Bundesbank projections. **1** According to the Bundesbank's negotiated wage index.

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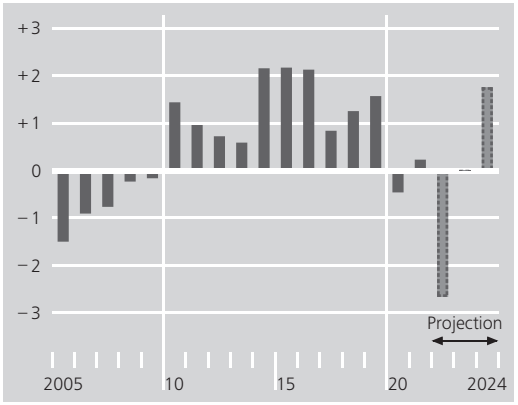
Real actual earnings per employee*

Year-on-year percentage change



Sources: Federal Statistical Office, Bundesbank calculations and Bundesbank projections. * Deflated by the Harmonised Index of Consumer Prices.

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23 The higher minimum wage is expected to push up actual earnings by around 0.8 percentage point. See Deutsche Bundesbank (2022f). Increases to the general statutory minimum wage will already have come on 1 January 2022 and 1 July 2022. In macroeconomic terms, these rises will have a stronger impact on actual wages than on negotiated wages, even if the latter will be affected strongly in some low-wage sectors, such as the hospitality industry.

24 In sectors that were particularly hard-hit by the pandemic-related restrictions, prices could even rise disproportionately to make up for past losses.

year is likely to still be somewhat higher than the growth in unit labour costs. In 2024, it could lag somewhat behind it, however. With an increase of around 2½%, domestic inflation as measured by the GDP deflator would still be significantly elevated, though.

Inflation rate well above previous expectations

The already extremely high inflation rate increased further still in the fourth quarter of 2021 and the first quarter of 2022. Inflation (as measured by the HICP) reached an all-time high of 7.8% in April 2022.[25] The last time Germany experienced such high inflation rates was during the oil price crisis in the 1970s. In the December projection, however, the rate had been expected to decline to around 4%. The fact that inflation overshot expectations by such a degree was primarily, but not solely, due to the energy component. Even before Russia's attack on Ukraine, inflation was, on a broad basis, more pronounced than expected. The war and its repercussions have exacerbated price pressures which were already high anyway. Crude oil prices rose drastically, for instance. In addition, this doubtless pushed up other costs of mineral oil production. At the consumer level, the prices of petrol and heating oil thus rose by just under 30% between February and March alone. The impact on food prices was also huge, leaving them almost 7% higher than in the previous year in April. The December projection had not even reckoned with a rate half that high. The prices of non-energy industrial goods also went up much more strongly than expected, probably owing to resurgent supply bottlenecks and the rise in commodity prices. Prices for services also surprised to the upside. This was partly attributable to travel services, where the sharp rise in oil prices is likely to have played a role. However, prices for the other services components also rose more strongly than expected.

Price pressure to remain high for the time being: for energy and food, …

HICP inflation is expected to come down only very slowly over the remainder of the year.[26] This is because price pressure will remain high for now: the assumption is that crude oil prices will fall markedly, but, at the same time, other significant cost increases for fuel and heating oil are likely to persist for a while yet. Furthermore, the previous huge increase in market prices for natural gas will probably continue to be passed on to consumers.[27] It is likely that price rises have not yet reached their peak where food is concerned, either. European agricultural producer prices are projected to increase by around 40% overall this year. This is partly a reflection of the fallout from the war, as producer prices for goods such as wheat – which Ukraine plays a key role in exporting – will be subject to even stronger price hikes. The war also pushed up costs for other production components, such as the price of fertilizers. Lastly, October's significant increase in the statutory minimum wage will affect some parts of the food sector especially strongly, one of these being the bakery trade.

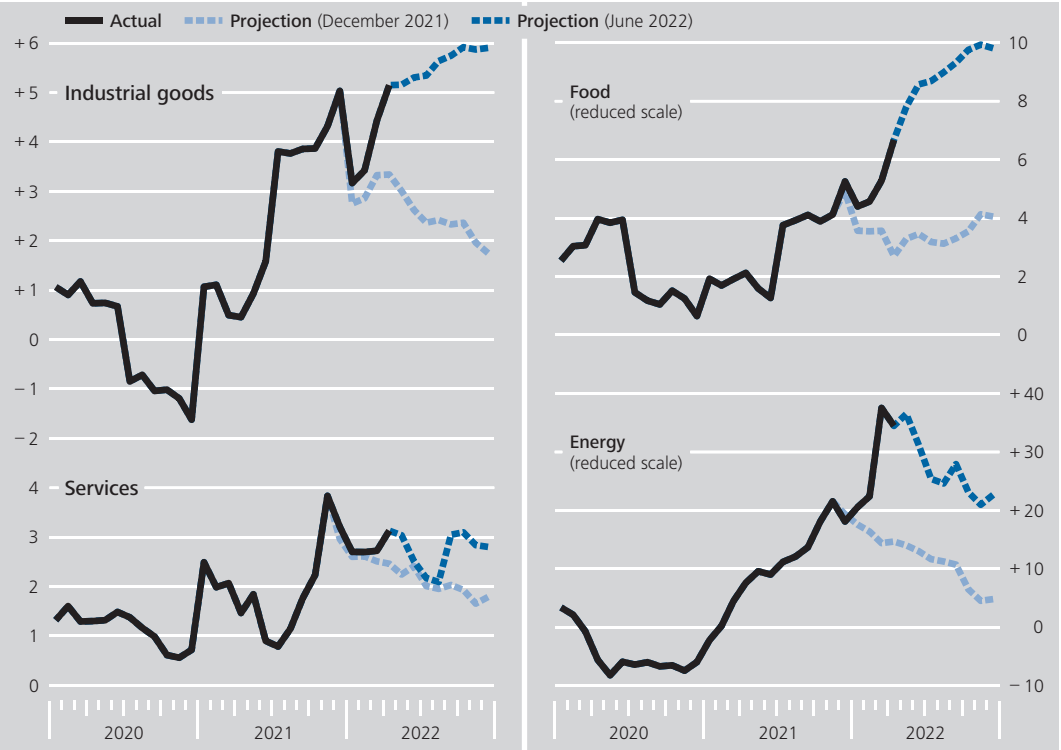
… but also for other industrial goods and services

Prices for non-energy industrial goods, too, will arguably increase considerably this year. Supply bottlenecks are likely to remain the main reason behind this, alongside the higher energy commodity prices. In addition, pandemic-related business closures could have a retrospective inflationary effect on the prices of some service providers if these agents seek to make up for previously incurred losses by widening their margins once the containment measures have expired. The renewed rise in labour costs will probably be another source of price pressure, which usually has an impact on service providers, in particular. Here, too, there are some sectors, such as hairdressing and taxi

25 The since-published May 2022 flash estimate was not yet available when the projection was finalised.
26 Government relief measures can only dampen the price pressures somewhat. The reduction in fuel tax, the launch of a €9 ticket for local public transport between June and August and the government's defrayal of the renewable energy levy (EEG levy) on electricity prices starting in July will have direct price effects. The estimated price effects of these measures are shown in the table on p. 20.
27 Energy prices are also being affected by the increase in the carbon price applied to the use of fossil fuels that came into force at the start of the year. This is likely to drive the headline rate up by somewhat less than 0.2 percentage point this year. See Deutsche Bundesbank (2019).

Latest upward revisions to projections for selected HICP components in Germany

Year-on-year percentage change



Sources: Federal Statistical Office and Bundesbank projections.
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firms, that are particularly affected by the increase in the minimum wage to €12 per hour.[28]

Inflation likely to reach a historical high this year

Combining the developments in the individual components, the HICP rate could increase to 7.1% in 2022. That is more than twice the rate recorded one year previously and by far the highest rate since the start of monetary union. The core inflation rate (excluding energy and food) could rise from 2.2% to 3.6%, which is three times higher than the long-term average.

Inflation projected to decline later in the projection horizon …

Starting next year, inflation is likely to recede gradually. It is assumed that energy commodity prices will fall significantly. However, as the surge in market prices for natural gas and electricity is, in part, only expected to be passed on to end customers with something of a time lag, energy price increases in 2023 will still be markedly above average and might only normalise again in 2024.[29] Food prices, too, will see inflation pressures subsiding according to the assumptions for commodity prices. That said, robust wage growth and the costs associated with the transition towards more sustainable and animal-friendly production methods will continue to provide momentum. Inflation rates will therefore be lower in the subsequent years, but still higher than average. The inflation rate excluding energy and food is also likely to decline. This is mainly because the price pressures stemming from the supply bottlenecks will gradually ease over the projection horizon and the indirect effects of the high energy prices as well as the increase in the prices of (non-energy) imports will diminish. Multiple factors are partly working in the opposite direction to

28 Noticeable price effects were also at play in some services sectors when the statutory minimum wage was introduced in 2015. See Deutsche Bundesbank (2015). The impact on the basket of goods as a whole is likely to remain limited, however. For example, the effect of the minimum wage on the HICP rate will probably only come to just under two-tenths of one percent over the entire projection horizon. See Deutsche Bundesbank (2022f).

29 Further increases in the carbon price will drive up the headline rate by around 0.1 percentage point in 2023 and 2024, respectively. See Deutsche Bundesbank (2019).

Estimated effects of government relief measures on consumer prices

Effects in percentage points

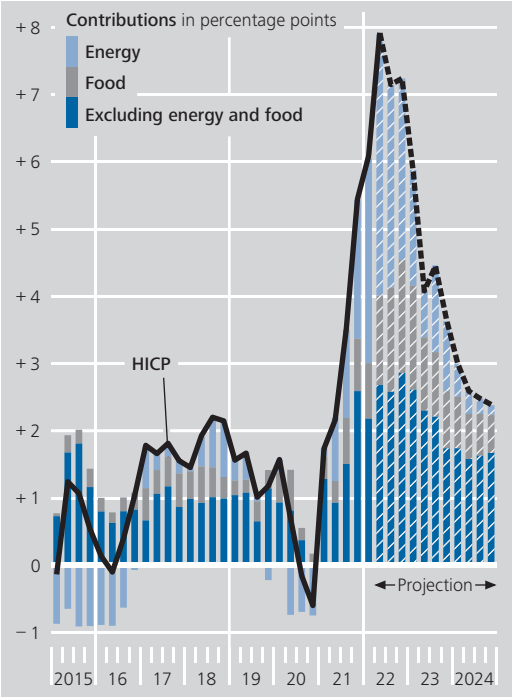
Measure	Time frame	HICP component concerned	Effect on headline HICP rate		
			Month	Annual average	
				2022	2023
Reduction in fuel tax	June to August 2022	Energy	* – 0.4	– 0.1	+ 0.1
€9 public transport ticket	June to August 2022	Services	* – 0.5	Just over – 0.1	Just over + 0.1
Government defrayal of the renewable energy (EEG) levy	From July 2022	Energy	– 0.4	– 0.2	– 0.2
Total	–	–	–	Just over – 0.4	0.0

Source: Bundesbank calculations. * Temporary measure, effect in the month of introduction, countereffect of the same size in the month following expiry of the measure.
Deutsche Bundesbank

this. One is that the intense pressure emanating from labour costs will increasingly make itself felt, especially as the economic situation improves. Second-round effects from the earlier sharp rise in consumer prices via the wage channel are another factor, albeit a limited one.

Contributions to headline HICP inflation by component

Quarterly, year-on-year percentage change



Sources: Federal Statistical Office, Bundesbank calculations and Bundesbank projections.
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There are also lagged effects from the robust increase in the minimum wage in autumn 2022. Lastly, the German economy's transition to climate neutrality and independence from fossil fuels – a matter which gained greater urgency as a result of the war in Ukraine – will arguably also go hand in hand with growing cost pressures.

… but will remain at a comparatively high level at the projection horizon, too

The headline HICP rate could decline to 4.5% in 2023 and to 2.6% in 2024, while the inflation rate excluding energy and food could decline first to 3.2% in 2023 and then to 2.4% in 2024. That would leave the inflation rates still markedly higher at the end of the projection horizon than their longer-term averages.

Public finances

Declining coronavirus-related budgetary burdens drive down deficit ratio in 2022

According to this projection, 2022 will see the general government deficit ratio decline to around 2¾% (2021: 3.7%). This will mainly be due to a significant reduction in the fiscal burdens caused by the coronavirus crisis. In addition, revenue will benefit from the dynamic growth in gross wages and salaries and nominal private consumption. By contrast, new measures will have a dampening effect (for information on these measures and the coronavirus response measures, see pp. 7 f.). More-

over, expenditure on pension, health and long-term care insurance schemes is growing significantly. The strong price increases are driving up the cost of government consumption and investment, in particular.

Decline stronger still in 2023, but significant deficits remain

The year 2023 will see the deficit ratio fall significantly to 1½% since the measures taken in response to the coronavirus crisis and the support provided to offset the high energy costs will have largely expired by then. In addition, the government budget will benefit from the ongoing economic recovery. There will be hardly any change in the deficit ratio in 2024. Growing deficits posted by central government off-budget entities for climate protection and the German armed forces will offset alleviating factors in other areas.

Structural deficits with historically high primary expenditure

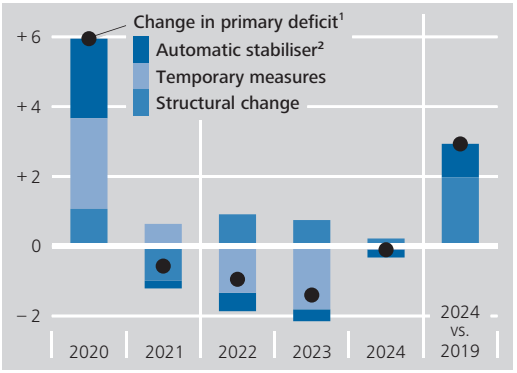
The structural general government deficit will move upwards toward 1½% of GDP over the projection horizon.[30] Deficits are projected mainly for central government, particularly its special funds. Before the coronavirus crisis, central government was still recording a structural general government surplus (2019: ½% of GDP). This turnaround is mainly attributable to rising expenditure, particularly on defence and climate protection, but also in the social sphere – mainly in the areas of pensions and long-term care. The structural primary expenditure ratio (excluding interest expenditure) will continue to rise significantly over the projection horizon.

Significant fall in debt ratio, but it remains above 60%

The debt ratio will fall significantly over the projection horizon to around 63% (2021: 69.3%). This is mainly on account of the relatively strong growth of nominal GDP in the denominator. Despite the deficits, this causes the ratio to decline. Moreover, debt-increasing one-off effects related to the coronavirus pandemic that are not reflected in the deficit will wane. For example, assistance loans will be repaid. Existing cash reserves are also likely to be used to finance the budget, which will reduce borrowing requirements. In addition, the portfolios of state-owned bad banks will diminish further.

Stabilising effect of the general government budget*

As a percentage of GDP, year-on-year change



* Bundesbank estimates. A positive change shows fiscal expansion. **1** Government deficit excluding interest expenditure. **2** Change in cyclical deficit.

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Risk assessment

All in all, risks to economic growth tilted to the downside, but risks to outlook for inflation rate to the upside

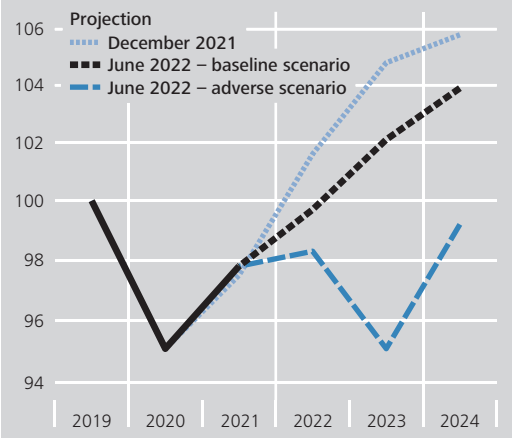
The macroeconomic projections described here are subject to an exceptionally high level of uncertainty in the current environment. The greatest uncertainties include further developments in the war in Ukraine, including its economic knock-on effects, the global dynamics of the pandemic and the impact of high inflation. From today's perspective, the risks to economic growth appear to be tilted to the downside in overall terms, mainly due to the possibility of Russian energy supplies being halted. With regard to inflation, upside risks predominate throughout the projection horizon. These risks already partly materialised after the projection was finalised. On account of the surprisingly high inflation momentum in May, the annual average HICP rate for 2022 could already amount to 7¾%, as things currently stand.

Even in the baseline scenario of the projection, considerable setbacks are assumed for the eco-

30 Cyclical factors and temporary one-off effects are stripped out of the structural variables. These influences will diminish to almost zero in 2023 and 2024.

Real gross domestic product in Germany

2019 = 100, log scale, annual averages



Sources: Federal Statistical Office and Bundesbank projections.
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Downside risks to real economy regarding continuation of war against Ukraine and its consequences

nomic outlook due to the war in Ukraine. However, these could turn out to be considerably more severe still. If the conflict were to intensify, the duration and intensity of the direct and indirect effects would increase. In this context, there could also be a stoppage of all deliveries of Russian energy products – either by an import embargo imposed by the EU and its partners or by Russia unilaterally halting its deliveries. Germany's dependence on Russian energy sources has already been reduced significantly since the outbreak of the war (see the box on p. 23). But still, in such an adverse risk scenario, the German economy would arguably experience a pronounced decline in economic activity, which would be accompanied by further price rises (see the box on pp. 23 ff.).[31] If, on the other hand, the situation eases unexpectedly quickly, economic activity could turn out to be higher and the inflation rate lower.

Evolution of the pandemic still a downside risk to economic activity

The ongoing pandemic continues to pose a downside risk to economic activity, too. Although Germany lifted most of the coronavirus containment measures in the spring, in China, protective measures continue to considerably curtail social life, unleashing some severe consequences not just for China's economy but for global activity as well. For example, lockdowns imposed in several major cities, such as Shanghai, home to the world's largest container port, dampened economic activity and intensified global supply chain disruptions. Should the global economy come to a standstill amid sustained disruptions in China, supply bottlenecks[32] could turn out to be even more persistent and foreign demand weaker than expected over the projection horizon. This would weigh on German exports and investment. However, the further course of the pandemic in Germany also harbours risks. If – in the autumn, say – infection rates worsen, for example as a result of new virus variants, and more extensive protective measures need to be re-imposed, private consumption could suffer a further setback.

Uncertainties surrounding households' domestic consumption expenditure

In Germany, further risks can be identified in both directions with regard to private consumption. Households could use the additional savings they accumulated during the pandemic for future consumption expenditure to a greater or lesser extent than assumed here. The related uncertainties mainly stem from possible interactions with the high inflation and the uncertainty surrounding how long it will persist, as well as concerns about developments in the war in Ukraine.

Price increases could intensify further due to war in Ukraine and supply bottlenecks

The outlook for price inflation was already subject to a high degree of uncertainty in past projections. Against the backdrop of the pandemic and its specific features, it was unclear for some time to what extent historical relationships still apply. This is increasingly being called into question by the fact that inflation keeps on being significantly underestimated and by the extremely high inflation rates. Since the outbreak of the war in Ukraine, price increases have exceeded expectations by a wider margin

31 Compared with earlier simulation calculations, the expected recession shifts into the following year, mainly due to the time-lag of the effects caused by gas rationing. See Deutsche Bundesbank (2022g).
32 Disruptions to global value added and logistics chains could also be more severe than assumed in the projection for other reasons, such as the ramifications of the war in Ukraine. However, a more favourable outturn cannot be ruled out, either. Less constrictive supply bottlenecks would be accompanied by a more dynamic recovery in exports and an earlier normalisation of price inflation.

Possible development of the German economy in an adverse risk scenario

Russia's war of aggression against Ukraine and its impact on the global economy have shaped the assumptions underlying the macroeconomic projection (see the box on pp. 5 ff.). An adverse risk scenario was developed as a way of accounting for the prevailing uncertainty surrounding key assumptions. Unlike in the baseline scenario, the assumption here is an escalation of the conflict.[1] This assumption is associated with a further intensification and expansion of the sanctions imposed, starting from the summer of this year. Energy and food commodity prices register stronger increases and persist at higher levels throughout the projection horizon. Another assumption is a complete and permanent stoppage of Russian energy exports to the European Union (EU). This leads to energy rationing and cutbacks in production in EU countries. In addition, this scenario assumes that further disruptions in foreign trade and increased supply chain problems will materialise. In particular, food exports from Ukraine and Russia decline more sharply than in the baseline scenario. Overall, it is assumed that macroeconomic uncertainty and financial market volatility will increase. Compared with the baseline scenario, monetary and fiscal policy is assumed to remain unchanged.[2]

Major assumptions in the adverse scenario

Percentage deviations from baseline scenario[1]

Item	2022	2023	2024
Commodity prices			
Crude oil	25.5	53.2	34.7
Natural gas	90.5	170.4	109.5
Food	3.2	19.2	23.8
German exporters' sales markets	– 1.8	– 5.7	– 5.9

Source: ECB staff. **1** For information on the assumptions made in the baseline scenario see the table on p. 6.

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Rationing effects given a stoppage of gas supplies

A loss of Russian energy supplies from the third quarter of 2022 leads to gas supply bottlenecks over the scenario horizon. The absence of Russian deliveries of crude oil and bituminous coal is assumed not to result in any rationing effects given that independence from these supplies has now largely been achieved.[3] The size of the gas gap – that is, the amount by which gas de-

1 The adverse scenario was specified as part of the Eurosystem's macroeconomic projections and simulated by all Eurosystem national central banks. It is based on assumptions made jointly by Eurosystem experts, and the results form part of the scenario calculated for the euro area as a whole. See European Central Bank (2022). The effects on the development of exporters' foreign sales markets and competitors' prices were calculated by ECB staff and made available to the national central banks. The same was done with an estimation of movements in lending rates and the equity market. Earlier Bundesbank calculations concerning the possible macroeconomic repercussions of the Ukraine war in a similarly defined risk scenario can be found in Deutsche Bundesbank (2022g). Similarities to and differences from these earlier calculations are discussed at appropriate points later on in this text (see, in particular, p. 28 f.).

2 As far as fiscal policy in Germany is concerned, this means, for the calculations presented here, that no additional fiscal measures are assumed beyond the automatic stabilisers included endogenously in the model.

3 Since the beginning of 2022, Germany's reliance on Russian deliveries of these two commodities has been reduced significantly; see Federal Ministry for Economic Affairs and Climate Action (2022). The share of Russian supplies of bituminous coal still came to around 8% at the beginning of May 2022, and the EU's fifth package of restrictive measures legislates that complete independence is to be achieved by mid-August 2022. As regards crude oil, Germany is still dependent on Russia for around 12% of its supplies at present, with the bulk of this being accounted for by the Schwedt refinery. Subject to a certain transitional period, this refinery can, however, be supplied with alternative deliveries via the ports of Rostock and Gdańsk; see Federal Ministry for Economic Affairs and Climate Action (2022).

mand exceeds the available supply – depends on multiple aspects. These include the volume of Russian supplies that needs to be replaced as well as the possibility of sourcing gas from other countries at short notice.[4] Adjustments by energy consumers are another key aspect – a number of recent studies indicate that significant savings can be achieved in natural gas consumption, including in the short term.[5] The expected topping up of the natural gas reservoirs is another important factor to consider. Based on how gas storage levels have changed on average since the beginning of May 2022, it is assumed that the gas reservoirs are more than 60% full at the beginning of July 2022.

The time profile of the gap in the supply of gas is determined, first, by the speed at which supplies are expanded and by the scope for savings.[6] Second, seasonal patterns in natural gas consumption, the prioritisation of certain consumer groups and filling levels in gas reservoirs are also factors. Gas consumption tends to decrease significantly in the summer months, allowing natural gas reservoirs to be topped up for the winter period. Since priority is given by law to the supply of gas to essential social services and household customers as well as to small and medium-sized enterprises in business, trade and services, industry will be disproportionately hard hit by the effects of gas rationing.[7] The modelling makes the assumption that two-fifths of industry is supplied with gas throughout so that, for example, the production of essential intermediate inputs and final goods is assured and production facilities do not suffer any permanent damage.[8] The final assumption made in the model is that gas reservoirs have a certain minimum filling level in all months in order to safeguard the future supply of protected customers and to account for the uncertainty surrounding ex-

4 According to the Federal Ministry for Economic Affairs and Climate Action, Germany was dependent on Russia for 35% of its gas supplies in April of this year. Compared with the previous years, where figures averaged 55%, a significant reduction has already been achieved within the first few months of this year. This was mainly due to the expansion of supplies from other countries, which could persist. Furthermore, the present calculation assumes that additional supplies will become available in Germany via floating LNG terminals from January 2023 and that these capacities will be gradually expanded from mid-2023 onwards. From the third quarter of 2024, the expansion of supplies and the assumed savings result in Germany's gas supply becoming independent of Russian deliveries. This independence would be achieved somewhat sooner than anticipated by the Federal Ministry for Economic Affairs and Climate Action owing to the assumed higher adjustment pressure; see Federal Ministry for Economic Affairs and Climate Action (2022).
5 See German Association of Energy and Water Industries (2022), Forschungszentrum Jülich (2022) and German Institute for Economic Research (2022). In the scenario calculations, it is assumed that savings are made by industry, households, business, trade and services, transport, and in the generation of electricity and heat. Overall savings in terms of gas consumption come to around 18% in the first four quarters after supplies are stopped. Starting in summer 2023, owing to the horizon that will then be available for adjustments, further savings of 10 percentage points are assumed (i.e. a total of 28% relative to pre-embargo consumption).
6 For a further scenario analysis with an intra-year gas gap, see also Joint Economic Forecast Project Group (2022).
7 See Section 53a of the German Energy Industry Act *(Gesetz über die Elektrizitäts- und Gasversorgung).* In this context, the area of business, trade and services comprises all craft industries and enterprises with up to 19 employees from the production sector as well as all enterprises in the trade and services sector. The assumption here is that two-thirds of the business, trade and services area belongs to the prioritised group.
8 The decision on the rationing of non-protected customers at the emergency level of the Emergency Plan for Gas for the Federal Republic of Germany (see Federal Ministry for Economic Affairs and Energy (2019)) is taken by the Federal Network Agency. According to the Federal Network Agency, multiple criteria play a key role in this regard; these include, for example, considering the lead times needed for shutdowns, preventing damage to the economy and businesses, safeguarding supplies of critical end products such as food and pharmaceuticals and the availability of substitutes in production; see Frankfurter Allgemeine Zeitung (2022) and Federal Network Agency (2022).

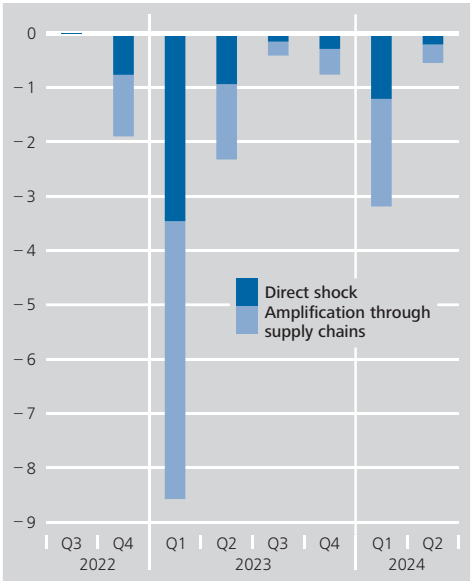
pected gas consumption – for example, in the event of stronger demand during an unusually cold winter.[9] This means that consumption by the remaining, unprotected gas customers will have to be throttled in the period from the third quarter of 2022 to the second quarter of 2023 by just under one-third on average. A certain gas gap will exist from the third quarter of 2023 as well, albeit one that is significantly smaller than in the preceding four quarters.

A sectoral input-output model can be used to roughly estimate the economic effects of constraints in the supply of gas.[10] Amongst other things, this model depicts the supply chains across the sectors of the German economy based on the linkages between intermediate inputs contained in the system of accounts. In the calculations, the directly affected sectors in industry and services are exposed to different degrees to the gas rationing shock. Sectors with a higher input of natural gas in production relative to their value added – such as chemicals sector or metal-working industry – are hit harder than those where the natural gas intensity of production is low.[11]

According to the model calculations, the production losses caused by the stoppage of gas supplies would lead to losses in value added of 3¼% in the period from the third quarter of 2022 to the second quarter of 2023.[12] In this regard, the effect of gas rationing would mainly be felt in the first quarter of next year, which is why much of the loss in gross domestic product (GDP) materialises in 2023. The GDP losses computed for the period from the third quarter of 2023 to the second quarter of 2024, at 1¼%, are significantly smaller than in the

Potential GDP losses due to production cutbacks in the case of natural gas rationing*

Percentage deviations from the baseline scenario



Source: Calculations based on the 2018 German input-output table produced by the Federal Statistical Office. * Shocks to non-prioritised industrial sectors and to services depending on the natural gas intensity of their activities.

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9 The filling level requirements laid down in the German Gas Storage Act *(Gasspeichergesetz),* by contrast, are not fully met in the scenario calculation. In an emergency, these could be subordinated behind the other criteria of the Federal Network Agency (see the German Act Amending the Energy Industry Act – *Gesetz zur Änderung des Energiewirtschaftsgesetzes zur Einführung von Füllstandsvorgaben für Gasspeicheranlagen sowie zur Änderung von § 246 des Baugesetzbuchs*). In the scenario calculation the minimum filling level that must be guaranteed each month is set at 10%.

10 See Deutsche Bundesbank (2022g).

11 For industrial sectors with a high intensity of natural gas input (measured by the ratio of natural gas input to value added), it is assumed that a decline in the supply of natural gas of 31% (Q3 2022 to Q2 2023) and of 11% (Q3 2023 to Q2 2024) leads to an identical percentage decline in output. For an overview of these sectors, see Deutsche Bundesbank (2022g). For the remaining sectors, the shock level is adjusted downwards according to their lower intensity of natural gas input as well as the percentage of the prioritised consumer groups they account for.

12 The quarterly profile of the GDP losses is derived from the quarterly shares of the gas gap per year. To smooth the rationing effects, it is assumed that a constant share of the gas consumption of unprotected customers is cut between the fourth quarter of 2022 and the second quarter of 2024. This assumption affects neither the size of the gas gap nor the accumulated economic losses. It influences only the distribution of GDP losses over the quarters and thus allows the rationing effects to be better integrated into the following simulation with the Bundesbank's macroeconometric model. Without this assumption, the GDP losses would be even more strongly concentrated in the first quarter of 2024.

preceding four quarters owing to the smaller size of the gas gap. Strong amplification effects via supply chains increase the original shock effect to two-and-a-half times the size. This can be explained by the fact that some of the sectors that are particularly strongly affected supply important intermediate inputs for other production areas.[13]

Macroeconomic effects

The macroeconomic effects of the scenario are estimated using the Bundesbank's macroeconometric model (BbkM-DE).[14] The effects of gas rationing are also fed into the simulations carried out using the BbkM-DE model.[15] The uniform model framework means that it is possible to combine the time profile of production losses caused by a lack of gas supplies with the other assumptions regarding the macroeconomic environment (concerning, inter alia, developments in commodity prices and sales markets as well as uncertainty effects). This way, it is also possible to quantify their impact on the inflation rate and include macroeconomic feedback effects, such as those channelled via the labour market. Since the BbkM-DE model determines GDP via its expenditure components, as is customary with this class of model, the sector-specific production losses are distributed across the components of final expenditure using data from the input-output tables on the breakdown of the respective product groups.[16] Implementation in BbkM-DE by means of applying additional shocks to the expenditure-side GDP components nonetheless takes into consideration the supply-side nature of the production cutbacks.[17]

The simulation calculations indicate the most severe strain on real GDP for the coming year. The key reason for this, alongside the rationing effects, will be the slump in German exporters' sales markets.[18] Overall, the shortfall of the real GDP level relative to the baseline scenario widens from around 1½% in the current year to roughly 6¾% in 2023. GDP then declines by just over 3% relative to the year 2022 instead of growing by just under 2½% as assumed in the baseline scenario. That said, GDP growth in 2024 is considerably stronger in the adverse

13 The size of this factor is determined above all by the composition of the sectors affected by the shock and their relative position within the German production network. It cannot be ruled out that the amplification effects via supply chain linkages in the chosen model framework are being underestimated. See, for example, Deutsche Bundesbank (2022g) and Krebs (2022).
14 As performed in Deutsche Bundesbank (2022g), the uncertainty effects and disaggregated price effects on the HICP components energy and food are quantified using satellite models and then fed into the simulations. For details on BbkM-DE, see Haertel et al. (2022).
15 This was not implemented in this manner in earlier simulation calculations by the Bundesbank; see Deutsche Bundesbank (2022g).
16 According to this approach, exports are hurt most by the gas rationing, followed by investment in machinery and equipment and other fixed investment. Private consumption is less affected. In the distribution of production cutbacks across expenditure components, it is assumed that if a particular good is unavailable, economic agents do not switch to available alternatives beyond the extent that has already been assumed when calculating the rationing effects (see also footnote 22). This appears to be a plausible approach, especially in the case of key investment and exports.
17 To this end, it is assumed that the thus induced decline in GDP, which can be attributed in economic terms to the production cutbacks, has no impact on the output gap. A possible price-dampening effect induced by the rationing is thus eliminated. In addition, it is assumed that when enterprises set their prices, they allow the influence of the productivity declines to feed through into unit labour costs in line with the estimated behavioural equations. The price increases produced as a result were checked for plausibility using a structural vector autoregression model.
18 The transmission channels in the charts are defined differently than those presented in Deutsche Bundesbank (2022g), where the contribution of German foreign demand comprised only the direct disruptions in bilateral foreign trade with Ukraine and Russia. Indirect effects of higher commodity prices on sales markets in other countries were attributed to the commodity price channel. In Deutsche Bundesbank (2022g), the illustrated effect of foreign competitors' prices had been distributed across the transmission channels shown therein, with by far the bulk being accounted for by the commodity price channel. Unlike in Deutsche Bundesbank (2022g), the depicted uncertainty channel also explicitly contains the effects of higher lending rates and lower equity prices.

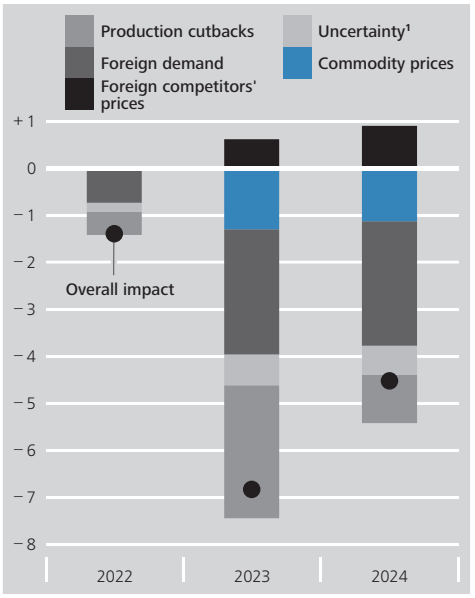
than in the baseline scenario. Even so, the level of real GDP is then still 4½% below that of the baseline scenario.

The inflation rate exceeds the rates from the baseline scenario in the current year, particularly on account of the higher oil prices. It is not until the year after that the increases in gas prices feed through into consumer prices. That same year is also when the price increases resulting from the production cutbacks become apparent. According to the simulations, the influences of the oil price and production losses will fade out in 2024 and the persistently lower demand from abroad will dampen price developments. Overall, the inflation rate in the adverse scenario would be ½ percentage point higher on average for the current year and somewhat more than 1½ percentage points higher in 2023 than the rates simulated in the baseline scenario, before the effect weakens to just under ¼ percentage point in 2024.

The effects calculated in the simulations mean that, in this adverse scenario, the German economy experiences a temporary considerable contraction instead of following a subdued recovery path, as envisioned in the baseline scenario. While GDP growth still manages to remain slightly positive on average in 2022 (see the table on p. 29), this is only thanks to the increase in GDP in the second half of 2021.[19] The rationing effects that begin to emerge in the coming winter in particular cause GDP to decline sharply in 2023. The economy recovers from that setback in 2024 but does not yet return to its pre-pandemic output level. At the same time, the inflation rate is very high for a longer period. In 2024, inflation will be somewhat higher still than what is al-

Potential impact on the level of real GDP in Germany in the adverse scenario

Percentage deviations from the baseline scenario



Source: Bundesbank calculations using BbkM-DE, building on the Eurosystem's jointly defined assumptions regarding the international environment and including information from SVAR models and input-output analysis. **1** Including lending rates and the equity market.

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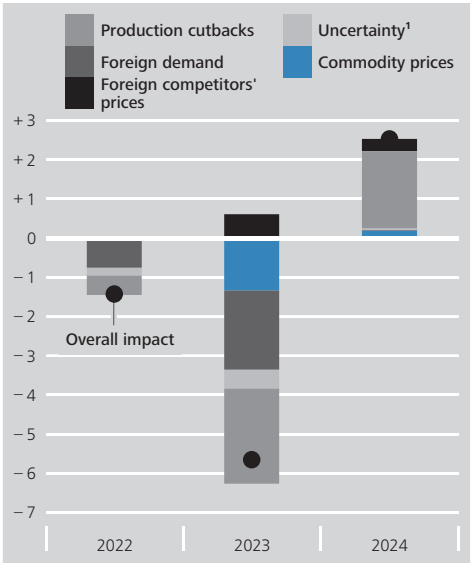
Potential impact on the year-on-year growth rate of real GDP in Germany in the adverse scenario

Deviations from the baseline scenario in percentage points



Source: Bundesbank calculations using BbkM-DE, building on the Eurosystem's jointly defined assumptions regarding the international environment and including information from SVAR models and input-output analysis. **1** Including lending rates and the equity market.

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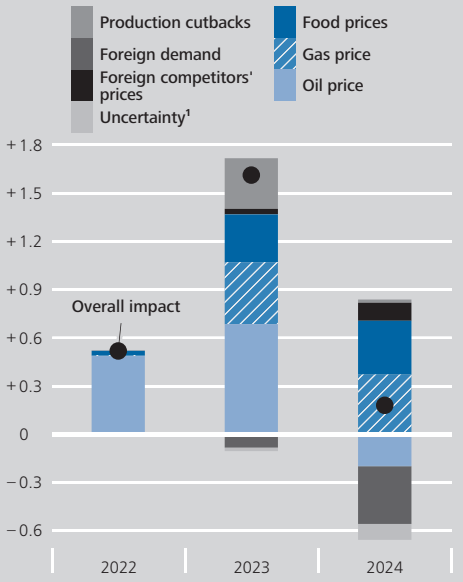
19 The resulting statistical carry-over from 2021 comes to 1.1 percentage points.

Potential impact on the HICP rate in Germany in the adverse scenario

Deviations from the baseline scenario in percentage points



Source: Bundesbank calculations using BbkM-DE building on the Eurosystem's jointly defined assumptions regarding the international environment and including information from SVAR models and input-output analysis. **1** Including lending rates and the equity market.

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ready envisioned in the baseline scenario of the projection.

Interpreting the results

Given how dynamically the situation has evolved since the start of the war against Ukraine, the time at which this adverse scenario was prepared is key to how the results are interpreted. This also means that there are deviations from earlier calculations prepared by the Bundesbank, which were published in April 2022.[20] These concern both the outlook for the macroeconomic environment[21] and the impact of energy rationing.[22] Because the current adverse scenario has a later starting point and accounts for seasonal patterns in the supply of gas, the impact of quantitative losses in gas supplies on economic activity shifts into the coming year. That is when the dampening effect of higher commodity prices and weaker foreign trade come into play as well. As things currently stand, this explains why the stress factors under the adverse scenario will only hit the German economy with full force from 2023 onwards.

Overall, the estimates of the macroeconomic repercussions of the adverse scenario are subject to considerable uncertainty.[23] In particular, the calculations concerning the

20 In the April 2022 edition of the Monthly Report, the scenario had been projected to start at the end of the first quarter of 2022; see Deutsche Bundesbank (2022g). In the current calculations, the starting date has been shifted to the beginning of the second half of the year. For this reason, the impact on the international environment and the German economy will be smaller in the current year.

21 The increase in energy commodity prices is now smaller relative to the baseline scenario. In part, the increases in commodity prices assumed in the earlier calculations are now contained in the baseline scenario. Furthermore, the impulse from commodity prices will weaken to a greater extent in the final year of the projection horizon, partly because a more significant year-on-year decline is now assumed for the year 2024. The assumed impact of the scenario on German foreign demand is of a similar magnitude as before (with the exception of the current year). This also applies to the effects on food prices and foreign competitors' prices. The uncertainty effects shift more strongly into later years. The fiscal measures that had previously been included and further measures that have been adopted in the meantime by the Federal Government (in the area of armaments and to provide relief from increased energy costs) are now already included in the baseline scenario (see p. 7 f.) and thus no longer form part of the adverse scenario.

22 Compared with the earlier calculations, the gas gap, amongst other things, has been calculated with greater granularity in terms of savings opportunities and expansion of supplies and a quarterly rationing profile was modelled. As the delivery stoppage is assumed to start later, the natural gas reservoirs will now fill up over the second and third quarters of 2022, which means that the gas supply bottleneck will materialise later. The calibration of the shock has been adjusted such that the unprotected sectors are directly exposed to the shock in accordance with their (relative) gas intensity. By contrast, gas deliveries to energy suppliers are now hardly affected by rationing owing to substitutes or prioritisation. Lastly, behavioural adjustments by different consumer groups in response to higher gas prices and the like have been explicitly taken into account when determining the gas gap. In addition, these adjustments increase over time. For this reason, the present calculations assume full additivity, over the entire analysis period, of the GDP losses that can be attributed to quantitative restrictions according to the input-output model with those resulting from higher gas prices according to the BbkM-DE model.

23 For uncertainties concerning the model and the scenario definition, see also the relevant section in Deutsche Bundesbank (2022g), pp. 25 f.

spillover effects of missing gas supplies through the supply chains of the German economy can only roughly account for the complexity of sectoral interlinkages. The effects on real GDP may be both higher and lower than those shown here.[24] As far as the inflation rate is concerned, the upside risk predominates. Thus, given the high inflation rates that continue to be expected, it is also possible that increased production costs will be passed through to consumer prices to a greater extent.[25] Moreover, the risk of the high inflation becoming entrenched via stronger second-round effects is greater still in the adverse scenario (see the relevant section on the risk assessment on pp. 20 f.).

Comparison of baseline and adverse scenarios – June 2022 projection

Year-on-year percentage change

Item	2022	2023	2024
Real GDP, calendar adjusted			
Baseline scenario	1.9	2.4	1.8
Adverse scenario	0.5	– 3.2	4.3
HICP			
Baseline scenario	7.1	4.5	2.6
Adverse scenario	7.6	6.1	2.8

Deutsche Bundesbank

24 A greater availability of substitutes could dampen the GDP losses, for example. These include evasive action in terms of consumption or behavioural changes by households or enterprises that are not modelled in BbkM-DE. On the other hand, the gains in price competitiveness may be overstated in as far as the increase in foreign competitors' prices is the result of higher sales prices of energy-exporting trading partners. This is because German exporters do not compete in the energy market, but export other goods. Uncertainty also exists in terms of the rationing effects, in particular with regard to the potential scope available to different consumer groups to make savings, the timing and scale of the expansion of supply and the degree to which effects are amplified via supply chains.

25 Current inflation figures suggest that pass-through in terms of gas consumer prices has happened more quickly in recent months than was the case in the sample period underlying the model estimates. Accordingly, the gas price effects reported here could shift forward in time. Furthermore, a price adjustment clause in the recently adopted amendment to the German Energy Security Act *(Energiesicherungsgesetz)* allows energy suppliers to already pass on price increases to their customers at the alert level of the Emergency Plan for Gas at short notice and irrespective of the contractual situation.

Key figures of the macroeconomic projection – non-calendar adjusted

Year-on-year percentage change

Item	2021	2022	2023
GDP (real)	2.9	1.8	2.2
GDP (real, calendar adjusted)	2.9	1.9	2.4
Components of real GDP			
Private consumption	0.1	3.7	1.5
Memo item: Saving ratio	15.0	10.8	9.1
Government consumption	3.1	0.1	– 2.4
Gross fixed capital formation	1.5	1.8	4.7
Business investment[1]	2.5	1.3	6.6
Private housing construction investment	1.3	0.8	– 0.5
Exports	9.9	0.5	4.8
Imports	9.3	2.7	2.9
Memo item: Current account balance[2]	7.4	4.1	4.7
Contributions to GDP growth[3]			
Domestic final demand	1.1	2.2	1.3
Changes in inventories	1.0	0.4	– 0.1
Exports	4.3	0.3	2.4
Imports	– 3.5	– 1.1	– 1.3
Labour market			
Total number of hours worked[4]	1.9	1.5	1.4
Employed persons[4]	0.0	1.3	0.3
Unemployed persons[5]	2.6	2.3	2.3
Unemployment rate[6]	5.7	5.0	4.9
Memo item: ILO unemployment rate[7]	3.6	3.0	3.0
Wages and wage costs			
Negotiated pay rates[8]	1.6	2.7	2.8
Gross wages and salaries per employee	3.5	4.2	4.5
Compensation per employee	3.4	4.0	4.5
Real GDP per employed person	2.8	0.5	1.9
Unit labour costs[9]	0.5	3.4	2.6
Memo item: GDP deflator	3.1	3.8	3.2
Consumer prices[10]	3.2	7.1	4.5
Excluding energy	2.4	4.4	3.9
Energy component	10.1	27.2	8.5
Excluding energy and food	2.2	3.6	3.2
Food component	3.0	7.8	6.5

Sources: Federal Statistical Office; Federal Employment Agency; Eurostat. 2022 to 2023, Bundesbank projections. **1** Private non-residential fixed capital formation. **2** As a percentage of nominal GDP. **3** In arithmetical terms, in percentage points. Discrepancies in the totals are due to rounding. **4** Domestic concept. **5** In millions of persons (Federal Employment Agency definition). **6** As a percentage of the civilian labour force. **7** Internationally standardised as per ILO definition, Eurostat differentiation. **8** Monthly basis. Pursuant to the Bundesbank's negotiated wage index. **9** Ratio of domestic compensation per employee to real GDP per employed person. **10** Harmonised Index of Consumer Prices (HICP).

Deutsche Bundesbank

still. With a possible stoppage of Russian energy exports, energy prices would be driven up markedly again (see the box on pp. 23 ff.). Not only oil and gas prices themselves would then pick up. On top of this, the shortages could lead to cost mark-ups in other areas, similar to what has been recently observed. Additional supply problems – for example due to the pandemic intensifying in Asia – could also lead to increased pressure on prices.[33] Lastly, the costs of the German economy transitioning to climate neutrality could be even higher than assumed in the projection.

Persistently high inflation rates raise risk of second-round effects via inflation expectations and wages

The large number of cost increases that firms are exposed to is likely to increase the likelihood that these costs will be passed on to consumers more quickly and on a greater scale than in the past. An increased pass-through of costs of this kind was assumed in the projection only to a very limited extent, not least because assumptions in this regard are also subject to a high degree of uncertainty.[34] Accordingly, this represents an upside risk. Longer-term inflation expectations remained at around 2% recently and were thus higher than the average of the past ten years. If these expectations continue to rise, they could influence firms' pricing behaviour in that they increase their prices today in anticipation of higher inflation. This could contribute to a longer-lasting period of high inflation. Similar second-round effects could also occur in the form of stronger wage growth. Thus far, this channel has not played a major role in Germany, and the projection also only factors in a small degree of amplification effects via wages. Nevertheless, persistently high inflation rates and increased inflation expectations could lead to higher wage demands across the board and increasingly to stronger negotiated wage rises that extend beyond the level anticipated in the projec-

33 However, owing to China's key role in global commodity demand, a persistent lull in the Chinese economy could also push down oil and industrial metals prices.
34 In individual cases there is evidence that, at least for some goods, costs are already being passed on more quickly.

tion. Should firms subsequently adjust their prices once again, inflation rates would remain elevated over a longer horizon. If monetary policy is consequently tightened to a greater extent than assumed in the projections, economic activity might be dampened more significantly.

List of references

Beckmann, E. and T. Schmidt (2020), Bundesbank online pilot survey on consumer expectations, Deutsche Bundesbank Technical Paper No 01/2020.

Deutsche Bundesbank (2022a), Weekly activity index for the German economy, available at https://www.bundesbank.de/en/statistics/economic-activity-and-prices/weekly-activity-index/weekly-activity-index-for-the-german-economy-833976

Deutsche Bundesbank (2022b), Supply bottlenecks likely to weigh on industrial production for quite some time, Monthly Report, May 2022, pp. 58-59.

Deutsche Bundesbank (2022c), The possible longer-term impact of the Ukraine war on the Russian economy, Monthly Report, May 2022, pp. 15-16.

Deutsche Bundesbank (2022d), Public finances, Monthly Report, May 2022, pp. 70-84.

Deutsche Bundesbank (2022e), Bundesbank Online Panel Households (BOP-HH), questionnaire wave 27 – March 2022, available at https://www.bundesbank.de/resource/blob/825490/b509f03af0fe6d16eac44269c86e4f45/mL/questionnaire-27-data.pdf

Deutsche Bundesbank (2022f), The macroeconomic impact of the planned increase in the general statutory minimum wage to €12 per hour, Monthly Report, February 2022, pp. 54-55.

Deutsche Bundesbank (2022g), Potential macroeconomic consequences of the war in Ukraine – simulations based on a heightened risk scenario, Monthly Report, April 2022, pp. 13-29.

Deutsche Bundesbank (2021a), Outlook for the German economy for 2022 to 2024, Monthly Report, December 2021, pp. 17-43.

Deutsche Bundesbank (2021b), Households' motives for saving during the pandemic and their implications for the projection, Monthly Report, June 2021, pp. 25-28.

Deutsche Bundesbank (2021c), Pandemic-induced damage to German potential output moderate so far, Monthly Report, December 2021, pp. 30-32.

Deutsche Bundesbank (2020), Households' saving behaviour during the pandemic, Monthly Report, December 2020, pp. 26-27.

Deutsche Bundesbank (2019), The impact of the Climate Package on economic growth and inflation, Monthly Report, December 2019, pp. 29-33.

Deutsche Bundesbank (2015), Impact of the introduction of the minimum wage on consumer prices – initial findings, Monthly Report, May 2015, pp. 64-66.

Dustmann, C., A. Lindner, U. Schönberg, M. Umkehrer and P. vom Berge (2022), Reallocation Effects of the Minimum Wage, The Quarterly Journal of Economics, Vol. 137, pp. 267-328.

European Central Bank (2022), Eurosystem staff macroeconomic projections for the euro area, June 2022, available at https://www.ecb.europa.eu/pub/projections/html/ecb.projections202206_eurosystemstaff~2299e41f1e.en.html

Federal Ministry for Economic Affairs and Climate Action (2022), Zweiter Fortschrittsbericht Energiesicherheit, 1 May 2022.

Federal Ministry for Economic Affairs and Energy (2019), Emergency Plan for Gas for the Federal Republic of Germany, September 2019.

Federal Network Agency (2022), Lastverteilung Gas – Handlungsoptionen, Abwägungsentscheidung, situationsbedingtes Handeln, 17 May 2022, available at https://www.bundesnetzagentur.de/DE/Fachthemen/ElektrizitaetundGas/Versorgungssicherheit/aktuelle_gasversorgung/HintergrundFAQ/Download.pdf

Forschungszentrum Jülich (2022), Wie sicher ist die Energieversorgung ohne russisches Erdgas?, 16 March 2022.

Frankfurter Allgemeine Zeitung (2022), Netzagenturchef zur Gasnotlage "Das Leben ist dann nicht mehr fröhlich und locker", 17 May 2022, available at https://www.faz.net/aktuell/wirtschaft/gas-aus-russland-das-passiert-wenn-nichts-mehr-geliefert-wird-18037540.html

German Act Amending the Energy Industry Act (*Gesetz zur Änderung des Energiewirtschaftsgesetzes zur Einführung von Füllstandsvorgaben für Gasspeicheranlagen sowie zur Änderung von § 246 des Baugesetzbuchs*), 26 April 2022.

German Association of Energy and Water Industries (2022), Kurzfristige Substitutions- und Einsparpotenziale Erdgas in Deutschland, 17 March 2022.

German Energy Industry Act (*Energiewirtschaftsgesetzes* – EnWG), Section 53a, Sicherstellung der Versorgung von Haushaltskunden mit Erdgas.

German Institute for Economic Research (2022), Energieversorgung in Deutschland auch ohne Erdgas aus Russland gesichert, DIW aktuell, No 83, 8 April 2022.

Gesellschaft für Konsumforschung (2022), Consumer sentiment reaches historic low, press release of 27 April 2022, available at https://www.gfk.com/press/consumer-sentiment-reaches-historic-low

Haertel, T., B. Hamburg and V. Kusin (2022), The macroeconometric model of the Bundesbank revisited, Deutsche Bundesbank Technical Paper, 01/2022.

Joint Economic Forecast Project Group (2022), Von der Pandemie zur Energiekrise – Wirtschaft und Politik im Dauerstress, spring 2022.

Krebs, T. (2022), Auswirkungen eines Erdgasembargos auf die gesamtwirtschaftliche Produktion in Deutschland, IMK Study, No 79.