Risks facing Germany as a result of its economic ties with China

Germany's economy has been forging ever closer ties with the People's Republic of China (PRC), in particular since the latter joined the World Trade Organization (WTO) back in 2001. This closer relationship has seen Germany reap handsome gains from China's rapid emergence as an economic power. Those ties also present a growing source of risk, however. Important challenges lie ahead for China's economy, and even an economic crisis with global spillover effects does not seem inconceivable. On top of this, relations between advanced economies in the West and the PRC have worsened noticeably of late, as shown by the uptick in trade and geopolitical tensions and risks and the like.

If these risks materialise, Germany's economy could take a huge hit, especially if the extreme scenario of an abrupt economic decoupling from China were to play out. Industry in particular is home to a number of sectors that rely heavily on Chinese demand, and for some firms that are directly invested in China, substantial portions of their sales and profits would be at stake. The economic impact would be felt more broadly if deliveries of key intermediate inputs dried up, many of which would be virtually impossible to replace in the short term. The likely outcome of this would be production losses. What is more, an abrupt decoupling from China would probably leave the German economy aching under sharply increased uncertainty. If developments followed a similar playbook elsewhere in the world, the global economy as a whole would be affected, adding to the downward pressure.

There are also risks to the stability of the German financial system. Granted, the German financial system's direct links with China are on the small side. However, Germany's banking sector is highly exposed to domestic enterprises that are heavily dependent on China. Far-reaching disruptions in economic relations between the two countries would take a significant toll on these firms and ultimately leave them more likely to default on their loans. Losses of confidence and general economic weakness would add to the burden on the financial system in that kind of scenario.

All in all, a sudden massive deterioration in economic relations with China would leave Germany facing the prospect of severe economic disruptions. But even an orderly retreat from China would come at a considerable cost. German enterprises would miss out on a key sales market, and many supply chains could arguably only be recalibrated at the expense of sizeable losses in efficiency. For some critical intermediate inputs, it would only be possible to scale back dependences over the medium to long term, if that. But there would be a downside for China, too, which continues to rely heavily on the West as a source of trade and technology. Maintaining good economic relations, then, is in everyone's interest. Even so, enterprises and politicians in Germany should do more to de-risk and to strengthen the resilience of the German economy.

Introduction

Many sides to Sino-German relationship

Germany and China have a multifaceted relationship. Their intense trade relations are a catalyst for competition, innovation and welfare, benefiting both sides for the most part. Beyond that, though, there are also mounting geopolitical tensions and accusations of unfair trade practices. This article focuses on the implications of the economic ties between Germany and China.

Close economic ties between Germany and China …

By embracing market reforms, China's economy has managed to chart an impressive ascent in recent decades. Measured in terms of nominal gross domestic product (GDP) at market exchange rates, China now ranks as the world's second largest economy behind the United States. The German economy has benefited from China's economic success story in all manner of ways. Particularly the range of capital goods and motor vehicles exported from Germany has dovetailed well with the needs of the emerging market economy. Many German firms tapped into the fast-growing Chinese market by investing directly in the country. German financial institutions contributed to the financing of this expansion. At the same time, China's integration into the international division of labour made final products and key intermediate inputs more affordable in Germany, which has also benefited consumers here.

… are a source of risk

That said, the closer economic ties forged with China also meant greater dependences and more risks, if only, to a degree, on account of China's growing weight within the global economy. Problems in the Chinese economy move global financial and commodity markets and spill over into other economies via the foreign trade channel.[1] They are also likely to leave their mark on Germany. Arguably, though, an abrupt and severe deterioration in economic relations with China will probably take a much greater toll.

Political relations worsened recently, …

Recent years have seen tensions ratchet up between China and the West, largely on the back of political developments that are not primarily of an economic nature. But economic relations, too, have suffered in recent years. German representatives often used to complain that it was tougher for German firms to access the Chinese market than vice versa.[2] In addition, last year saw China restrict exports of important commodities and raw materials as well as the technology needed to extract and process them, citing national security concerns.[3] Moreover, many advanced economies have accused the PRC of infringing intellectual property rights and using unfair trade practices to its advantage.[4] Governments in advanced economies issued a broad response to this with trade remedies such as anti-dumping and countervailing duty actions.[5] More worrying than potential competitive disadvantages is the concern that China might be able to access sensitive areas of public order in the event of a conflict. It is for this reason that Chinese enterprises' equity investments in critical infrastructure and security-related technologies have come under increasing scrutiny. Furthermore, some advanced economies have imposed restrictions on exports of high-tech goods to China, with political relations between the United States and

1 China has also evolved into one of the world's largest bilateral lenders. See Horn et al. (2023). This can impact on the global financial system because cross-border rescue lending may be less institutionalised, less transparent and more piecemeal in the future. This could present greater risks for Germany as an important net capital exporter.
2 For example, a long-standing rule, which was only largely repealed a few years ago, forced foreign manufacturers wanting to produce in China to enter into a joint venture.
3 For example, the Chinese government imposed new export restrictions on gallium, germanium and graphite and prohibited exports of technologies used to extract and separate rare earths. These moves thus signalled China's willingness to leverage its market position in the critical raw materials space for political gain.
4 One indication of competitive distortions is China's exceptionally high industrial policy subsidy ratio, even by international standards. See DiPippo et al. (2022).
5 Thus, more than one-third of all anti-dumping and countervailing duty actions worldwide have currently been taken against China, according to the WTO Trade Remedies Data Portal.

China in particular worsening further as a result.[6]

… amid considerable geopolitical tensions

Geopolitical developments are a source of danger and considerable escalation risks. This is particularly true when one considers Taiwan, which enjoys close relations with many advanced economies. An escalation of geopolitical tensions could set in motion a spiral of tit-for-tat economic and financial sanctions.

China's structural and economic problems …

In addition, China's economy faces some stiff economic challenges. Growth has been in structural decline for some time now,[7] and cyclical weakness aggravated the slowdown last year. This was partly due to the after-effects of income losses during the pandemic and the lengthy containment measures. Furthermore, the sharp downturn in the real estate market continued unabated.[8] These events left a severe dent in households' and general government finances,[9] dampening economic activity further.

… could usher in an economic crisis

It cannot be ruled out that China's economy will weaken further and even run into a crisis. Following years of overinvestment, buoyed in part by a highly expansionary economic policy, there is a danger of further corrections, and not just in the real estate sector. Overall, the high level of private and public debt in China is a source of considerable risk. In recent years, it wasn't just real estate firms that ran into difficulties but a growing number of government financing vehicles, too. If those vehicles need to be restructured, the brunt will probably be borne primarily by Chinese banks.[10] Given the existing vulnerabilities within the banking system, this could affect financial stability in China. These developments have prompted the International Monetary Fund to warn of considerable risks to the global economy.[11]

Focus on implications for German economy

Given the dangers to economic relations and the macroeconomic risks in China, what do the potential repercussions for Germany's economy look like? First, in terms of real economy dependences. And second, concerning the risks that China presents to Germany's financial system. This latter topic, which will be explored in particular detail later in this article, also illuminates vulnerabilities resulting from exposures to firms that rely heavily on China business.

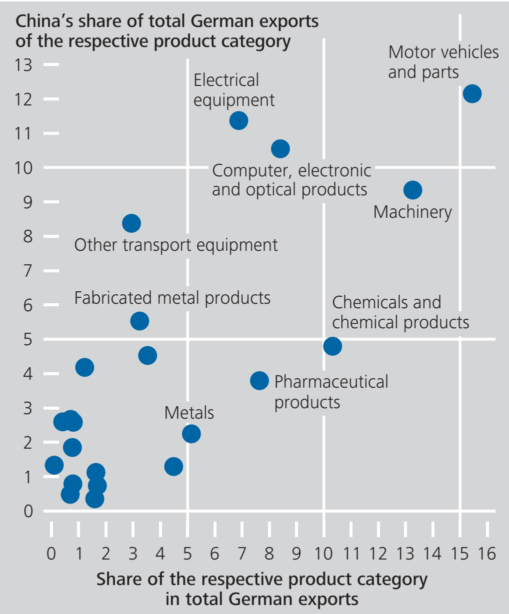
Risks as a result of Germany's real economy ties with China

China is an important pillar of the German economy in many respects. The risks associated with this relationship are no less diverse. One possible source of vulnerabilities is the focus on China as a market. Another is the reliance of many firms on Chinese intermediate inputs in their supply chains. For some, China also ranks as a key manufacturing location. If these relations were to deteriorate suddenly and massively, this could spread to firms that seem less directly exposed, for example through the confidence and uncertainty effects it would unleash.

6 The escalation of the trade disputes between the United States and China in 2018 and 2019 and its impact are summarised in Deutsche Bundesbank (2020). Since then, the Biden administration in the United States has taken a raft of additional measures restricting trade with, foreign direct investment in, and technology transfers to China.
7 This illustrates the constraints of China's export-driven growth model in particular, in addition to the demographic burden of a rapidly ageing population. Government efforts to recalibrate the economy and close the gap to the technological frontier in key industries have so far only delivered limited success. See Deutsche Bundesbank (2018, 2023a).
8 For further reading on the implications of the downturn in China's real estate market, see also Deutsche Bundesbank (2021a).
9 Real estate plays a significant role in households' wealth in China. The fall in house prices has left them nursing considerable losses, as reflected, amongst other things, by the very depressed level of consumer confidence. In addition, local governments saw a significant source of their revenue dry up as sales of land usage rights were less profitable or absent altogether. See also Deutsche Bundesbank (2014).
10 Local government financing vehicles' debt amounted to almost half of GDP in 2022, with Chinese banks holding around four-fifths of the exposures. See International Monetary Fund (2023a).
11 See International Monetary Fund (2023b).

China's significance for Germany's exports*

%



Sources: Federal Statistical Office and Bundesbank calculations. * Exports according to the foreign trade statistics based on two-digit codes from the goods directory for production statistics, excluding the product categories that are insignificant for deliveries to China or for total German exports (02, 03, 05, 06, 07, 12, 35) and excluding 89.
Deutsche Bundesbank

Exports to China

China: an important export market for Germany, but not a dominant one

German exports to China are of considerable importance for certain industrial sectors, but not of paramount importance for the economy as a whole.[12] In 2022, Germany exported €107 billion worth of goods to China. With a 7% share of total goods exports, China was the fourth most important importing country for Germany. Compared with other euro area countries, this means that a comparatively high share of exports goes to China. However, total exports to China amounted to no more than 3½% of German GDP if services are included.[13] The magnitude is broadly similar when analysed in terms of value added. This perspective takes into account that China also sources from other countries products that have undergone production stages in Germany. At the same time, the contribution of foreign value added to the value of German exports is excluded.[14] From a macroeconomic perspective, China is therefore a significant sales market, but not an outstanding one. Nevertheless, some manufacturing sectors are much more reliant on Chinese demand. These include key areas of the German economy such as motor vehicles, mechanical engineering, electronics and electrical engineering.

Macroeconomic models …

What economic disruptions in China may imply for German exports and economic activity can be illustrated with the aid of simulation studies, ideally using a combination of models: The Bundesbank's own macroeconometric model (BbkM-DE) delivers a granular view of the German economy,[15] while the NiGEM global macroeconomic model is used to derive assumptions regarding developments in China and the rest of the world.[16] In this way, it is possible to account not only for the direct implications of changes in Chinese demand but also for indirect effects via other trading partners of Germany, commodity prices and monetary policy.[17]

… allow an economic crisis in China to be simulated

Past experience in other countries shows that a financial or economic crisis in China could severely impair its demand for imports. Episodes of excessive credit growth, in particular, have resulted in many places in financial crises accompanied by severe macroeconomic disruptions. Earlier credit boom-bust episodes saw annual investment growth in the affected countries decline by 12 percentage points on average for two years, while private consump-

12 See also Deutsche Bundesbank (2023a).
13 Exports of services to China only play a subordinate role from an overall economic perspective; in 2022, they accounted for less than one-fifth of goods exports.
14 This is shown by calculations based on global input-output tables, according to which the share of German value added consumed in China is 3%. See OECD (2023a).
15 The BbkM-DE model is described in detail in Haertel et al. (2022).
16 NiGEM is the global macroeconomic model developed by the National Institute of Economic and Social Research (NIESR). It models the economies of most OECD countries as well as major emerging market economies. International linkages are modelled via foreign trade and the interest rate/exchange rate relationship. See also Hantzsche et al. (2018).
17 A similar approach was used to quantify the macroeconomic consequences of the war in Ukraine. See Deutsche Bundesbank (2022).

tion growth fell by three percentage points on average.[18] Based on NiGEM simulations, a comparable economic downturn would temporarily shrink China's imports by as much as one-fifth compared with a baseline scenario absent such a crisis. Foreign demand for German goods overall would probably decline by no less than just over 2%. Germany's international competitiveness would also come under pressure from price reductions, particularly by Chinese competitors.

Fallout manageable for German economic activity, simulations suggest, …

The simulations suggest that the negative spillover effects on the German economy would be noticeable but manageable. Real GDP in Germany could come in 0.7% lower than otherwise expected in the first year of the crisis, followed by losses of just under 1% in the second year. This is largely due to the slump in China and subdued demand in the rest of the world. The worsened international competitive position is less of a factor and its impact comes with a lag. The decline in interest rates arising in the simulations dampens the impact of the shock. However, the easing of monetary policy is only moderate because, according to the simulations, the dampening effects on the inflation rate in the euro area – and also in Germany – will remain limited.

… but possibly underestimated

However, more adverse effects on the German economy are certainly possible. After all, the simulations omit some transmission channels that are difficult to model within a one-size-fits-all model framework,[19] notably the effects of increased uncertainty.[20] It is equally conceivable that Chinese demand for German goods and services will experience an even stronger slump.[21]

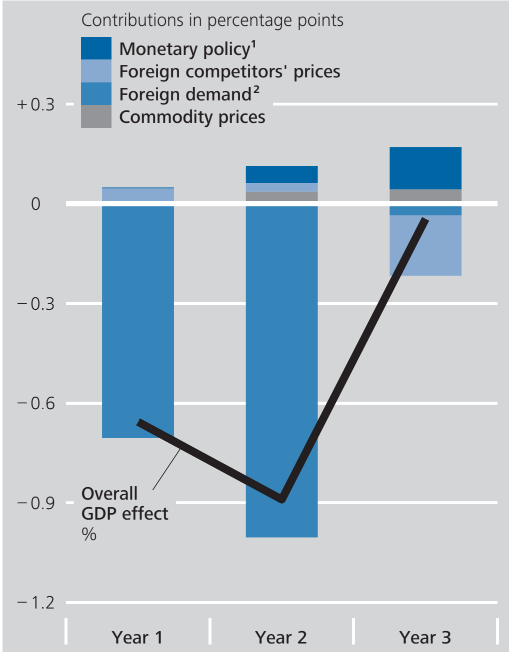
Imports from China

China: Germany's most important import partner

Germany's imports from China have soared in recent decades. In terms of value, they currently exceed German exports to China significantly.[22] In 2022, Germany purchased 13% of its global goods imports from China, making China Germany's most important foreign supplier. The range of imported products is broad, comprising not only final products such as smartphones, computers and clothing but also intermediate inputs, in particular.

Simulated impact of an economic crisis in China on German real GDP

Deviation from baseline



Source: Bundesbank calculations using NiGEM and the Bundesbank's macro model. **1** Interest rates and exchange rate developments. **2** Contains direct (foreign trade) and indirect (consumption and investment) effects.

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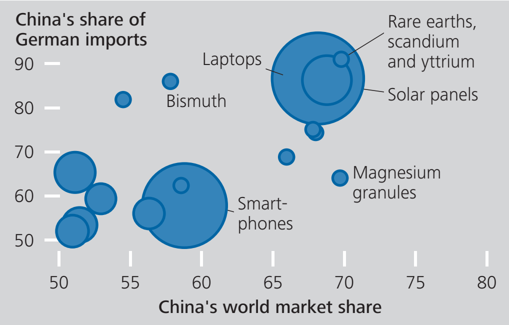
High level of dependence, especially for some intermediate inputs

There is a high level of dependence on China for some intermediate inputs. A large share of certain electronic and electrical intermediate inputs, including batteries, as well as some raw

18 As shown by studies of 70 economic crises between 1960 and 2010 in advanced and emerging market economies that were preceded by excessive credit growth. See Abiad et al. (2016).
19 Some of these channels are discussed in Banco de España (2023).
20 The uncertainty effects would arguably be severe in particular if an economic crisis in China coincided with a geopolitical escalation.
21 This is because the simulations do not account for the above average import intensity of China's heavily impaired investment. Nor is the particular structure of the range of German exports, with its strong focus on capital goods, fully accounted for. See also Deutsche Bundesbank (2018).
22 In 2022, Germany's bilateral foreign trade deficit with China amounted to €86 billion. China was thus the country that had the largest trade surplus with Germany.

Germany's important and critical imports from China*

Percentage data for 2022[1]



Sources: Trade Data Monitor and Bundesbank calculations. * HS 6-digit codes that either account for more than 0.1% of total German imports or contain critical raw materials. **1** The bubble size shows what share of total German imports each product category accounts for.
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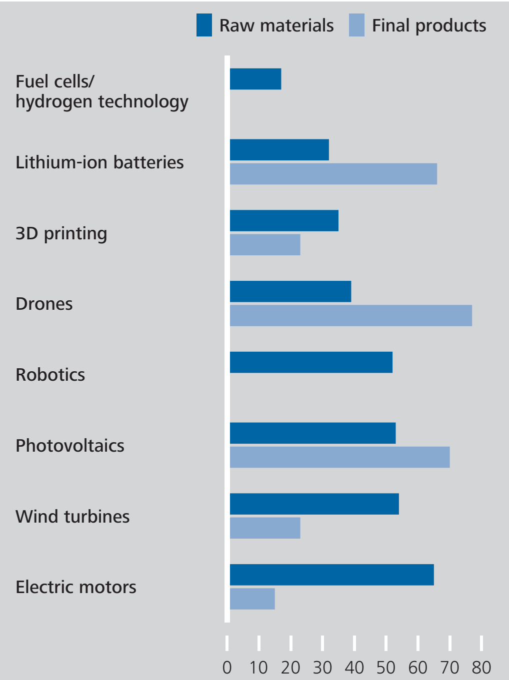
China's world market share for raw materials and final products in areas of modern technologies

%



Source: European Commission (2020).
Deutsche Bundesbank

materials such as rare earths, come from China.[23] China also accounts for a large share of imported pharmaceutical ingredients such as antibiotics.[24] In addition, it is hardly possible to switch to other supplier countries for a number of products, as China dominates the production of these goods worldwide. Dependence on China is particularly pronounced for some critical raw materials.[25] These are essential, not least, for the production of electric engines, wind turbines, photovoltaic systems and other modern technologies.

Lack of imports could cause considerable production losses

A lack of imports of Chinese intermediate inputs could give rise to considerable production losses in German industry. This risk was highlighted amid the temporary disruptions in Chinese goods deliveries during the pandemic. As a result of the strict lockdown in parts of China at the start of 2020, the German manufacturing sector suffered marked production losses (see the box on pp. 17 f.). A representative survey of German firms conducted by the Bundesbank (Bundesbank Online Panel – Firms (BOP-F)) last year also points to the high level of dependence on, and difficulty in substituting, essential imports from China.[26] According to the survey, nearly one out of every two firms in the manufacturing sector has been directly or indirectly sourcing essential intermediate inputs from China.[27] More than 80% of these firms reported that it was at least difficult to replace essential intermediate inputs. Granted, over one-half of the surveyed industrial firms had taken measures or planned to do so in the near future in order to reduce their dependence. However, this is likely to be a complex and lengthy process, especially for intermediate inputs that are particularly difficult to replace.

23 Taiwan also plays a key role as the country of origin for German imports of some electronic components, especially advanced microprocessors and integrated circuits.
24 See IW Consult (2022).
25 Thirty raw materials for which the European Commission has identified both a high economic importance and a high supply risk are considered critical raw materials. For example, China accounts for 60% of global rare earth mining and as much as 90% of global rare earth processing. See European Commission (2020).
26 See Deutsche Bundesbank (2023b).
27 Essential intermediate inputs are goods and services without which a relevant part of an enterprise's production processes would cease or could only be carried out subject to considerable delays or at greatly reduced quality.

The impact of Chinese supply chain shocks on manufacturing in Germany

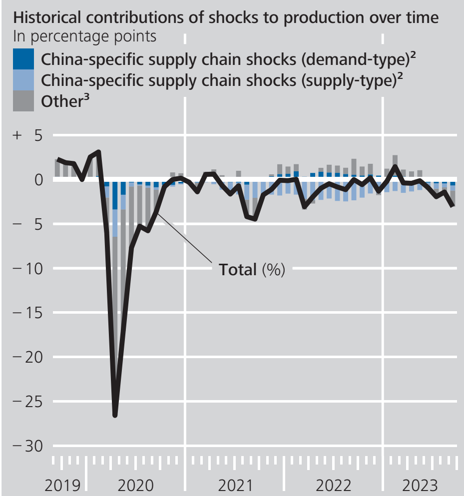
The spread of the coronavirus in China at the beginning of 2020 led to the imposition of lockdowns by the Chinese authorities, resulting in a collapse in the country's industrial output. In February and March 2020 there was a corresponding material decline in Chinese deliveries to Germany. These rebounded very strongly in April and May 2020, despite economic activity in Germany also having been severely restricted by this stage.[1] Later on in the pandemic, imports from China grew at a fairly brisk pace until China's zero-COVID strategy led to new bottlenecks.

A structural vector autoregressive (SVAR) model can be used to illustrate the contribution of China-specific supply chain shocks to the evolution of German industrial production. Such shocks indicate, for example, the disruption in the supply of Chinese intermediate goods for German industrial production (in the case of the Chinese lockdowns). However, the approach can also identify shocks caused by higher demand in the German manufacturing sector for Chinese intermediate goods (e.g. electronic components). The results of this decomposition allow inferences to be drawn about which drivers led to supply bottlenecks during the pandemic. Both types of supply chain shock are identified using sign restrictions on the impulse-response functions.[2]

According to the estimates, China-specific supply chain shocks had a considerable impact on manufacturing output in Germany.[3] For April 2020, around one-quarter of the decline in production in Germany can be attributed to supply chain disruptions in China. However, the effects this had were already waning by the end of spring 2020, mainly owing to China's rapid reopening,

The role of Chinese supply chain shocks in the evolution of German manufacturing output*

Change with respect to December 2019,[1] monthly data



* Based on a SVAR model with four variables and sign restrictions, estimated with data from January 2000 to September 2023. **1** Percentage changes are approximated using the logarithmic differences of the series. **2** Supply-type supply chain shocks move quantities and prices of Chinese imports in different directions; demand-type supply chain shocks move them in the same direction. **3** Comprises demand shocks and supply shocks to domestic industry and the deterministic component.

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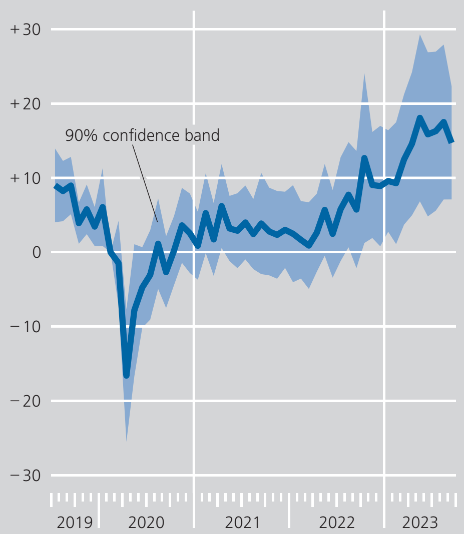
1 In addition to the rapid reopening of China's economy, the demand in response to the pandemic for goods manufactured specifically in China, such as electronics (and components) for IT and consumer electronics, but also face masks and protective clothing, also played a role. See Deutsche Bundesbank (2021b).
2 It is assumed that a disruption to the supply of intermediate inputs from China can only partially be offset by substituting goods from other countries, resulting in cutbacks in production. See Khalil and Weber (2022). Supply-type supply chain shocks move Chinese import quantities and prices in different directions, while demand-type supply chain shocks move them in the same direction. The estimation for January 2000 to September 2023 takes into account German manufacturing output, German imports from China and German imports of manufactured goods from the rest of the world (seasonally and price-adjusted in each case), and the Chinese producer price index (converted into euro).
3 Similar analyses also show this to be the case for the euro area and the United States. See Deutsche Bundesbank (2021c), Khalil and Weber (2022) and European Central Bank (2023).

Impact of above average exposure to Chinese intermediate inputs on manufacturing output*

%, base period: February 2020



* Difference of production in sectors whose dependence on Chinese intermediate inputs lies above the median. Estimates from January 2019 to September 2023 based on 75 manufacturing sectors. Transport goods production and textile processing, which were particularly affected by the German restrictions in April 2020, were excluded.

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but also to the higher demand for Chinese intermediate goods. Over the further course of the pandemic, the heightened demand for goods with a large share of Chinese value added – which also included pandemic-induced demand – actually buoyed German production. However, from mid-2021 onwards and in particular in 2022, German industrial activity was increasingly hampered by renewed supply-type supply disruptions in China in the wake of the country's long-maintained zero-COVID strategy. These shocks made imports more expensive and dampened price-adjusted imports from China, while at the same time favouring imports from other countries.

Sectors particularly dependent on Chinese intermediate inputs suffered significantly larger drops in output in the spring of 2020. At the lowest point, in April 2020, their output was around 15% below that of less exposed sectors, as shown by an analysis of granular sectoral data.[4] Like the first analysis, this analysis also indicates a rapid easing of the disruption: at the end of 2020 and in 2021 there were no longer any notable differences between the sectors. As of the end of 2022, the particularly exposed sectors actually outperformed.

All in all, the experience of recent years shows that there are advantages to having closely integrated supply chains with China, but also risks. While the procurement of intermediate inputs from China allowed the German manufacturing sector to adapt quickly to pandemic-related shifts in demand, there were notable production constraints as a result of Chinese supply disruptions in the early phase of the pandemic. The fact that these constraints were only temporary is of little comfort, as the supply chain disruption during the pandemic that caused them was also only short-lived. Protracted crises, say as a result of trade embargos, are likely to result in far more serious consequences.[5] Moreover, disruptions to imports could lead to more drastic losses in output if, in particular, critical and difficult to substitute intermediate inputs were to be affected.

4 Dependence on Chinese intermediate inputs is measured by the share of the costs attributable to imports of intermediate inputs from China in relation to the total costs of all intermediate inputs and wages. The calculation is based on input-output tables for the EU and corresponding import data. According to this measure, particularly exposed sectors include the IT and electronics industry, textile processing and battery manufacturing. Details of the approach can be found in Khalil and Weber (2022).
5 According to Khalil and Weber (2022), the longer downturn in manufacturing output in the United States in 2018-19 can be explained by negative China-specific supply chain shocks. These shocks hit the US economy in the wake of the US-China trade war. A similar development would also be likely for Germany and the EU if there were to be protracted disruptions in supply chain trade with China.

Foreign direct investment in China

China is an attractive destination of German foreign direct investment, …

German firms considerably increased their foreign direct investment (FDI) in China. Investment in China, especially in industry, is likely to have been fuelled primarily by efforts to serve a large and rapidly growing sales market. In this context, producing locally in China has been an attractive option in part due to, in some cases, high customs barriers. Another factor in China's favour as an investment location has been its low labour costs. In 2022, Germany's outward FDI to China amounted to €11.2 billion.[28] Equity capital thus amounted to €86 billion.

… particularly in automotive and mechanical engineering sectors

Production locations in China are particularly important for the automotive and mechanical engineering sectors and the chemicals industry. At the end of 2022, the country held 6% of Germany's FDI stocks and was in third place behind the United States and Luxembourg, which is a major holding location.[29] Some sectors concentrated far more heavily on China. This is particularly true of the automotive sector, where almost 30% of FDI is targeted at China.[30] China is also a major location for German FDI in the mechanical engineering sector (13%) and the chemicals industry (8%). Chinese affiliates were important sources of revenue in all of these sectors.[31]

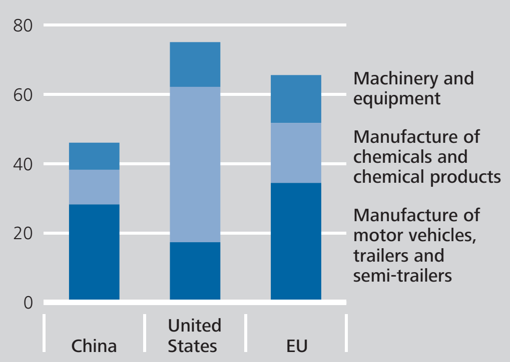
FDI highly profitable so far

Investment income from FDI in China is high. In 2022, the Chinese affiliates of German groups generated a profit of €23 billion, around half of which was reinvested in China. That means that 15% of Germany's global investment income was generated from FDI in China. This figure has risen significantly in recent years, making it higher than the 12% share of global revenue generated by foreign affiliates in China and the 4% share of global equity investment in China.[32] This suggests that investing in China is very lucrative for the firms involved.

It is most likely against this backdrop, too, that German enterprises maintained their level of investment in China until recently, despite the

German foreign direct investment by sector in key regions*

€ bn, data for 2021



* Sector classification based on declaration of foreign affiliates worldwide. Indirect and direct investment. US data are current only up to the end of 2019 for the automotive sector.
Deutsche Bundesbank

Unlike other foreign firms, German firms reinvest their profits in China

heightened geopolitical risks. This is also reflected in the profits of German firms reinvested in China. In 2021, these rose sharply – and with them equity investment.[33] From the second quarter of 2022 to the third quarter of 2023, too, German enterprises continued to reinvest their profits in China. One reason for reinvesting profits could be the strict regulation of FDI in China. In the same period, however, other

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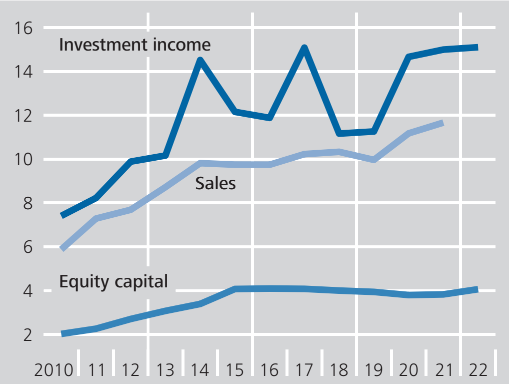
28 Given the heightened geopolitical risks and the fact that complaints about China becoming less attractive as an investment location have been mounting for some time now, the recent rise comes as quite a surprise. It is sometimes assumed that German firms are increasingly setting up "closed-loop" production lines in China, one reason for this being the hope that they could continue operating in the event of a conflict, as they would then be able to cope without flows of goods from the West. See Südekum (2022).
29 For most other euro area countries, the percentage of total foreign investment accounted for by China is lower.
30 This high level of investment is explained by the fact that the Chinese passenger car market is the largest in the world. Moreover, car imports in China were subject to high tariffs for a long time. The joint venture requirement for foreign manufacturers to enter the market was recently largely eliminated.
31 Data from the Microdatabase Direct investment (MiDi) for 2021 – the most recent data available – show that, in the automotive sector, Chinese group units contributed 30% to the annual revenue of all foreign affiliates worldwide.
32 Based on data on Germany's net direct investment position. Equity capital differs from total FDI in that the latter also includes intra-group loans.
33 Generally speaking, profits generated by German affiliates abroad in 2021 were up sharply on the crisis year of 2020.

Economic indicators for German foreign direct investment in China*

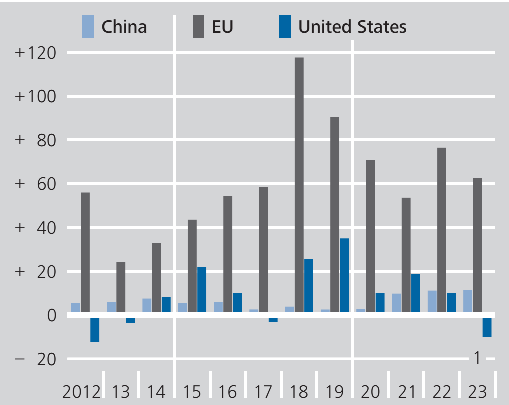
%



* Relative to the corresponding economic indicators of all foreign affiliates worldwide.
Deutsche Bundesbank

German equity capital (transactions) abroad by region

€ bn



1 Preliminary data for 2023 only up to and including October.
Deutsche Bundesbank

foreign enterprises withdrew US$160 billion in profits from China.[34]

Indirect dependences

Materialisation of risks posed by China will probably impact economy as a whole

Even firms with no direct ties to China could suffer in the event of an escalation of an economic or geopolitical conflict with the West. This is suggested by the BOP-F survey of more than 7,000 German firms for the months of April to June 2023. Around 60% of the surveyed firms believe that an escalation of economic or geopolitical tensions between China and western economies resulting in new trade barriers and restrictions on FDI would have a negative impact on their business activities. A lack of imports of intermediate inputs would have a negative impact on just over one in ten German enterprises.[35] By comparison, declines in exports or own production in China would be particularly problematic for very few companies. Many enterprises (42%) would suffer mainly due to the heightened uncertainty about future economic developments that such a conflict would entail. Among these are numerous firms with no direct dependence on Chinese imports. Enterprises with no business in China could also be affected by such an escalation via other transmission channels. A collapse of deliveries of Chinese intermediate inputs to intermediate goods manufacturers could have an impact on downstream production stages in Germany. It could also create risks for the German financial system, thereby worsening financing conditions.

Risks as a result of Germany's financial ties with China

Various stability risks facing German financial system

The German financial system may be vulnerable to risks from its exposure to China through various channels. First, German financial institutions maintain direct relationships with Chinese borrowers. Second, indirect risks to the German banking system could arise from bank loans to domestic enterprises and sectors that depend heavily on China. In addition, other financial system stakeholders, such as insurance corporations or investment funds, could also have direct and indirect ties with China.

34 See Douglas and Soon (2023).
35 This mainly affects enterprises in the manufacturing sector.

The banking sector's direct financial exposure

German banks' direct exposure to China is limited

The size of domestic banks' direct exposure to Chinese borrowers is limited.[36] It stood at €36 billion at the end of 2022. The total direct exposure to China amounts to 1.25% of the banking system's total exposure to all non-financial corporations and 0.1% of its total exposure to all customer groups.[37] The largest customer groups in China were credit institutions (€18 billion), enterprises and households (€11 billion) and public authorities (€7 billion). Compared with borrowers from other countries, the exposure to China ranks just 20th in terms of total amounts borrowed. This has not changed in recent years.

Only a few institutions are notably exposed

The total direct exposure of most single banks to China is not particularly large, either. Measured in terms of common equity tier 1 (CET1) capital, the direct risks posed by Chinese borrowers to more significantly exposed institutions are limited.[38] The few exceptions include, in particular, single branches of Chinese banks and single institutions classified as "other commercial banks".

Direct vulnerability moderate by international standards, too

As for other countries, banks' exposure to China plays a much greater role. According to the Bank for International Settlements,[39] the United Kingdom is a particularly prominent example. At the end of the reference period, its exposure stood at €238 billion.[40] Within the euro area, French banks, in particular, were comparatively highly exposed to China.[41]

The banking sector's indirect financial exposure

By contrast, significant indirect risks to German banks, …

Economic ties with China pose significant risks to the German banking system. In a crisis scenario, financial exposure to German borrowers who invest particularly actively in China would probably be adversely affected. These would include enterprises with a high level of FDI in China. However, there are also risks associated with the strong focus of export business on China or dependence on important intermediate inputs.

Short-term impact of a conflict with China on the activity of German firms*

Response percentages

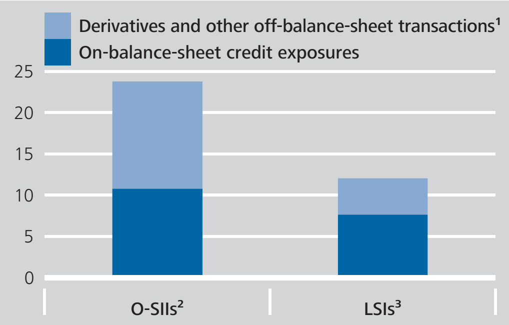
Source: Bundesbank calculations based on the Bundesbank Online Panel – Firms (BOP-F) survey conducted in Q2 2023. Representative data based on a sample of 7,333 firms. * Question: Imagine a scenario in which economic or geopolitical tensions between China and the West (including the European Union) escalate over the coming months, leading to new trade barriers and restrictions on [foreign] direct investment. What impact would this have on your enterprise's business activities?

Deutsche Bundesbank

36 This is the total exposure in the credit register for loans of €1 million or more. Pursuant to Section 14 of the Banking Act *(Kreditwesengesetz)*, loans of €1 million or more comprise on-balance-sheet and off-balance-sheet transactions. Off-balance-sheet transactions include, amongst other things, warranties, guarantees and derivatives as well as undrawn revocable and irrevocable lending commitments. The exposures also include loans to Chinese-based affiliates of German enterprises and intra-group loans.
37 The exposure amount is moderately higher when Hong Kong and Taiwan are also included. These exposures amounted to €13.5 billion and €4.5 billion, respectively, at the end of 2022.
38 Supervisors focus particularly on institutions' CET1 capital. It consists of paid-in capital instruments that have to fulfil certain requirements as well as disclosed reserves.
39 Consolidated Banking Statistics data are available for 31 countries. Exposures are reported on a guarantor basis for the end of 2022.
40 On top of this, exposure to Hong Kong amounted to €513 billion. The London-based big banks HSBC and Standard Chartered are likely to play an important role in this.
41 In absolute terms, however, France's total exposure was also limited, at €45 billion. Germany comes to €19 billion on a comparable basis.

Aggregate direct exposure to China by category of bank

€ bn, as at Q4 2022



1 For reasons of statistical anonymity, it was necessary to consolidate the "Derivatives" and "Other off-balance-sheet transactions" items. 2 Comprises the 16 other systemically important institutions (O-SIIs) in Germany. 3 Comprises all other non-O-SIIs in Germany.

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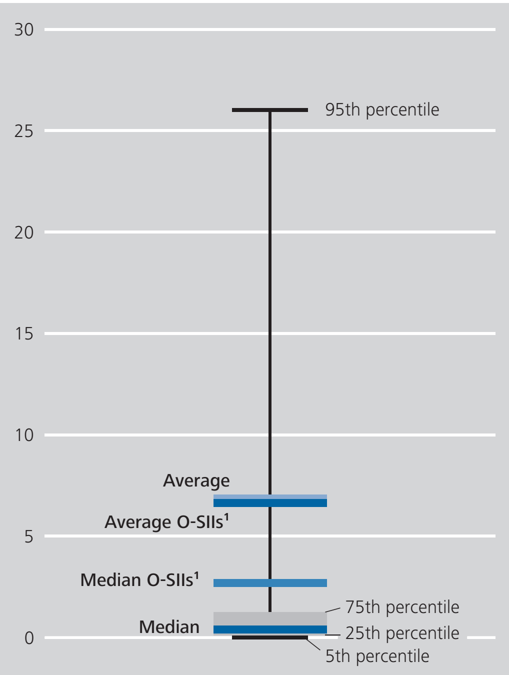
Distribution of direct exposure to China in the domestic banking system

As a percentage of CET1, Q4 2022



Source: Credit register of loans of €1 million or more. 1 Comprises the 16 other systemically important institutions (O-SIIs) in Germany.

Deutsche Bundesbank

… due, amongst other things, to large exposure to enterprises investing in China

The German banking system's total exposure to firms that relatively actively engage in FDI in China is large. This conclusion can be drawn from analyses linking microdata for enterprises and banks. At the end of 2022, domestic banks' exposure to firms making these investments stood at nearly €220 billion, corresponding to six times the direct exposure to borrowers domiciled in China and almost 42% of aggregate CET1 capital. The total exposure of other systemically important institutions (O-SIIs),[42] in particular, is comparatively large (see the box on pp. 24 f.).

Banks also exposed to sectors with high dependences on China in terms of exports …

German banks are also relatively highly exposed to individual sectors for which China is an important export market.[43] These include the manufacture of machinery and equipment, metal production and processing and, in terms of services, water and air transport. The importance of Chinese demand for domestic value added is greatest in these sectors.[44] At the end of 2022, the banking system's exposures to enterprises in these sectors amounted to around €140 billion. For the average systemically important bank, exposure came to around 40% of tier 1 capital. Averaged across all institutions, the figure was significantly lower, at 5%.

… and imports

The total exposure to firms in sectors that are comparatively heavily dependent on imports of Chinese intermediate products is also relatively high. Dependence on Chinese intermediate inputs is particularly pronounced in the textiles and clothing sectors, in computers, electronic and optical products, electrical equipment, and in fishing and aquaculture.[45] Total exposure to

42 Banks that are important to the functioning of a country's national economy. The Federal Financial Supervisory Authority (BaFin) and the Deutsche Bundesbank are jointly responsible for identifying German O-SIIs, taking note of the relevant guidelines published by the European Banking Authority (EBA). For a list of banks currently classified as O-SIIs for Germany, see https://www.bafin.de/EN/Aufsicht/BankenFinanzdienstleister/Eigenmittelanforderungen/ASRI/asri_node_en.html
43 Due to insufficient data, it is impossible to determine individual enterprises' dependence on exports or imports from China. As an alternative, the focus here is therefore on entire sectors for which China has comparatively large significance in terms of exports or imports.
44 This is determined based on OECD data for 2020 (see OECD (2023a)). The sectors are ranked based on the percentage of a sector's domestic value added that is consumed in China. Specifically, for the 10% of sectors with the highest value added share, Chinese final demand is classed as being particularly significant.
45 This is reflected in Chinese intermediate inputs making up a large percentage of total imported intermediate goods. The reference dataset is once again the OECD (see OECD (2023b)), with the 10% of sectors where China makes up the largest share of domestic and foreign inputs being considered here.

these sectors amounted to €92 billion at the end of 2022. Systemically important banks had exposures, on average, to the tune of just under one-fifth of their tier 1 capital, compared with an average of 5.5% across all institutions.

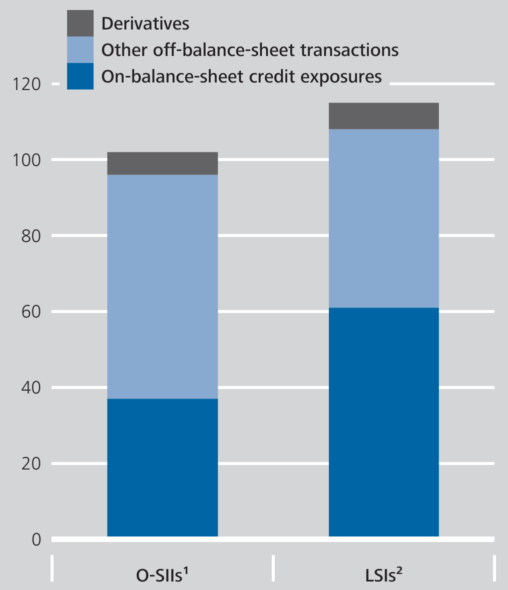
Extent of indirect risks to the stability of the banking system can only be approximated

These results should be treated with caution. The calculations include total claims against exposed enterprises and sectors. This tends to overestimate the associated risks. After all, it is not clear what proportion of the affected exposures would have to be written off in an economic downturn scenario or if geopolitical tensions were to escalate. Moreover, the results are heavily dependent on how the enterprises concerned are defined.[46] In the absence of suitable data, indirect financial risks resulting from potential dependences on imports or exports can be analysed only on a sectoral basis. However, there could well be firms with far above average dependences in sectors that are not classed as particularly vulnerable overall.[47] In addition, even where import shares are low in terms of their value, dependency may be high if imports cannot be sourced from other countries. Moreover, the results point to potential major contagion effects in a risk scenario as the exposed firms are highly interconnected with the real economy.[48] To round out the list, analyses show that banks in Germany provide much financing to the foreign special-purpose vehicles (SPVs) of multinational companies.[49] It is unclear to what extent the latter use these vehicles to channel further debt capital to China. This could render German banks' actual loss potential significantly greater in an adverse scenario.

46 For more information on the sensitivity of the results to the definition of the enterprises affected, see pp. 24 f.
47 One indication that this could be the case is that considerably more firms usually entertain trade ties with China than have FDI there.
48 This is evidenced by analyses of what are known as groups of connected clients, also referred to as borrower units. These are enterprises that are legally and/or economically independent borrowers but are nevertheless closely interconnected in legal and/or economic terms, e.g. through (material) ownership stakes (≥ 50%), profit transfer agreements etc.
49 See also the box on pp. 24 f.

Aggregate indirect exposure to China by category of bank*

€ billion, as at Q4 2022

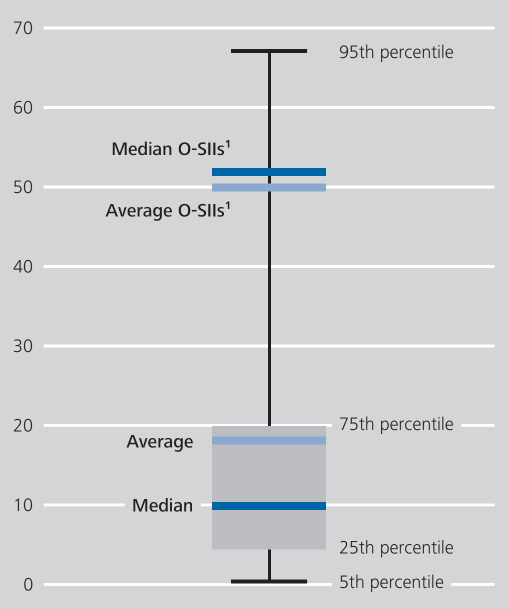


* Domestic enterprises are classified as being particularly exposed to China if one of the following key figures – sales, equity, total assets or headcount – of their foreign affiliates in China exceeds a threshold of 10% of all foreign affiliates worldwide. **1** Comprises the 16 other systemically important institutions (O-SIIs) in Germany. **2** Comprises all other non-O-SII institutions in Germany.

Deutsche Bundesbank

Distribution of indirect exposure to China in the domestic banking system*

As a percentage of CET1, as at Q4 2022



* Domestic enterprises are classified as being particularly exposed to China if one of the following key figures – sales, equity, total assets or headcount – of their foreign affiliates in China exceeds a threshold of 10% of all foreign affiliates worldwide. **1** Comprises the 16 other systemically important institutions (O-SIIs) in Germany.

Deutsche Bundesbank

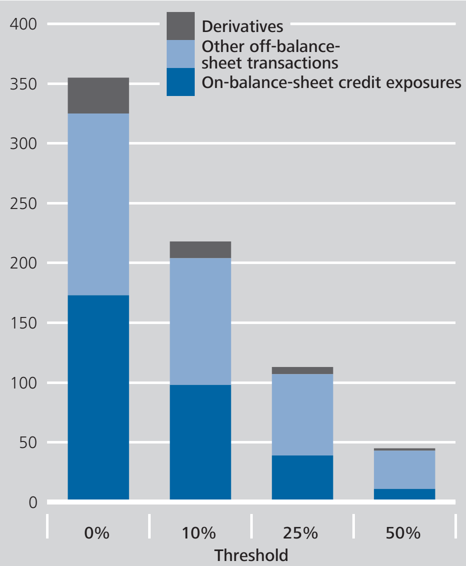
Risks to financial stability in Germany on account of firms active in China

Disruptions in relations with China would potentially have severe repercussions for German firms heavily invested in that country. Should they put those firms' solvency at risk, this could also pull the German banking system into the vortex. One way of measuring such vulnerabilities is to link statistical and supervisory reporting databases.

Risks to domestic firms from their exposure to China are assessed through the amount of their FDI in that country. Information on this is provided by the Deutsche Bundesbank's Microdatabase Direct investment (MiDi). Domestic firms are classified as being particularly exposed to China if a high weight is assigned to Chinese foreign subsidiaries held directly or indirectly (via holding companies). To qualify, these firms' Chinese subsidiaries have to account for at least 10% of sales, equity capital, total assets or headcount of all foreign affiliates worldwide. As at end-2022, 756 firms fit the bill.

Aggregate indirect exposure to China by threshold*

€ billion, as at Q4 2022



* Domestic enterprises are classified as being particularly exposed to China if one of the following key figures – sales, equity, total assets or headcount – of their foreign affiliates in China exceeds a threshold of 10%, 25%, 50% or 0% of all foreign affiliates worldwide (accordingly includes all firms with affiliates in China).

Deutsche Bundesbank

Information on German banks' financial exposures to domestic firms with a high weight of Chinese foreign affiliates is based on data from the credit register for loans of €1 million or more. The dataset contains both on-balance-sheet and off-balance-sheet transactions between individual banks and firms which are merged into total exposures. On-balance-sheet transactions include lending, whereas warranties, guarantees and derivatives are some of the types of transactions reported as off-balance-sheet.[1] Information from the reporting system for loans of €1 million or more can be linked to bank balance sheet data, which are subject to supervisory reporting requirements. In this manner, information on banks' common equity tier 1 (CET1) capital[2] and risk-weighted assets (RWAs)[3] can be taken into account. Moreover, the data allow a distinction to be made between exposures of other systemically important in-

1 Starting with the 31 March 2019 reporting reference date, the definition of credit was expanded. Since then, off-balance-sheet transactions have also included undrawn revocable and irrevocable lending commitments.
2 Supervisors focus particularly on institutions' CET1 capital. It consists of paid-in capital instruments which have to fulfil certain requirements as well as disclosed reserves. Both components must be available to institutions for unrestricted and immediate use to cover risks or losses. Institutions must have a CET1 capital ratio of at least 4.5%. Capital buffer requirements also have to be met using CET1 capital.
3 RWAs are a measure of a bank's risk.

stitutions (O-SIIs) and those of less significant institutions (LSIs).[4]

Overall, the German banking system has high total exposures to firms invested in China. In recent years, these exposures have risen significantly, consistent with German firms' growing business ties with China. At the end of 2022, domestic banks' exposures stood at nearly €220 billion, representing almost 7% of RWAs and nearly 42% of CET1 capital. At last report, around half was accounted for by off-balance-sheet transactions, a very high share in terms of German banks' general balance sheet structure.

Systemically important banks are particularly exposed. Their median exposures amounted to more than 50% of CET1 capital, with off-balance-sheet transactions playing a dominant role. The same holds for exposures of smaller branches of foreign banks. By contrast, savings banks account for almost half of on-balance-sheet credit exposures.

The funding of foreign special-purpose vehicles (SPVs)[5] by domestic banks can potentially entail additional risks. Total exposures to these entities, at €163 billion in the final quarter of 2020, were almost as high as those to domestic multinational enterprises (€208 billion).[6] By comparison, direct exposure to their subsidiaries in China, at €14 billion as at end-2020, was relatively small. Part of the China-related total exposure, though, could have been rerouted via lending to SPVs and thus hidden. However, a more detailed analysis of this channel that looks through the financial flows routed via such cross-border relationships between firms is next to impossible.

The quantification of indirect vulnerabilities is highly uncertain. One reason lies in the high stock of, in some cases, opaque off-balance-sheet exposures of the banking system. Another is that there is already sizeable discretionary scope for defining the group of potentially vulnerable firms. The stricter the criteria applied here are, the lower the banking system's calculated total exposure will be. It falls to one-half if the threshold for sales, equity capital, total assets or headcount attributable to Chinese foreign affiliates is raised from 10% to 50%. On the other hand, if all firms with affiliates in China are included, the total exposure nearly doubles. That said, though, it is precisely from this perspective that it is unlikely that total exposures to the affected firms would have to be written off as, if Chinese business were less important, the firm's future as a going concern would tend not to be jeopardised even if the risk were to materialise. However, firms not interlinked with China through subsidiaries of their own can likewise be exposed to elevated risks if, say, they are linked through long-term equity investments to other firms that themselves have injected large volumes of FDI into China.[7]

4 The Federal Financial Supervisory Authority (BaFin) and the Deutsche Bundesbank are jointly responsible for identifying German O-SIIs, taking note of the relevant guidelines published by the European Banking Authority (EBA). See https://www.bafin.de/EN/Aufsicht/BankenFinanzdienstleister/Eigenmittelanforderungen/ASRI/asri_artikel_en.html
5 A special-purpose vehicle (SPV) is a firm established to serve a clearly defined business purpose. SPVs are deployed primarily for financing instruments going above and beyond traditional lending.
6 We are looking here at domestic multinational enterprises (group parents) which simultaneously have a non-resident SPV and an affiliate in China.
7 This is shown by an analysis of groups of connected clients made up of legally or economically affiliated firms. It is assumed here that the entire group is exposed if at least one of the affiliated firms is active in China via FDI. Applying this very broad definition, just under 52,000 firms would be affected and the total exposure of the banking system would amount to around €2.4 trillion.

Other financial exposures

Risks for insurers and investment funds moderate

Domestic open-end investment funds and insurers have little direct exposure to China; the indirect risks are moderate. The total direct exposure of open-end investment funds and insurers to China amounted to €5 billion and €8.4 billion respectively at the end of 2022.[50] However, open-end investment funds held €54 billion worth of shares in enterprises that appear potentially at risk due to having foreign affiliates in China, and insurers had investments amounting to €48 billion in such enterprises (in both cases, on an entity or ultimate-parent basis).

Conclusion

Overall, the German economy is heavily dependent on China

Overall, the German economy is heavily dependent on China. China is important for significant parts of German industry, be it as a sales market, a production centre or a source of intermediate goods. Germany appears more vulnerable to disruptions in economic relations with China than most other euro area countries or the United States, partly because industry is of greater significance to the economy as a whole in Germany.

Abrupt decoupling, in particular, likely to be very costly for the economy

An economic crisis in China similar to those that have occurred in the past in other countries following a correction of excessive credit growth would arguably be manageable for the German economy. However, an abrupt decoupling, say as a result of a geopolitical crisis, would deal a considerable blow to German industry, in particular. Enterprises that are directly invested in China, which are typically large, would stand to lose a substantial part of their sales and profit base. The number of firms that depend directly or indirectly on critical intermediate inputs from China is much larger. A lack of imports could cause them to experience serious production losses, at least in the short term. In German industry, which is characterised by a high degree of division of labour, this would probably also impact downstream production stages. In addition, there would be spillover effects that would trigger similar problems in other economies. The heightened uncertainty associated with this would likely mean that all sectors of the German economy would be affected. Overall, the economic losses would arguably clearly eclipse the costs of the extensive decoupling from Russia.

Financial system also potentially at risk

The close real economic ties between Germany and China also give rise to considerable risks for the German financial system. While the direct interconnectedness of German financial intermediaries with China is fairly small, German banks are highly exposed to domestic enterprises and sectors that are heavily dependent on China. A far-reaching disruption to Sino-German economic relations would impact these firms and sectors significantly and ultimately increase the probability of credit defaults. In addition, the German financial system would likely face further strains in such a scenario. These could, for example, be the result of a general loss of confidence in the global financial markets.

However, Germany also benefits from close economic ties with China

When analysing these risks, the benefits of close ties with China should also be taken into account, however. In recent years, German industrial enterprises have derived significant financial benefit from exports to China. In addition, they have generated high sales and profits from production in China. The large volume of imports from China has likewise been beneficial for Germany. A decoupling from China is therefore likely to entail business and economic costs over the medium and long term. This would be true even if dependences were reduced in an orderly and gradual manner.[51] The economy would likely suffer particularly large losses if production were “reshored”

50 At the end of 2022, the aggregate net asset value of domestic open-end investment funds stood at around €2,500 billion, while German insurers held investments totalling €2,014 billion at market values at the same point in time.
51 See Baqaee et al. (2023).

to Germany on a broad scale.[52] In addition, China has a strong position in or even a quasi-monopoly for some products, meaning dependences can be reduced at best in the medium to long term.

Moreover, dependences also on the Chinese side

It should also be taken into account that mutual dependences entail fewer risks than unilateral dependences. Granted, the stocks of Chinese FDI in Germany are very low so far. Nonetheless, China, too, sources important intermediate goods from Germany. Only a small proportion of total Chinese exports of goods (3%) goes to Germany, but looking at the G7 group (including the EU), this share rises to 40%. Overall, China is heavily dependent on the advanced economies for trade and technologies.[53]

Resilience should therefore be strengthened, but decoupling not advisable

Consequently, a unilateral decoupling from China appears neither realistic nor desirable overall. However, firms and policymakers should continue to do all they can to reduce risks and strengthen the resilience of the German economy (de-risking). Strengthening the international trade order and regional free trade agreements that make it easier for enterprises to diversify international supply relationships can make a contribution. The Federal Government's strategy on China[54] and the European Commission's measures to reduce dependence on critical raw materials point in the right direction.[55] It also seems relevant for financial institutions to keep an eye on indirect vulnerabilities that may arise through borrowers' business activities.

52 See, for instance, Fuest et al. (2022).
53 See Gerards Iglesias and Matthes (2023).
54 Amongst other things, the paper calls on companies to take greater account of geopolitical risks in their decision-making. Cluster risks should be internalised to prevent the government from having to intervene in the event of a geopolitical crisis. This is particularly important given that several large firms have extensive exposures. See Federal Government (2023).
55 The Critical Raw Materials Act recently passed by the Council and the European Parliament stipulates, amongst other things, that as of 2030 not more than 65% of the EU's annual consumption of each strategic raw material may be sourced from a single third country. See European Commission (2023).

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