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CORRIGENDUM

This document corrects document SWD(2022) 629 final of 23.05.2022.
Correction of figures in table 2.1.

The text shall read as follows:

COMMISSION STAFF WORKING DOCUMENT

In-depth review for Germany

in accordance with Article 5 of Regulation (EU) No. 2011/1176 on the prevention and correction of macroeconomic imbalances

Accompanying the document

COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN CENTRAL BANK, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE, THE COMMITTEE OF THE REGIONS AND THE EUROPEAN INVESTMENT BANK

2022 European Semester – Spring Package

{COM(2022) 600 final} - {SWD(2022) 628 final} - {SWD(2022) 630 final} - {SWD(2022) 631 final} - {SWD(2022) 632 final} - {SWD(2022) 633 final} - {SWD(2022) 634 final} - {SWD(2022) 635 final} - {SWD(2022) 636 final} - {SWD(2022) 637 final} - {SWD(2022) 638 final} - {SWD(2022) 639 final}

On the basis of this in-depth review for Germany undertaken under Regulation (EU) No 1176/2011 on the prevention and correction of macroeconomic imbalances, the Commission has considered in its Communication "European Semester – 2022 Spring Package" (COM(2022)600 final) that:

Germany is experiencing imbalances. Vulnerabilities relate to a persistent large current account surplus, which reflects subdued investment relative to savings, and has cross-border relevance. The current account surplus declined only slowly until 2020, and increased in 2021. It remains well beyond the levels suggested by the country's fundamentals, reflecting consumption restraint and persistently subdued investment. Corporate investment has remained below the pre-pandemic level and corporations have continued to post strong net savings. Residential investment has gradually increased from a low level but supply still falls short of housing demand. Existing barriers, including administrative ones, constrain public and private investment. The current account surplus is likely to remain elevated even if expected to decline somewhat in 2022 on account of higher commodity prices. Recent announcements to promote investment are promising and the RRP is geared towards addressing investment bottlenecks. Still, further resources and efforts to tackle investment bottlenecks as well as thorough implementation are key for promoting investment further.

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1. INTRODUCTION

In 2021, over the previous annual cycle of surveillance under the Macroeconomic Imbalances Procedure (MIP), the Commission identified "macroeconomic imbalances" in Germany. ([1]) These imbalances were related to a subdued level of investment relative to savings reflected in a persistent current account surplus, and had cross border relevance. The 2022 Alert Mechanism Report concluded that a new in-depth review (IDR) should be undertaken for Germany with a view to assess the persistence or unwinding of imbalances. ([2])

The German economy faces headwinds from trade disruptions, as well as a surge in inflation following Russia's invasion of Ukraine. Effective policy support helped to cushion the economy during the COVID-19 crisis. Real GDP declined by 4.6% in 2020, less than in the EU and the euro area. Public investment increased by 6% in 2020, cushioning the shortfall in overall investment. Recurrent pandemic waves and persisting shortages of key raw materials and supplies kept the GDP rebound more moderate than in the rest of the euro area at 2.9% in 2021. Exports proved relatively resilient to the slowdown in car manufacturing as the value-added per car increased. Continuous disruptions in supply chains and Germany's relatively strong dependence on international trade and Russian gas are a further drag following Russia's invasion of Ukraine. There is upward pressure on costs and prices, in particular for energy, with inflation (HICP) at 7.6% in March 2022, its highest rate in more than four decades. Domestic demand in 2022 should benefit from additional public investment, and discretionary fiscal measures announced to respond to the effects of the Russian aggression against Ukraine are expected to cushion the economy. Along with a commodity price shock, such staggered demand may contribute to narrowing the current account surplus somewhat in the short run, but is unlikely to represent a structural change. Overall, the current account surplus remains elevated and is expected to stay above 6% of GDP.

This in-depth review presents the main findings for the assessment of imbalances. , The assessment is backed by a thematic section on investment needs and bottlenecks to public and private investment. Spillovers and systemic cross-border implications of imbalances are also taken into account, including the spillover effects of the government's fiscal spending plans on other Member States. In addition, assessments from previous IDRs and in the context of fiscal assessments are also considered if relevant. The MIP assessment matrix is published in the 2022 Country Report for Germany. ([3])

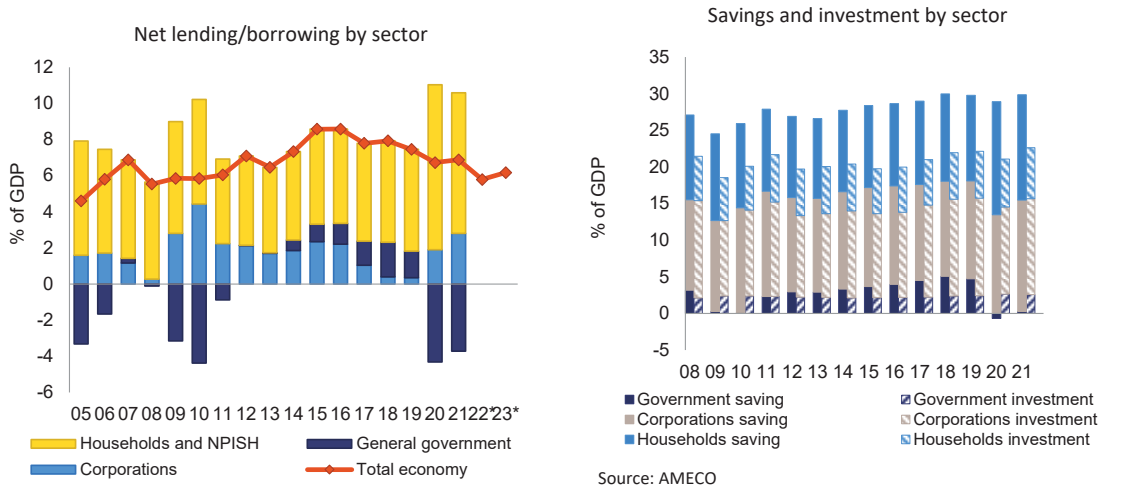
([1]) European Commission (2021), European Semester Spring Package 2021, COM(2021) 500 final, 02.06.2021.
([2]) European Commission (2021), Alert Mechanism Report 2022, COM (2021) 741 final, 24.11.2021.
([3]) European Commission (2022), Country Report Germany 2022, SWD(2022)607 final, 23.05.2022.

2. ASSESSMENT OF MACROECONOMIC IMBALANCES

Assessment of gravity, evolution and prospects of macroeconomic imbalances

The German economy's large current account surplus reflects among others a subdued level of domestic demand relative to income. The persistent large surplus stayed above 6% of GDP in every year since 2011 peaking at 8.6% of GDP in 2015 and has been declining only slowly afterwards. It reflects low demand and the various sectors of the economy were overall net lenders (see Graph 2.1). It was only mildly affected by economic fallout of the COVID-19 pandemic, as the exports held relatively strong. In 2021, it has increased to 7.4% of GDP. Private savings (both household and corporate) increased, also reacting to reduced consumption possibilities and increased uncertainty, offsetting the decrease in government savings. Hence, although the sectoral composition of the savings changed, the overall level did not change so much. The surplus continues to be significantly above what can be explained by economic fundamentals, ([8]) such as Germany's demographics and high manufacturing intensity, which would add up to a current account surplus of somewhat above 2% of GDP.

Graph 2.1: **Savings and investments by sector and the resulting net lending/borrowing**



Source: European Commission services

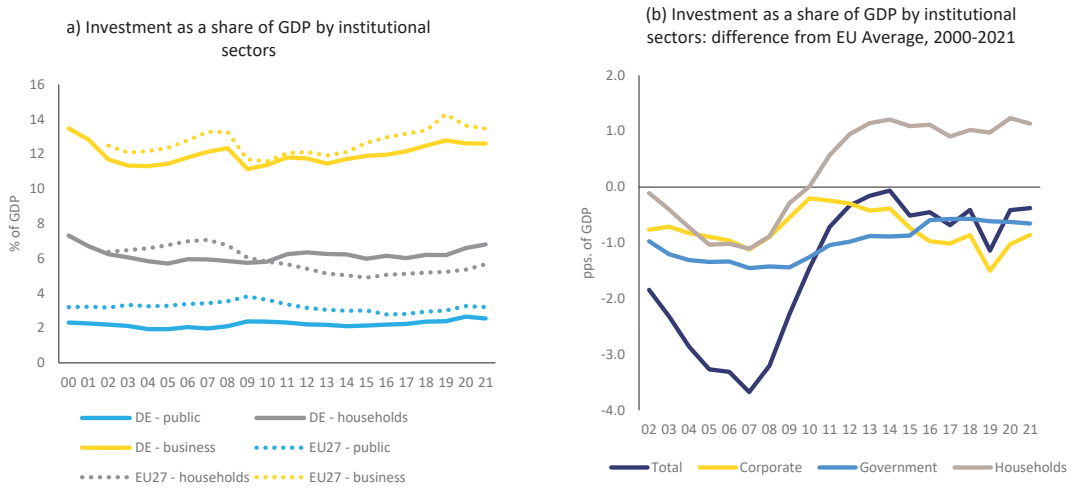
The current account surplus is expected to contract in 2022 due to high energy prices and trade disruption. The current account surplus is expected to decline to 6.4% of GDP in 2022. ([9]) Trade disruption and impaired supply chains, also associated with the Russian military aggression against Ukraine, are expected to limit exports, in particular from the competitive manufacturing sector. Rising commodity prices will additionally depress the external balance (see Box 2.2). Higher costs and prices are expected to dent corporate and household savings. Fiscal support measures are expected to keep the budget in deficit. On the other hand, uncertainty will lead to consumption and investment retrenchment and the surplus would stay significantly above what fundamentals suggest, rebounding to 6.8% of GDP in 2023.

([8]) For a methodology, see Coutinho, L., Turrini, A., and Zeugner, S. (2018): Methodologies for the Assessment of Current Account Benchmarks, European Economy Discussion Paper 86.

([9]) Note that this figure refers to the current account balance in balance-of-payments terms. The current account balances that German authorities report under the national accounts concepts are slightly lower.

The inability to channel high savings to domestic investment has resulted in a deterioration of capital stock which limited potential growth. Germany has the highest household saving rates in the EU. ([10]) At the same time, corporate investments were relatively suppressed, remaining below the EU average and the overall investment rate remained below the EU average. Public investment has been on a gradual upward trajectory already prior to the COVID-19 pandemic, but over the past two decades it has remained below the EU average (see Graph 2.2), resulting in underinvestment, notably at the local level, and has dented the quality of public infrastructure. ([11]) On top of this investment backlog, there are considerable new and increasing investment challenges related to the decarbonisation and digitalisation of the economy. Addressing the demand shortfall through rebalancing savings and investments would first and foremost improve the allocation of domestic resources and thus increase the potential output of the German economy, with positive spillovers to the euro area. ([12])

Graph 2.2: **Investment by institutional sectors**

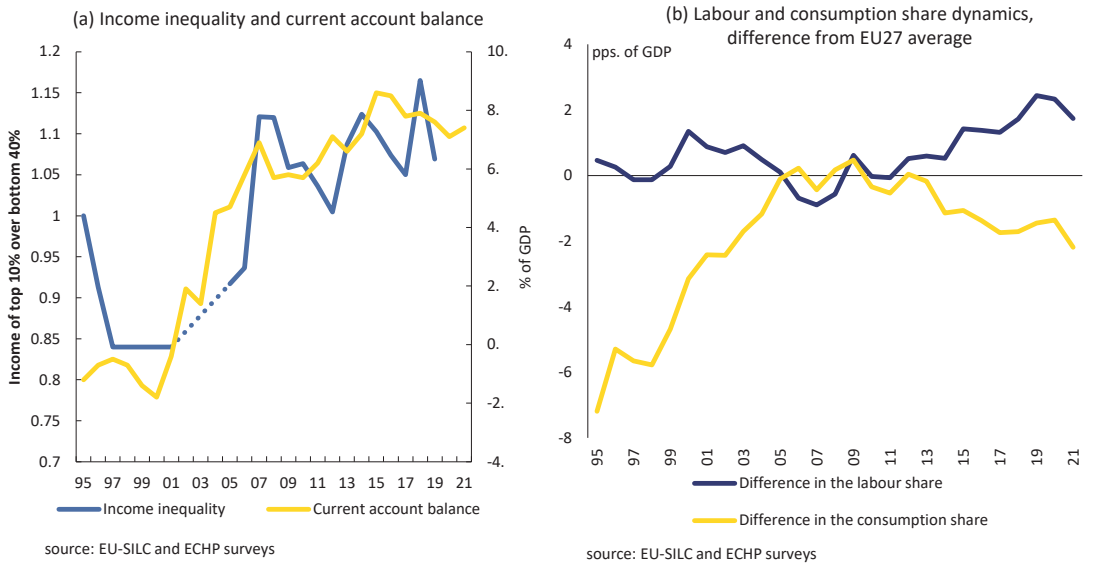


Source: Eurostat

High household savings also reflect income inequality. Germany's high household saving rate has been linked to various factors, including "a specific German propensity to save". ([13]) At the same time, the high overall saving rate masks considerable differences across social groups. Microdata suggests that 40% of German households with the lowest income have overall negative or around zero saving rates, and the high average saving rate is driven in particular by the highest income groups – with the 10% of the population with the highest income providing for 54 to 65% of total savings, and the 1% of the population with the highest income providing for 13 to 37% of total savings. ([14]) Higher income groups have a much higher propensity to save and the increase in current account surplus went hand-in-hand with higher income inequality at the top of the income distribution (see Graph 2.3a). ([15]) In addition, lower income groups tend to save on saving accounts bearing low deposit rates, which limits long-term prospects for wealth accumulation and are further away from investment.

([10]) German households had the highest saving rates in the EU in ten years out of the eleven years from 2010 to 2020. In 2019, German households had a gross saving rate of 18.4% compared to an EU average of 12.2%, while in 2020 the rates were 23.4% and 18.3%, respectively.
([11]) For further details, see the thematic chapter on persistent investment needs and bottlenecks.
([12]) See Box 2.2 in this report, and spillover analyses in earlier In-Depth Reviews including Box 3.2 Spillovers of a sustained increase in public investment – the case of Germany in European Commission (2020), Country Report Germany 2020 - Including an In-Depth Review on the prevention and correction of macroeconomic imbalances, SWD(2020) 504 final.
([13]) European Commission (2018), Country Report Germany 2018 - Including an In-Depth Review on the prevention and correction of macroeconomic imbalances, European Commission, Brussels.
([14]) Späth, J. and Schmid, K. D. (2018), "The Distribution of Household Savings in Germany" *Jahrbücher für Nationalökonomie und Statistik*, vol. 238, no. 1, 2018, pp. 3-32.
([15]) International Monetary Fund (IMF) (2019), Germany - Selected Issues. IMF Country Report No. 19/214, July 2019.

Graph 2.3: **Household, labour and consumer perspective**



(1) Income inequality is measured here as the income share of the top 10% of the population divided by the income share of the bottom 40% of the population. There is a break in the series in 2001 after the discontinuation of the ECHP survey and a break in 2020 reflecting a change in the SILC survey
Source: European Commission services

Disincentives to work more hours still drag down disposable income of low- and middle-income households, although the share of labour income in GDP has increased in recent years. In the early 2000s, private consumption was held back by wage moderation which led to a shrinking of the labour income share in GDP (see Graph 2.3b), but these losses have been largely recouped in the 2010s. At the same time, taxes on labour including social security contributions remain high, ([16]) affecting take-home pay and households' disposable incomes. Taxation of marginal employment (such as for *Minijobs*) combined with the joint income taxation of couples (*Ehegattensplitting*) create disincentives to increasing the number of hours worked, consequently constraining earned income. Policies that increase disposable incomes particularly among low- and middle-income households, which have an above-average propensity to consume, could help external rebalancing, while also fostering more inclusive growth. The minimum wage increases in 2022 are expected to work in this direction, absent a strong reduction in employment or hours worked.

Housing investment has gradually increased from a low level but supply still falls short of housing demand. Residential investment has increased from the trough at the turn of the century and currently accounts for roughly a third of domestic investment; however a large part of the increase was eaten up by rising costs. ([17]) The increase of housing completion from the low levels reached in 2009 has not been sufficient to dampen house price increases (see box 2.1). Housing shortages show stark regional differences, and there is evidence that regional focus of construction activity does not fully align with the current and future housing demand. ([18])

Corporate savings outpace corporate investments as the latter are held back by temporary and structural barriers. High corporate savings partly reflect savings of wealthy individuals, accumulated within firms due to preferential tax treatment, mainly within the inheritance and gift tax system. Firms owned and managed by a small number of families tend to save more than other firms, and more than similar firms in the euro area. ([19]) Gross corporate savings remained high during the pandemic and in 2021 they reached 15.2% of GDP, a historical peak. This reflected that a large share of companies

([16]) Reflected in databases and rankings such as https://europa.eu/economy_finance/db_indicators/tab/ and https://ec.europa.eu/taxation_customs/taxation-1/economic-analysis-taxation/data-taxation_en and OECD (2021), Taxing wages.
([17]) For further details see the thematic chapter on investment needs.
([18]) Henger, R. M. and Voigtländer, M., (2021), Weiterhin hohe Wohnungsbedarfe – vor allem in Großstädten Aktuelle Ergebnisse des IW-Wohnungsbedarfsmodells. IW-Gutachten.
([19]) International Monetary Fund (IMF) (2019), 2019 Article IV Consultation - Germany. IMF Country Report No. 19/213, July 2019.

benefitted from generous policy support, and also that many could exercise pricing power. At the same time, lockdowns, restrictions on economic activity, supply bottlenecks and heightened uncertainty acted against investment. Corporate investment recovered only partially in 2021, matching GDP growth, with the investment-to-GDP ratio remaining at 12.6% of GDP, slightly below its pre-pandemic level (12.8%), and remaining below the euro area average of 13.3% of GDP. Overall, the high corporate savings in the past decade only partially translated into domestic investment. Investment also remained below the level in other EU countries, despite favourable financing conditions, persistent investment needs and high corporate earnings. Structural barriers, such as slow permit procedures and insufficient digital infrastructure, keep inhibiting public and private investment. ([20]) The improvement of framework conditions, such as reducing administrative burden as promoted in the Recovery and Resilience Plan (RRP), ([21]) is expected to contribute to further improvements.

Over the years, public investment remained subdued, as fiscal and structural policies have not achieved a sustained increase in public investment. Between 2014 and 2019, structural budget balances exceeded the medium-term budgetary objective under the Stability and Growth Pact (SGP). This appears partly due to overly prudent budgetary planning, as the realised headline balances repeatedly turned out better than planned (the difference amounting on average to 1% of GDP), primarily as revenues systematically tended to develop more favourably than included in the budget plans.

Government savings could have been used to a greater extent to enable higher public investment. Better activation of available resources, together with flanking measures enabling better absorption, could have ensured effective realisation of a larger volume of investment. This could have helped public investment catch up with the EU average (see Graph 2.2).

Assessment of MIP relevant policies

Responding to the economic effects of the pandemic and the Russian aggression against Ukraine, Germany has been taking measures to protect incomes and to reduce longer-term scarring effects on its economy. In 2020, federal support for municipalities was key to keep local public investment on track despite uncertainty and revenue shortfalls. Non-financial corporations benefitted from liquidity support, from debt and insolvency moratoria, as well as from the government's effort to reduce the labour cost by providing short-term work compensation (*Kurzarbeitergeld*), which also helped households. Government support for corporates and households continued in 2021, combined with forced savings due to reduced consumption opportunities. In 2022, discretionary fiscal measures have been taken to cushion the effects of the Russian aggression against Ukraine on the economy.

Timely and full implementation of the RRP and of all planned additional public investment will be crucial to increase the investment levels, but may nonetheless not cover all large investments needs. As explained in the chapter on investment needs, the Recovery and Resilience Plan aims to help reducing barriers to investment and promote public and private investment. The new government also aims to strengthen investment into the twin green and digital transition, to improve framework conditions for infrastructure investment and to increase investment into its armed forces. Box 2.2 shows how GDP and current account balance might be impacted, assuming that these commitments translate into an additional yearly expenditure of EUR 16 billion on green investments (0.4% of GDP) and about EUR 20 billion on defence (0.5% of GDP). The simulation suggests the GDP level being 1.1% higher in 2025 to 2027, and the current account surplus 0.1 pp of GDP lower than without the stimulus. A higher than assumed import content, for example for defence expenditure, could result in a higher reduction in the current account surplus and lower increase in GDP. At the same time, even if the announced investments are implemented, they appear to only partially address the total investment needs. ([22])

([20]) For further details, see the thematic chapter on persistent investment needs and bottlenecks.
([21]) https://ec.europa.eu/info/business-economy-euro/recovery-coronavirus/recovery-and-resilience-facility/germanys-recovery-and-resilience-plan_en
([22]) See thematic chapter on investment needs.

Box 2.1: House price developments in Germany

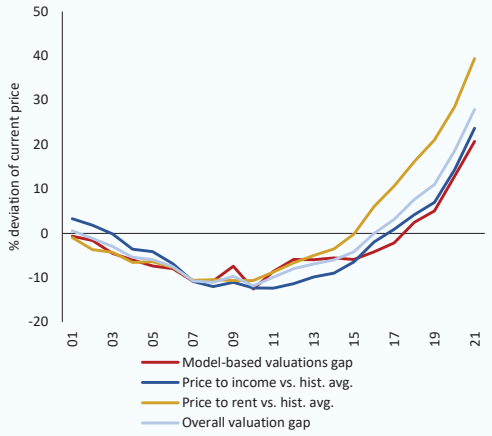
House prices accelerated during the pandemic to a 12% growth rate year-on-year, and now are at almost double their 2008 levels. House prices had been steadily outpacing income growth during the 2010s, and increased by around 60% from 2008 to 2019Q4. Until 2021Q4, prices increased by a further 22%. The house price dynamics are broad based: while price increases had been particularly severe in major cities, most other urban and rural areas had also seen price increases close to the national average.

Commission and ECB models consider 2021 German house prices to be overvalued by 20-30%. The Bundesbank assesses house price overvaluation to range between 15% and 40% depending on the region. A combination of various assessment tools show that national house prices exceeded the level suggested by fundamentals by 28% in 2021Q4, compared to 19% in 2020 (see Graph 1a). Among such tools, the price-to-rent gap surged to 39.4% above its long-term average. Since 2021, the average household would need more than ten years of income to buy a 100m^2 apartment, which is nevertheless comparable to the situation in most euro area Member States.

The growth of mortgages has been considerable, and has become subject to a macroprudential recommendation by the European Systemic Risk Board (ESRB) in 2022. A low average mortgage rate has made loan repayments less burdensome, leading to a significant increase in MFI loans for housing purchases, reaching a y-o-y growth of 7.1% in 2021 from 6.5% in 2020 (see Graph 1b). In addition, at 41% of GDP the level of household mortgages is relatively high when one takes into account the home ownership ratio in Germany, which is particularly low for low- and middle income earners. ([1]) Germany is one of two Member States to which the ESRB had addressed macroprudential recommendations in 2022. The ESRB identifies house price overvaluation, high house price growth, signs of loosening of lending standards and significant data gaps as the key vulnerabilities in the German housing market.

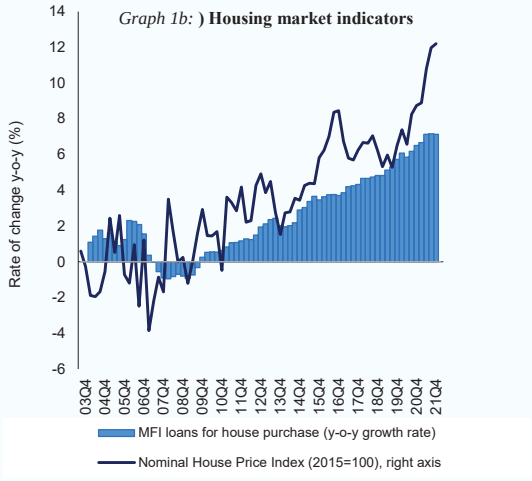
Housing supply is increasing but is still insufficient to close the gap between demand and supply. Residential construction increased to 7.2% of GDP in 2021, but this mainly reflected renovation (see Table 1). Despite strong price signals, the number of completed dwellings per capita remains considerably lower than in neighbouring Member States, which points at structural supply rigidities (see chapter 3).

Graph 1a: **) House price overvaluation gap**



source: Eurostat, ECB, European Commission calculations

Graph 1b: **) Housing market indicators**



source: Eurostat, ECB, European Commission calculations

Table 1: Selected house market indicators

			2003-07	2008-12	2013-17	2018	2019	2020	2021	2021Q2	2021Q3	2021Q4
House price developments	Unit	Source										
Real house price, yoy growth	%	(a)	-1.8	0.7	3.9	5.1	4.4	7.1	7.6	8.9	7.8	7.4
Nominal house price, yoy growth	%	(a)	-0.5	2.0	4.9	6.7	5.8	7.8	11.0	10.8	12.0	12.2
Price to income in level [1]	years	(b)	8.0	7.4	8.0	8.8	9.1	9.7	10.5	10.5	10.7	10.9
Valuation gaps												
Price to income gap [2]	%	(c)	-5.1	-11.8	-5.3	4.2	7.0	14.3	23.7	21.7	25.7	28.4
Price to rent gap [2]	%	(c)	-7.1	-9.4	1.6	16.2	21.1	28.5	39.4	36.9	42.1	46.0
Model valuation gap [3]	%	(c)	-7.3	-9.0	-4.7	2.5	5.0	12.9	20.7	18.9	22.7	25.4
Average house price gap [4]	%	(c)	-6.5	-10.1	-2.8	7.6	11.0	18.6	27.9	25.8	30.2	33.3
Housing credit												
Mortgages (% GDP)	%	(d)	41.1	37.4	35.8	36.4	37.3	41.0	41.4			
Mortgages, yoy growth	%	(d)	0.8	0.6	3.3	4.8	5.7	6.5	7.1			
Housing supply												
Residential construction - dwellings (% GDP)	%	(e)	5.3	5.4	5.9	6.2	6.4	7.0	7.2			
Residential construction - dwellings, yoy growth	%	(e)	-8.4	2.3	1.5	3.0	1.5	3.4	1.3			
Non-residential construction (% GDP)	%	(e)	3.9	4.1	3.9	4.0	4.1	4.3	4.4			
Value added in the construction sector, yoy growth	%	(e)	-12.3	1.2	0.7	1.9	0.4	3.8	-0.5			
Building permits, yoy growth	%	(a)	-7.6	5.7	7.3	1.9	3.2	2.4	3.9			
Other housing market indicatos												
Share of owner-occupiers, with mortgage or loan	%	(a)	29.4	28.0	26.5	25.6	25.8	31.4				

Notes:
(1) Price to income in level is the number of years of income necessary to buy an assumed 100m2 dwelling. See Bricogne, J-C, A. Turrini, and P. Pontuch, 2019, "Assessing House Prices: Insights from HouseLev, a Dataset of Price Level Estimates", Discussion Paper 101, European Commission, available in "https://ec.europa.eu/info/publications/assessing-house-prices-insights-houselev-dataset-price-level-estimates_en".
(2) Price to income and price to rent gaps are measured in deviation to the long-term average (from 1995 to the latest available year).
(3) The model valuation gap is estimated in a cointegration framework with nominal house prices as the dependent variable and five fundamental explanatory variables: total population, real housing stock, real disposable income per capita, real long-term interest rate and price deflator of final consumption expenditure. See Philiponnet and Turrini, Assessing House Price Developments in the EU (2017) available in "https://ec.europa.eu/info/publications/economy-finance/assessing-house-price-developments-eu_en" and revision notes presented to LIME in October 2019 and June 2020. [How to make a reference if it is not public?]
(4) The average house price gap is the simple average of the price-to-income, price-to-rent and model valuation gaps.
Sources: (a) Eurostat, (b) Eurostat, OECD, ECB, BIS, Ameco, national sources, European Commission calculations, (c) European Commission calculations, (d) ECB, Ameco (e) Ameco.

([1]) The 2021 mortgage to GDP ratio was ca. 40% of GDP both in Germany and in the rest of the euro area. Yet owner-occupiers accounted for 50% of German households in 2019, compared to 70% for the rest of the euro area.

The considerable increase in the minimum wage has the potential of increasing low incomes, supporting disposable incomes and consumption, yet earned incomes at the bottom remain heavily taxed. From October 2022, the minimum wage is increasing to EUR 12 per hour (+25% compared to the minimum wage at the end of 2021), the second highest level in the EU. This will bring the Kaitz-index (minimum wage over median wage) from about 50% in 2020 to about 60%, and result in a significant wage push at the bottom of the wage distribution. This is expected to directly affect close to eight million workers (about a quarter of all employees) and have an upward effect on the entire wage distribution. This contributes to a positive wage drift compared to the overall moderate negotiated wage developments. ([23]) At the same time, the tax wedge for low and middle-income earners remains among the highest in the EU, and constitutes a permanent drag on disposable incomes.

Conclusion

Germany entered the COVID-19 crisis with a persistent current account surplus that remains largely unchanged and continues to indicate underuse of resources. After a temporary reduction in 2020, the current account surplus increased again in 2021 to 7.4% of GDP, and it remains high, reflecting private consumption restraint and persistently subdued investment relative to savings. A number of structural barriers, including administrative ones, constrains public and private investment. In the context of heightened geopolitical risks, business and consumer uncertainty, corporate investments may remain subdued, highlighting the importance of frontloading public investment. Due to the important role of gas in Germany's energy mix, Germany is more exposed to the energy price shock in general, and to Russian

([23]) As of March 2022, the government expected the minimum wage increase to add 0.6 pps to wage growth in 2022 and 1.2 pps in 2023, while the Bundesbank expected the growth of gross wages and salaries to be 0.8 pps higher in 2023 compared to the situation without a minimum wage increase in October. The Bundesbank expected half of the total impact from wage increases for those who earned previously below EUR 12, and the other half of the total impact from wage increases who have earned above. (Bundesbank (2022), Monatsbericht Februar 2022, 74. Jahrgang, Nr. 2.)

energy imports in particular, than the EU average, which also may affect the current account in the short-term (see box 2.3).

There are promising policy announcements, still further resources and efforts to tackle investment bottlenecks as well as thorough implementation are key for promoting investment further. A timely and targeted implementation of the planned investments would help to increase the overall investment level. This would be further supported by tackling the investment bottlenecks, as envisaged in the Recovery and Resilience Plan.

Based on the findings in this in-depth review, the Communication "European Semester – 2022 Spring Package" ([24]) sets out the Commission's assessment as to the existence of imbalances or excessive imbalances in Germany, in line with Regulation 1176/2011.

([24]) European Commission (2022), European Semester Spring Package 2022, COM(2022)600 final.

Box 2.2: Spillover effects of public investment: Germany

This box uses the Commission's QUEST model to quantify the potential impact of announced investment plans in Germany. ([1]) The new government declared the 2020s to be a "decade of future-oriented investment" and sets out a long-term investment programme. The simulation here assumes that the plan could imply additional public investment of around EUR 16 billion per year until 2025, mainly geared toward the green and digital transition. ([2]) Reflecting a government pledge of setting up an EUR 100 billion fund for defence, the simulations also consider defence spending of EUR 20 billion per year. As a stylised assumption for modelling purposes, half of it is classified as investment. The total stimulus under consideration reaches almost 1% of German GDP on average (2022-2025). The analysis assumes that the stimulus is sustained, i.e. the public investment rate only gradually returns to baseline. Finally, focussing on spillover to the rest of the euro area, a second set of simulations is run jointly for the German and Dutch investment programmes (the latter amounts to around 1.3% of Dutch GDP p.a. for 2022-2026). ([3])

The model simulations apply the following technical assumptions. Public capital in the model increases productivity. The model explicitly features short-run implementation delays for public investment, e.g. related to contracting time and planning horizons. Moreover, due to time-to-build frictions, investment takes time to translate into productivity gains. The output elasticity of public capital is set to 0.12, as suggested by meta-analysis (Bom and Ligthart, 2014). A low-productivity scenario highlights the importance of this assumption. ([4]) The simulation assumes that no neutralising fiscal measures are implemented for the first ten years. Monetary policy is assumed to retain its accommodative stance for 2022 and gradually normalise afterwards.

Table 1 shows that, if implemented fully, the public investment programme can have considerable positive domestic GDP effects and cross-border spillovers. In line with earlier QUEST simulations, the public investment plan increases output and enhances employment and wage growth in both Germany and the rest of the euro area. ([5]) Based on the assumption of productive public capital, the additional investment boosts demand and potential growth. There are positive trade spillovers to the rest of the euro area from higher import demand in Germany and a euro depreciation. The current account surplus (in % of GDP) declines relative to baseline. The effect is smaller under high productivity because of the implied competitiveness gains. Importantly, the assumed accommodative monetary policy limits the crowding out effects of private demand and increases positive spillover in the monetary union.

Table 1: Simulation results of public investment programme scenarios

	2022	2023	2024	2025	2026	2027	2028	2029	2030
Only DE plan (high productivity)									
GDP Germany	0.5	0.9	1.0	1.1	1.1	1.1	1.0	0.9	0.9
Current account Germany (%GDP)	-0.1	-0.1	-0.1	-0.2	-0.2	-0.1	-0.1	-0.1	0.0
GDP rest of the euro area	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Joint stimulus (DE&NL, high productivity)									
GDP Germany	0.5	0.9	1.0	1.1	1.2	1.2	1.0	1.0	1.0
Current account Germany (%GDP)	0.0	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	0.0
GDP rest of the euro area	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3
Joint stimulus (DE&NL, low productivity)									
GDP Germany	0.4	0.7	0.7	0.7	0.7	0.6	0.4	0.3	0.3
Current account Germany (%GDP)	-0.1	-0.1	-0.2	-0.2	-0.2	-0.1	-0.1	-0.1	-0.1
GDP rest of the euro area	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1

Note: The table reports the GDP level and the current account balance in %-deviation and pp-deviation from baseline, respectively. The first row considers only the DE investment plan. The rest of the euro area excludes Germany and the Netherlands. Source: Commission services.

There are substantial downside risks. The low productivity scenario highlights the importance of selecting high-quality investment projects. While sizable effects remain, the growth impact is substantially lower (especially in the long run) when public investment is allocated to less productive uses. Besides the productivity effects, the simulated impact depends strongly on the assumption that the plans are carried out in full. In the past, realisation of investment plans was lagging behind announcements. If the actual investment fell short of the assumed volumes, the positive domestic and spillover effects would be (roughly) proportionally lower.

([1]) For information on the QUEST model, see Burgert et. al (2020) A Global Economy Version of QUEST: Simulation Properties, ECFIN Discussion Paper 126 and https://ec.europa.eu/info/business-economy-euro/economic-and-fiscal-policy-coordination/economic-research/macroeconomic-models_en#quest-macroeconomic-model

([2]) This investment is expected to be realised from the top-up of Climate and Transformation Fund by an additional EUR 60 billion, as announced end 2021.

([3]) The stimulus is on average EUR 19 billion, with a backloaded profile of 0.7% of GDP in 2022 and 2.6% in 2025, assumed to revert to the baseline after 2026. See Box 2.1 in the in-depth reviewt on the Netherlands (SWD(2022)636 final) that provides further details.

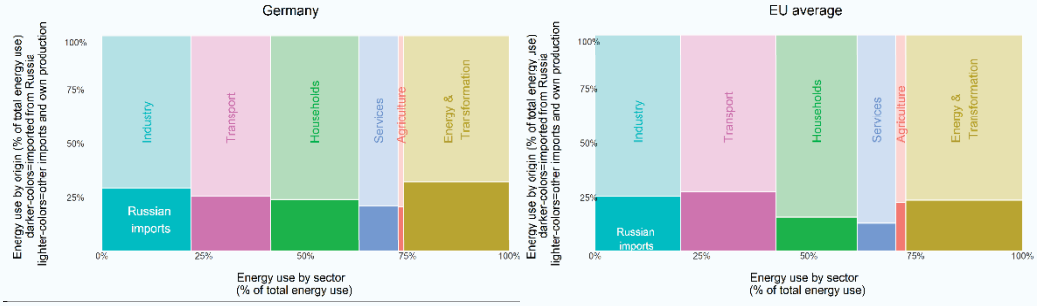
([4]) In this case, the output elasticity is set to 0.05, in line with the lower bound considered in Leeper et al. (2010). Government Investment and Fiscal Stimulus, Journal of Monetary Economics, 57, 1000–12.

([5]) See European Commission (2017) and European Commission (2020).

Box 2.3: Exposures to the commodity price surge, and to Russia

This box summarises risks and exposures regarding the commodity price surge, and the importance of direct links with the Russian economy. The surge of commodity prices since 2021 had been amplified by the Russian military aggression against Ukraine. This box reviews the implications for the savings-investment imbalances in Germany. Due to the important role of gas in Germany's energy mix, Germany is more exposed to a commodity price surge in general, and to energy imports from Russia in particular, than the EU average.

Graph b.3.1: Sectoral distribution of energy use and of energy imported from Russia



Notes: The left panel displays the distribution of primary energy usage in Germany according to Eurostat energy balances. The horizontal axis displays the relative importance of energy-consuming sectors. The vertical axis displays the importance of energy importance from Russia in satisfying that need. Note that this dependence on Russia differs according to sector's use of natural gas vs oil and coal. For comparison, the right hand panels displays the same concept for the EU aggregate.
Russian imports include oil and petroleum products,natural gas and solid fossil fuels.
Sources: Eurostat and European Commission services calculations

The household sector depends on imported energy, in particular natural gas, for heating and other residential uses. Industry accounts for a fifth of overall energy use and is likewise heavily dependent on natural gas and on imports from Russia (Graph b.3.1). Table b.3.1 shows that in 2020 imports from Russia accounted for about two-thirds of natural gas and one third of crude oil imported to Germany. Beyond those significant energy links, the Russian economy seems to be of minor importance for the German GDP. Around 0.5% of German production is tied to Russian final demand, and direct financial links with Russia are considerably smaller than for the EU average (Table b.3.1). In contrast, German demand is non-negligible for Russian GDP. Almost 2% of Russia value-added depend directly on German final demand mostly focused on hydrocarbons.

Table b.3.1: Selected exposures

Trade & financial exposures	unit	DE	EU
Domestic value added embodied in exports to Russia	% of GDP	0.5%	0.4%
Non-energy Russian import content in final demand	% of GDP	0.4%	0.4%
Russian tourist nights spent	% of total 2019	2.3%	2.7%
FDI assets held in Russia	% of 2020 GDP	0.6%	2.5%
Portfolio & other inv. assets held in Russia	% of 2020 GDP	0.4%	0.9%
FDI liabilities towards Russia	% of 2020 GDP	0.2%	1.2%
Portfolio & other inv. liabilities towards Russia	% of 2020 GDP	0.6%	1.1%
Consolidated banking exposures towards Russia	% of 2021 GDP	0.2%	0.5%

Energy mix	unit	DE	EU
Solids fossil fuels (incl. peat)	% of Gross inland consumption 2020	15.6%	10.8%
Oil and petroleum products	% of Gross inland consumption 2020	34.7%	32.7%
Natural gas	% of Gross inland consumption 2020	26.1%	24.4%
Renewables and waste	% of Gross inland consumption 2020	17.9%	19.0%
Nuclear	% of Gross inland consumption 2020	5.8%	13.1%
Commodity exposures	**unit**	**DE**	**EU**
Net petroleum imports from all countries	% of GDP 2021	0.7%	1.2%
Crude oil imports from Russia '20	% of oil imports	34.0%	25.7%
Net gas imports from all countries	% of GDP 2021	0.6%	0.6%
Gas imports from Russia '20	% of gas imports	65.2%	43.6%

Notes: data source Eurostat for commodity exposures, European Commission Figaro for value-added exposures, BIS for consolidated banking exposures, European Commission FinFlows for other financial exposures. Energy gross inland consumption excludes net imports of electricity and derived heat.

The commodity price shock may affect private and public sector balance sheets, and will have an impact on the current account surplus. If German net imports of oil, gas and coal in 2022 remain comparable to the pre-pandemic period, the increased prices for those hydrocarbons would weigh on the German trade balance by an amount of up to 2 pp of GDP, when compared with 2019. However, past commodity price shocks suggest that German corporations adjust to such import price shocks by passing through prices as well as reducing their investment. At the same time, geopolitical concerns may also incentivise certain types of domestic investment including in networks and LNG terminals. (1) Overall, due to the commodity price shock, behavioural and policy responses and other temporary factors, the current account balance is forecast to temporarily decline by around 1 pp of GDP in 2022, and to recover somewhat in the following year. A potential disruption of energy imports from Russia, in contrast, might have more wide-ranging consequences, however with uncertain effects on external balances.

Table 2.1: **Selected economic and financial indicators (Part 1), Germany**

all variables y-o-y % change, unless otherwise stated	2003-07	2008-12	2013-17	2018	2019	2020	2021	forecast 2022	forecast 2023
Real GDP	1.6	0.7	1.8	1.1	1.1	-4.6	2.9	1.6	2.4
Potential growth (1)	1.3	1.0	1.6	1.2	1.0	0.8	0.9	1.0	1.1
Contribution to GDP growth:									
Domestic demand	0.8	1.0	1.6	1.6	1.8	-2.8	1.1	2.3	2.6
Inventories	0.0	-0.4	0.2	-0.1	-0.1	-0.9	1.0	-0.2	0.1
Net exports	0.7	0.1	0.0	-0.5	-0.7	-0.8	0.8	-0.6	-0.2
Contribution to potential GDP growth (1):									
Total Labour (hours)	0.2	0.1	0.6	0.3	0.1	0.0	0.1	0.1	0.2
Capital accumulation	0.3	0.2	0.3	0.4	0.4	0.3	0.3	0.3	0.3
Total factor productivity	0.8	0.6	0.7	0.6	0.6	0.5	0.5	0.5	0.6
Output gap (2)	-0.6	-0.8	0.2	1.5	1.5	-3.9	-2.0	-1.4	-0.1
Unemployment rate	9.5	6.3	4.3	3.2	3.0	3.7	3.6	3.3	3.2
Harmonised index of consumer prices (HICP)	1.8	1.7	1.0	1.9	1.4	0.4	3.2	6.5	3.1
GDP deflator	0.9	1.2	1.7	2.0	2.1	1.6	3.0	5.4	3.6
External position									
Current account balance (% of GDP), balance of payments	4.6	6.1	7.7	7.9	7.6	7.1	7.4	6.4	6.8
Trade balance (% of GDP), balance of payments	5.3	5.5	6.9	6.1	5.7	5.7	5.4	.	.
Primary income balance (% of GDP)	0.7	2.0	2.2	3.3	3.3	2.9	3.5	.	.
Secondary income balance (% of GDP)	-1.4	-1.4	-1.4	-1.5	-1.4	-1.6	-1.5	.	.
Current account explained by fundamentals (CA norm, % of GDP) (3)	0.4	1.1	1.9	2.3	2.3	2.3	2.2	1.8	1.7
Required current account to stabilise NIIP above -35% of GDP over 20Y (% of GDP) (4)	0.3	0.7	1.4	2.0	2.4	2.6	3.1	3.1	2.9
Capital account balance (% of GDP)	0.0	0.0	0.0	0.0	0.0	-0.2	0.0	.	.
Net international investment position (% of GDP)	11.4	24.2	34.3	54.8	60.3	63.4	68.4	.	.
NENDI - NIIP excluding non-defaultable instruments (% of GDP) (5)	7.1	19.0	35.7	48.3	53.6	55.8	54.2	.	.
Net FDI flows (% of GDP)	1.1	1.2	1.5	0.6	2.2	-0.1	2.9	.	.
Competitiveness									
Unit labour costs (ULC, whole economy)	-0.8	2.3	1.7	3.2	3.2	4.3	0.5	2.6	2.1
Nominal compensation per employee	0.9	2.2	2.5	2.9	3.4	0.4	3.4	3.4	4.0
Labour productivity (real, hours worked)	1.2	0.5	1.0	0.0	0.4	0.4	0.9	0.0	0.8
Real effective exchange rate (ULC)	-1.9	-0.2	1.1	3.2	-0.4	.	.	.	.
Real effective exchange rate (HICP)	-0.1	-1.6	0.3	2.6	-1.5	1.3	0.8	.	.
Export performance vs. advanced countries (% change over 5 years)	14.1	-1.1	-2.4	1.0	-2.9	1.9	.	.	.
Private sector debt									
Private sector debt, consolidated (% of GDP)	127.8	119.0	108.4	107.7	110.7	120.1	122.8e	.	.
Household debt, consolidated (% of GDP)	66.8	59.0	53.9	52.6	53.4	57.7	59.5e	.	.
Household debt, fundamental benchmark (% of GDP) (6)	59.0	57.5	59.3	61.5	62.3	66.8	65.9	.	.
Household debt, prudential threshold (% of GDP) (6)	43.4	46.7	51.9	54.6	54.7	53.3	52.8	.	.
Non-financial corporate debt, consolidated (% of GDP)	61.0	60.0	54.4	55.1	57.3	62.5	63.4e	.	.
Corporate debt, fundamental benchmark (% of GDP) (6)	67.5	71.8	74.3	75.4	76.2	81.5	80.6	.	.
Corporate debt, prudential threshold (% of GDP) (6)	62.6	69.5	75.9	77.0	77.2	77.4	76.9	.	.
Private credit flow, consolidated (% of GDP)	0.3	1.2	2.9	6.1	5.8	6.0	5.7e	.	.
Corporations, net lending (+) or net borrowing (-) (% of GDP)	1.2	2.4	1.8	0.4	0.3	1.9	2.8	3.7	4.2
Households, net lending (+) or net borrowing (-) (% of GDP)	5.8	5.4	5.1	5.6	5.6	9.1	7.8	4.6	3.0
Net savings rate of households (% of net disposable income)	10.6	10.3	10.0	11.3	10.8	16.1	15.0	.	.

(e) estimate based on ECB quarterly data

(1) Potential output is the highest level of production that an economy can reach without generating inflationary pressures. The methodology to compute the potential output is based on K. Havik, K. Mc Morrow, F. Orlandi, C. Planas, R. Raciborski, W. Roeger, A. Rossi, A. Thum-Thysen, V. Vandermeulen, The Production Function Methodology for Calculating Potential Growth Rates & Output Gaps, COM, European Economy, Economic Papers 535, November 2014.

(2) Deviation of actual output from potential output as % of potential GDP.

(3) Current accounts in line with fundamentals ("current account norms") are derived from reduced-form regressions capturing the main determinants of the saving-investment balance, including fundamental determinants, policy factors and global financial conditions. See L. Coutinho et al. (2018), "Methodologies for the assessment of current account benchmarks", European Economy, Discussion Paper 86/2018, for details.

(4) This benchmark is defined as the average current account required to reach and stabilise the NIIP at -35% of GDP over the next 20 years. Calculations make use of Commission's T+10 projections.

(5) NENDI is a subset of the NIIP that abstracts from its pure equity-related components, i.e. foreign direct investment (FDI) equity and equity shares, and from intracompany cross-border FDI debt, and represents the NIIP excluding instruments that cannot be subject to default.

(6) Fundamentals-based benchmarks are derived from regressions capturing the main determinants of credit growth and taking into account a given initial stock of debt. Prudential thresholds represent the debt threshold beyond which the probability of a banking crisis is relatively high, minimising the probability of missed crisis and that of false alerts. Methodology to compute the fundamentals-based and the prudential benchmarks based on Bricongne, J. C., Coutinho, L., Turrini, A., Zeugner, S. (2019), "Is Private Debt Excessive?", Open Economies Review, 1- 42.

Source: Eurostat and ECB as of 2022-05-02, where available; European Commission for forecast figures (Spring forecast 2022)

Table 2.2: **Selected economic and financial indicators (Part 2), Germany**

all variables y-o-y % change unless otherwise stated	2003-07	2008-12	2013-17	2018	2019	2020	2021	forecast 2022	forecast 2023
Housing market									
House price index, nominal	-0.5	2.0	4.9	6.7	5.8	7.8	11.0	.	.
House price index, deflated	-1.8	0.7	3.9	5.1	4.4	7.1	7.6	.	.
Overvaluation gap (%) (7)	-7.9	-11.3	-3.3	5.0	7.6	15.4	20.2	.	.
Price-to-income overvaluation gap (%) (8)	-6.0	-12.7	-6.1	2.8	6.5	13.7	23.5	.	.
Residential investment (% of GDP)	5.2	5.4	5.9	6.2	6.4	7.0	7.2	.	.
Government debt									
General government balance (% of GDP)	-2.4	-1.7	0.8	1.9	1.5	-4.3	-3.7	-2.5	-1.0
General government gross debt (% of GDP)	65.5	76.2	71.8	61.2	58.9	68.7	69.3	66.4	64.5
Banking sector									
Return on equity (%)	.	-1.6	2.1	2.2	1.7	1.9	.	.	.
Common Equity Tier 1 ratio	.	11.1	15.4	16.1	15.6	16.1	.	.	.
Gross non-performing debt (% of total debt instruments and total loans and advances)	.	2.1	1.9	1.2	1.1	1.1	.	.	.
Gross non-performing loans (% of gross loans) (9)	.	.	2.8	1.4	1.2	1.2	1.1	.	.
Cost of borrowing for corporations (%)	4.7	3.5	2.1	1.6	1.6	1.6	1.4	.	.
Cost of borrowing for households for house purchase (%)	4.7	3.8	2.1	1.9	1.3	1.2	1.3	.	.

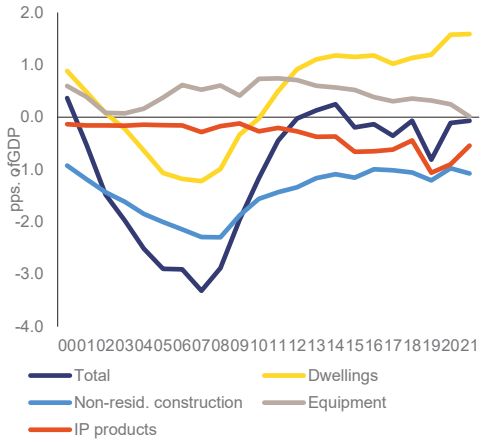
(7) Unweighted average of price-to-income, price-to-rent and model valuation gaps. The model valuation gap is estimated in a cointegration framework using a system of five fundamental variables; total population, real housing stock, real disposable income per capita, real long-term interest rate and price deflator of final consumption expenditure, based on Philiponnet, N., Turrini, A. (2017), "Assessing House Price Developments in the EU," European Economy - Discussion Papers 2015 - 048, Directorate General Economic and Financial Affairs (DG ECFIN), European Commission. Price-to-income and price-to-rent gaps are measured as the deviation to the long term average (from 1995 to the latest available year).
(8) Price-to-income overvaluation gap measured as the deviation to the long term average (from 1995 to the latest available year).
(9) Domestic banking groups and stand-alone banks, EU and non-EU foreign-controlled subsidiaries and EU and non-EU foreign-controlled branches.
Source: Eurostat and ECB as of 2022-05-02, where available; European Commission for forecast figures (Spring forecast 2022)

([1]) See chapter on investment needs.

3. THEMATIC CHAPTER: INVESTMENT NEEDS AND BOTTLENECKS

Germany's investment performance has been improving lately, but the overall level of investment remains relatively low. Since the turn of the century, the investment to GDP ratio has remained relatively low after the phase-out of the post-unification investment efforts in East Germany. Since then, total gross investment has been hovering at around 20% of GDP and total net investment at around 2.5% of GDP with only little fluctuations. Both total investment and public investment in percent of GDP have remained considerably below the EU average (as shown earlier on Graph 2.2), though increasing in recent years. Various investment types, including intellectual property (IP) and non-residential construction, remained below the EU average, while investment in equipment has been on a declining trend moving towards the EU average (see Graph 3.1). ([43]) In contrast, the share of non-productive residential investment has been increasing in the 2010s and exceeded the EU average.

Graph 3.1: **Investment share of GDP by type of asset: difference from EU average, 2000-2021**



Source: DESTATIS

Investment growth has been slow in an international comparison and important investment needs have accumulated over time. The increase in the net capital stock was more subdued than in other EU countries. Between 2000 and 2019 the net stock of fixed assets increased by 16%, well below the EU average of 26%, with particularly subdued developments in the energy, telecommunications as well as construction sectors (see Table 3.1). ([44]) There are significant investment needs for infrastructure and intangibles (see Graph 3.3), resulting in a slow take-up of IT in business and public administration, lagging expansion of generation and transmission capacity in the energy sector and slow roll-out of communication networks. These shortcomings are slowing down the green and digital transition.

([43]) There is a long-term trend of a decline in the share of equipment investment in GDP, in line with a corresponding trend of a gradual decline in the share of industry in gross value added. Both these trends are less pronounced when correcting for relative prices. For the investment ratio in GDP, the declining investment in machinery and equipment was counteracted by residential investments, essentially representing housing. However, volume increases in housing investment remained limited as the value-added expansion also reflected price increases.

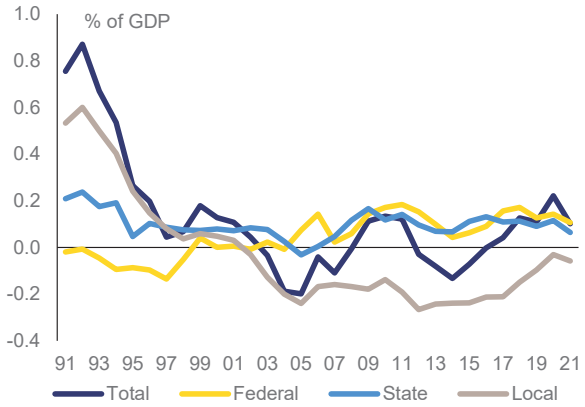
([44]) Adding to a protracted growth in the past, the crisis dented net investment. Net fixed capital formation in 2021 remained 18% below its 2019 level, compared to minus 3% for the rest of the euro area.

Table 3.1: **Net investment stock by sector, in 2019 compared to 2000**

Sector	DE	FR	IT	NL	AT	SE	ES	EU27*
Electricity, gas (NACE D)	98%	148%	119%	144%	115%	149%	179%	125%
Construction (NACE F)	86%	105%	98%	128%	100%	214%	153%	136%
Telecommunications (NACE J)	108%	204%	151%	119%	117%	246%	153%	157%
Education (NACE P)	106%	101%	107%	93%	112%	147%	140%	112%
All sectors of the economy	116%	111%	118%	131%	135%	150%	157%	126%

Data missing for Bulgaria, Cyprus, Croatia, Malta, Portugal for EU-27
Source: Eurostat (nama_10_nfa_st)

Graph 3.2: **Net investment by government subsector**



Source: Destatis

Public investment, especially at municipal level, has been characterised for decades by negative net investment in key public infrastructure, in particular schools. According to numerous studies, the annual public investment needs related to decarbonisation and digitalisation, education, transport and infrastructure vary between 1.3% and 2.1% of GDP over at least a decade (Bardt et al., 2020 ([45]); Agora Energiewende, 2021; Krebs, 2020 ([46]) and KfW, 2021 ([47])). The German Economic Institute (IW Köln) and the Macroeconomic Policy Institute (IMK) estimate the public investment backlog to be at EUR 450 billion for the next decade. ([48]) This figure includes over EUR 100 billion in national infrastructure including rail, broadband expansion and trunk roads, a similar amount for investments in education, including early childhood education, all-day schools and universities, and EUR 65 billion for investments in decarbonisation. The declining quality of public infrastructure ([49]) and the insufficient modernisation of services affect the attractiveness of Germany as a business location, ([50]) negatively impacting corporate investment.

([45]) Bardt, H., Dullien, S., Hüther, M. and Rietzler, K., (2020), For a sound fiscal policy. Enabling public investment, IW-Policy Paper, Nr. 6, Köln
([46]) Krebs, T. (2020), Öffentliche Investitionen: Bedarfe und Finanzierung. https://www.bundestag.de/resource/blob/684410/143685b2edde41b8bb29106f3a4b6dbf/Prof-Tom-Krebs-data.pdf
([47]) https://www.kfw.de/%c3%9cber-die-KfW/KfW-Research/KfW-Kommunalpanel.html
([48]) The estimates are based on a bottom-up approach, which also draws on an investment gap of about EUR 150 billion at the local level, estimated by the municipal survey of development bank KfW.
([49]) Between 2002 and 2020, the real value of public non-residential buildings and structures has declined by 10%, according to Destatis.
([50]) The perceived quality of infrastructure has declined over time according to the World Economic Forum: http://reports.weforum.org/global-competitiveness-index-2017-2018/competitiveness-rankings/#series=EOSQ056

Additional public investment would help increase the economy's potential growth and resilience. Timely and full implementation of the planned public investment will be crucial to increase investment levels, even if the announced investments remain below actual needs. Germany's Recovery and Resilience Plan is geared towards reducing barriers to investment and promoting public and private investment, supporting the digital and green transition with funding amounting to 0.7% of GDP over 2021-2026. In addition, the new government proclaimed the 2020s to be a "decade of future-oriented investment" suggesting a long-term investment programme, combining public and private investment on areas such as climate protection, digitalisation, education, research and innovation and infrastructure. The coalition agreement of the new government did not specify these objectives in detail, while more concrete commitments have been starting to emerge since. Considering existing announcements, the allocated financial resources remain relatively limited compared to the large investment needs. The federal government has increased the Climate and Transformation Fund by EUR 60 billion, assumed to result in a spending increase of EUR 16 billion in the four years 2022-2025. The government pledged another EUR 100 billion for defence investment, with spending planned at EUR 14 billion in the first year in 2022 and then yearly EUR 20 billion until including 2026. ([51]) Fully implementing these two announcements would raise Germany's GDP by 1.1% at its peak, and reduce the current account surplus by 0.1 pps, according to simulations by the Commission's QUEST model (see Box 2.3).

Even if additional resources are made available for public investment, take-up may be limited and support schemes may not function efficiently due to structural problems. The federal government has been increasing investment support in many areas under the responsibility of the Länder, for instance through the *DigitalPakt Schule* programme and regional support (*Regionalisierungsmittel*) for public transport. However, funding outflows have been slow: for example, in 2020, only 50% of the available funds from the local transport financing act were used. The Federal Audit Office issued recommendations on standardising and simplifying public transport schemes and to increase the contribution of the Länder. ([52]) The outflow of funds is further slowed down by shortages in raw materials and skilled labour in the construction industry.

Intricate, inefficient and outdated administrative planning and approval procedures and the lack of administrative capacities often result in severe bottlenecks to private and public investment. While there are temporary drags to investment such as supply bottlenecks and uncertainty, some investment barriers have been at play for longer. Protracted planning and approval procedures frequently lead to an insufficient uptake of public investment funds and slow down investment projects. ([53]) Small municipalities and districts (*Kreise*) in particular often lack the administrative capacity to manage investments and larger approval procedures. Local administrations suffer from a persistent skills shortage, both in number of people but also in the technical and digital competences, which has repeatedly been identified as among the most important bottlenecks. ([54]) Harmonisation and standardisation of IT infrastructure would speed up the process and reduce operating costs and bureaucracy. Germany is also lagging behind its own goals concerning eGovernment, i.e. the provision of digital public services. ([55])

The Recovery and Resilience Plan addresses some of the challenges related to slow planning and approval procedures, and important further commitments were suggested in the coalition agreement, while effective implementation of related measures will be key. The Plan adopted on 27 April 2021 includes important measures to accelerate planning procedures, to help municipalities manage investment subsidies and digitalise schools, as well to digitalise public services. The coalition agreement of the new government also commits to streamline administrative, planning, and approval procedures for

([51]) Besides the commitment to boost public investment, the coalition also promises to return to the German deficit rule (*Schuldenbremse*) from 2023 onwards. The ongoing legal challenge to transfer EUR 60 billion to the Climate and Transformation Fund may still put the pledge into question.

([52]) https://www.bundesrechnungshof.de/de/veroeffentlichungen/produkte/sonderberichte/2022-sonderberichte/oepnv-finanzierung-durch-den-bund-bereinigung-notwendig

([53]) For example, the average realisation time of building a railtrack of over 30 km has been 23 years of which 14 years relate to planning and permitting. IW Köln (2022), Faktencheck Güterverkehr in Deutschland: Von der fehlenden Infrastruktur zum Verlagerungspotenzial

([54]) In 2021, 90% of the surveyed companies identified availability of skilled staff as a barrier to investment, 77% identified high energy costs, and 71%-71% suggested business regulations and taxation or uncertainty about the future (European Investment Bank (2021), Investment Report 2021/2022 – Recovery as a springboard for change)

([55]) National Regulatory Control Council (2021), Monitor Digital Administration, Number 6. Available at: https://www.normenkontrollrat.bund.de/nkr-de/digitalisierung

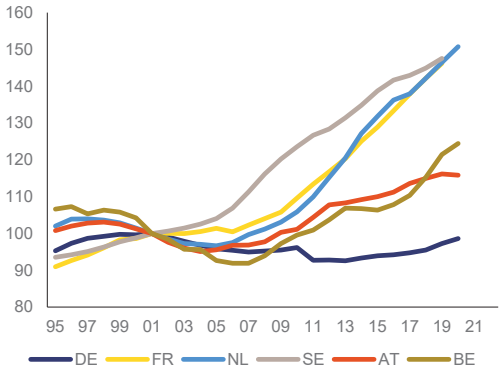
private and public investment, aiming to "cut the overall duration of proceedings by at least half". The government pledges to increase personnel and technical capacities at authorities and courts, to strengthen public consulting offers for the Länder and municipalities and to standardise IT solutions. There should also be a closer link between regional planning and approval procedures to avoid duplicating reviews. To ensure implementation, a joint steering group of the federal government and the Länder will be set up. These initiatives are welcome and their timely implementation will be important. Mixed responsibilities between levels of government may complicate implementation. Moreover, while halving the length of procedures is a welcome commitment, the lack of reliable statistics on the duration of procedures to date and on the individual steps in the procedures makes it difficult to operationalise this promise and to measure progress.

Increased electricity needs and the already decided phasing out of coal and nuclear call for strong investments in power generation and distribution. Net fixed assets in Germany's power generation stagnated since 2001, while they increased by about 50% in other advanced EU economies such as France, the Netherlands, and Sweden (see Graph 3.3). This reflects decades of subdued investments hampered by administrative, governance and permitting barriers. Moreover, a well-anticipated structural transformation is ahead, as Germany plans to phase out nuclear power plants by the end of 2022 and the coalition vowed to bring forward the phase out of coal power plants from 2038 to 2030, ideally. The lost capacity would be primarily replaced by renewables, as the government has committed to increasing the share of renewables in electricity generation to 80% by 2030 and to almost 100% by 2035. However, an expansion of the electricity grid, flexibility solutions, decentralised energy, energy efficiency measures and the reduction of investment bottlenecks for the deployment of renewables and expanding the grid are indispensable to reach this target. Likewise, adopting renewable hydrogen as a power source in industry will be important. To move forward with decarbonisation, Germany needs to expand further the generation capacity for renewable energy, transmission and distribution networks and storage. The Network Development Plan 2021-2035 provides for investments of about EUR 80 billion for onshore transmission grid expansion and of about EUR 38 billion for connecting offshore wind energy. ([56]) According to estimates published by the national regulatory authority, additional investment of at least EUR 16 billion is required for expanding the distribution grids until 2030. So far, investments in power generation capacity and power networks have lagged behind the goals and ambitions and the pace of expansion of the electricity grids has been slower than in other developed countries. The inauguration of the North-South interconnector *SuedLink* that was initially planned for this year was postponed, with the latest estimations being for 2028. ([57]) In particular, significant barriers remain in terms of conflicts over land use and lengthy approval procedures.

([56]) These investments are to be implemented by the power grid operators. A network charge to be paid by consumers ensures the refinancing of the respective investment cost that are not part of the federal budget. The investment plan takes take into account the currently applicable increased renewable energy targets, a complete coal phase-out as well as interconnectors.

([57]) https://www.faz.net/aktuell/wirtschaft/netzagentur-gibt-terminplan-fuer-stromautobahnen-auf-17765016.html and https://www.faz.net/aktuell/wirtschaft/deutschland-droht-naechstes-grossprojektdebakel-17769008.html

Graph 3.3: **Net fixed assets in power generation and distribution (NACE D)**



(1) Constant prices, index 2001=100
Source: Eurostat

Geopolitical risks shed new light on the investment needs in the energy sector (see also box 2.3). As key renewable sources of electricity, such as wind and solar, are variable, they need to be matched with the necessary infrastructure and flexibility solutions, including storage, to guarantee the constant supply of energy. In this context, the coalition agreement of the new government announces plans to update the national grid development plan towards a "climate neutrality grid". In addition, power plants fed with pipeline-delivered natural gas were planned to serve as balancing sources of electricity during the climate transition, as set out in Germany's National Energy and Climate Plan. However, the reliance on natural gas is being challenged by high gas prices, geopolitical tensions and the uncertainty of supply from Russia, Germany's main natural gas provider. Considering the Russian unprovoked invasion of Ukraine, the certification procedure for the gas pipeline Nord Stream 2 has been suspended. Substituting for Russian gas supplies by renewable energy and LNG imports will require major immediate investment in relevant infrastructure, notably electricity transmission capacity and regasification plants. This creates important implementation and administrative challenges.

Better framework conditions and digital infrastructure could speed up investment in digital technologies. Despite initiatives to digitalise businesses, the share of SMEs with at least a basic level of digital intensity is 59% in Germany. This is relatively low compared to the top five performers in the EU which have shares above 70%. Germany is also still lagging behind in deploying very high-capacity broadband in rural areas (with a coverage of 22.5% versus 37.1% EU average in mid-2021). At the same time, only 15.4% of households have access to a fibre connection (compared to an EU average of 50.0%), which places Germany among the Member States with the second lowest fibre coverage, while the top five EU performers have a fibre coverage higher or equal to 85% (Latvia, Spain, Portugal, Romania and Bulgaria). The lack of fibre connections is particularly affecting rural areas (11.3% versus 33.8% EU average). ([58]) Overall, the fixed assets of the ICT sector have tended to grow more slowly than in peer economies.

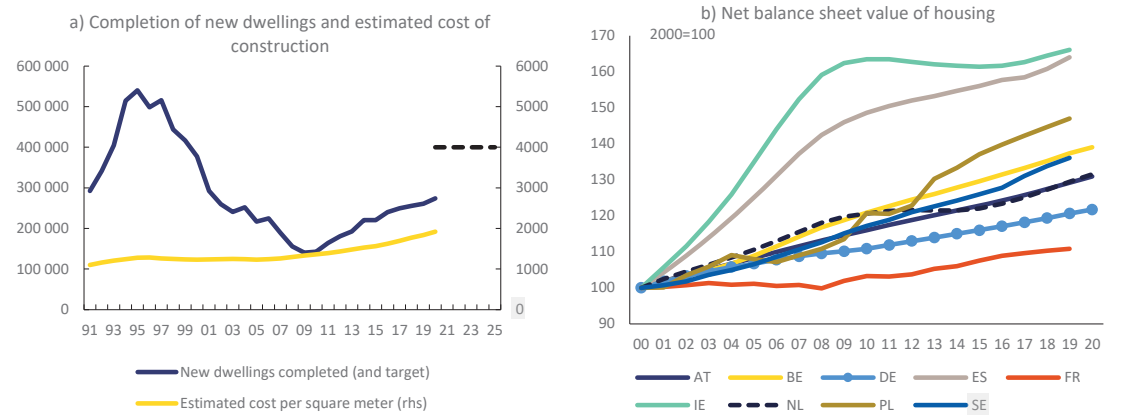
Achieving sustainable and resilient mobility requires considerable investment in rail and public transport, as well as maintenance of existing road networks and bridges. Germany has announced ambitious plans for rail, including to double passenger numbers, electrifying 75% of rail tracks up from currently around 60% and increasing rail freight to 25% of total freight by 2030. In 2022, EUR 13.6 billion investments (0.3% of GDP) are planned in railway infrastructure, with the dual objective of increasing capacity and the level of digitalisation. While this is about EUR 900 million higher than in 2021, and the highest amount invested so far, the railway investment backlog is estimated by Bardt et al. at EUR 60 billion in 2020 (1.7% of GDP). In addition, the KfW survey of municipalities suggests an investment need of EUR 33.6 billion in roads. The condition of the bridges in particular often leads to traffic problems.

Housing investment has been increasing consistently, but supply still falls short of housing demand. Housing investment has increased lately, including during the pandemic, to reach 7.2% of GDP in 2021,

([58]) For further statistics on digitalisation in Germany and in the EU, see https://digital-strategy.ec.europa.eu/en/policies/desi

reaching the highest level in the EU on account of substantial renovation investment (Box 2.1). Still, that is not enough to make up for the low investments of the early 2000s, and the net balance sheet of value of housing in the last two decades developed much slower than in other EU economies (see Graph 3.4). Current completion rates represent about 0.7% of the housing stock, remaining considerably below levels in neighbouring countries. ([59]) In 2020, 274 000 new dwellings were completed, which was close to double the 160 000 completions in 2010, but this is still half of the completion peak of 1995 and this remained below the 2017-2021 government target of 300 000 completions per year (Graph 3.4). The coalition agreement for the new government increased this target to 400 000 completions per year. Of these, 100 thousand are targeted as socially supported – which would quadruple current social housing completions, and this signals the need for considerable efforts. ([60]) To better match housing supply to demand, it would help to improve the availability of building land, ([61]) reduce bureaucracy and digitalise the building administration (*Bauämter*), while increasing the availability of skilled workers. Beyond new housing, the climate transition as well as high energy prices lead to increased investment needs in deep housing renovations. KfW supported programmes, some of which is financed from the Recovery and Resilience Plan, play an important role in this context.

Graph 3.4: **Housing completions, cost of construction, net balance sheet value of housing**



(1) net balance sheet value of housing is shown in constant prices
Source: Destatis for completion of dwellings and cost of construction, Eurostat for net balance sheet value of housing.

Investment needs in education remain considerable and tackling them could bring both economic and social dividends. Germany has been devoting comparatively fewer resources to education than other EU countries, with public spending in 2020 amounting to 4.7% of GDP, compared to an EU average of 5.0%. ([62]) There is a persistently high investment backlog in schools, estimated at EUR 47 billion (1.3% of GDP) in 2021, making up one-third of total municipal investment needs identified in KfW's survey. ([63]) Moreover, improving coverage and quality of early childhood education and care, all-day schools and universities necessitate an additional EUR 109 billion in the next ten years according to IW Köln and IMK (Bardt, 2020). The persistent gap in educational outcomes of disadvantaged groups is a constraint for skilled labour supply. Further resources in this area would promote potential growth, improve adaptability of the labour force to structural change and contribute to social inclusion.

([59]) OECD Affordable Housing Database, and in particular https://www.oecd.org/els/family/HM1-1-Housing-stock-and-construction.pdf
([60]) The tenant association (*Mieterbund*) sees public support of EUR 10 billion per year necessary to reach the target. https://www.mieterbund.de/presse/pressemeldung-detailansicht/article/62313-wir-brauchen-15-mio-neu-gebaute-wohnungen-bis-2025.html
([61]) Between 2010 and 2019 the price building land increased by 84% on average, driving up the price of housing – as prices for new housing increased by 47% in this period. https://www.bbsr.bund.de/BBSR/DE/presse/presseinformationen/2021/wohnen-immobilien.html
([62]) Eurostat COFOG database, at https://ec.europa.eu/eurostat/web/products-datasets/product?code=gov_10a_exp
([63]) KfW (2021), KfW-Kommunalpanel 2021