

## **| The global economy during the coronavirus pandemic**

*From the beginning of 2020 onwards, the coronavirus pandemic has been shaping economic developments around the world. These have taken the form of an unprecedented downturn in advanced and emerging market economies, a raft of measures to prevent the spread of infection, and extensive monetary and fiscal policy support. Only once effective vaccines had been introduced did a sustained recovery begin to take hold in many places. However, delivery delays and shortages of key intermediate inputs are preventing this recovery from progressing smoothly.*

*Despite the global nature of the pandemic, some economies have pulled through the crisis better than others. In a number of countries, such as the United States and China, economic output has already returned to – or even significantly exceeded – its pre-crisis level. Yet many economies, including the four largest euro area Member States, are still lagging behind.*

*This heterogeneity is largely down to differences in the pattern of the pandemic and the measures taken to combat it. This article presents several empirical studies that examine these relationships. Estimates show that workplace closures and stay-at-home requirements, for example, strongly curbed mobility. Although this slowed the spread of the pandemic, it was accompanied by major economic losses. Euro area countries which were hit particularly hard by the pandemic and in which restrictions were stricter or in force for longer experienced sharper slumps in activity. Moreover, countries in which high-contact services sectors are an economic mainstay proved particularly vulnerable.*

*Policymakers did not limit themselves to directly combating the pandemic, but supported the economy in many and varied ways. In the industrial countries, in particular, monetary and fiscal policy accommodation significantly cushioned the immediate impact of the crisis. Simulation calculations suggest that the cushioning effects were even greater in the United States than in the euro area. In many places, specific measures also protected jobs, averted corporate insolvencies and prevented turmoil in the financial system.*

*Since the beginning of this year, efforts to curb the pandemic in the long run have been focused on vaccination campaigns. This could go a long way towards keeping the longer-term damage from the pandemic fairly limited in the advanced economies. In many developing and emerging market economies, on the other hand, the recovery is being held back by slow progress in terms of vaccination efforts. Over the next few months, the priority will be to push ahead with vaccination campaigns around the world – and not only for humanitarian reasons. Global economic interconnectedness means that new waves of the pandemic in developing and emerging market economies would also damage the advanced economies. Another task will be to phase out the economic policy assistance measures as the pandemic recedes so as not to hamper the structural change that the pandemic has made necessary.*

## ■ Introduction

*Pandemic as a humanitarian disaster ...*

Almost two years after the outbreak of the coronavirus pandemic, large parts of the world remain firmly in its grip. The spread of the virus was first and foremost a humanitarian disaster. So far, over 240 million infections have been recorded around the world, with the real figure likely to be much higher. Almost 5 million people have lost their lives in connection with the virus.<sup>1</sup> It is only thanks to the rapid development of effective vaccines that recent waves of infection in the advanced economies have been less severe. The situation remains substantially more difficult in many emerging market economies and developing countries, where a significant proportion of the population will probably not be vaccinated until next year.

*... with enormous global economic repercussions*

As long as vaccination coverage among the population is insufficient, reducing contact remains the most effective way of curbing the spread of the highly infectious and dangerous virus. Only very few governments have relied completely on people adjusting their behaviour voluntarily, with most underpinning this with official measures instead. A kind of blueprint for such measures was provided by China, where the pandemic originated and where the rapid spread of the virus brought public life to a virtual standstill from as early as the end of January 2020. Just a few months later, countries all over the world were closing businesses and schools and imposing stay-at-home requirements and travel restrictions. The upshot was a global economic downturn of historic proportions. In the second quarter of 2020, global real GDP was around 10% below its pre-crisis level. Even at the height of the global financial and economic crisis of 2008-09, losses had not been not nearly as severe.<sup>2</sup>

*Recovery rapid and strong at first ...*

When the first wave of the pandemic receded in many countries, restrictions were undone to a degree over the course of the second quarter of 2020. This initially caused the economy to rebound strongly and at a more rapid pace

than widely expected.<sup>3</sup> Global industrial production and world trade had already exceeded their pre-crisis levels by the end of 2020. High-contact services sectors, on the other hand, found it much harder to make up the ground they had lost. The sporadic recovery in industries such as food services, the events industry and tourism, in particular, was set back several times by measures to contain new waves of infection. Even so, in many countries, the dip in general economic output for 2020 as a whole was much smaller than had been expected by the International Monetary Fund (IMF) in June 2020, for example.<sup>4</sup>

No region of the world escaped the pandemic and its economic repercussions. Nonetheless, some economies appear to have pulled through the crisis better than others. Differences in the severity of the slump in economic output were already visible in the first half of 2020. The subsequent recovery did not take place equally swiftly or steadily in all countries, either. In a number of countries, economic activity has already surpassed its pre-crisis level once again. This includes China, in particular, which has even returned to its original growth path. The rapid ramping-up of production capacity for medical personal protective equipment and the export sector's focus on certain consumer

*... but with major regional differences*

<sup>1</sup> Figures are based on data from Johns Hopkins University, which analyses official national statistics on key data for the pandemic. The actual spread of the pandemic and the number of victims whose lives it has claimed is probably significantly underestimated. For instance, the World Health Organisation assumes that the number of coronavirus-related deaths worldwide reported in 2020 was around 40% too low. See Dong et al. (2020) and World Health Organisation (2021).

<sup>2</sup> The GDP data are based on an aggregate of 48 economies using market exchange rates. Between the third quarter of 2008 and the first quarter of 2009, the GDP of this group of countries only fell by 4%.

<sup>3</sup> For instance, according to the expert dating of business cycles, which is widely regarded as an official source, the recession in the United States came to an end as early as April 2020. In the history of all business cycles since 1854, this was by far the shortest economic downturn. See National Bureau of Economic Research (2021).

<sup>4</sup> At the time, the IMF's forecast had predicted a decline of 4.9% in global GDP for 2020 as a whole. The latest calculations revised the decrease downward to 3.1%, mainly owing to the rapid recovery in the second half of 2020. See International Monetary Fund (2020a).

goods helped give its economy a major boost (for more information, see the box on pp. 46 f.). In the United States, real GDP is now back to just above its pre-crisis level. By contrast, in the largest euro area Member States, it is still some way off.

## Impact of the pandemic on mobility and global economic activity

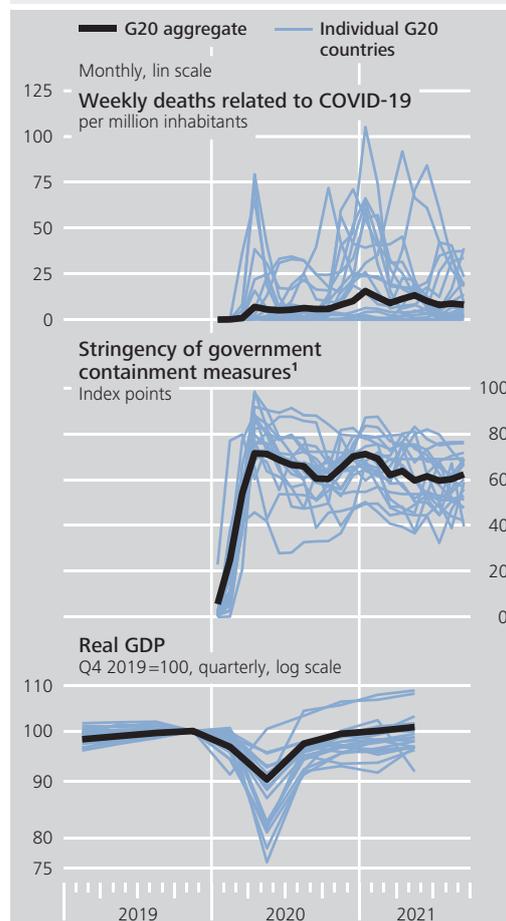
*Influence of government-imposed and self-imposed changes in behaviour ...*

One explanation for the mixed picture among countries could be differences in their responses to the pandemic in terms of the measures taken and their duration. In March and April 2020, many governments took swift action against the spread of infection, imposing far-reaching restrictions on social and economic life. Even until recently, some countries implemented drastic measures in an attempt to stop the virus from spreading. Others took a less tough stance, for example because the local infection figures allowed it, because they relied more strongly on voluntary changes in behaviour, or because additional restrictions appeared too costly in light of the economic situation. The complex interactions between the pandemic situation, the measures taken, changes in behaviour, and economic activity present a major challenge for empirical studies. Although it seems plausible to assume that the sharp drop in GDP in Germany in the second quarter of 2020 was the result of government measures, other countries that took a less strict stance also experienced considerable declines. Even in the absence of administrative measures, infection rates brought about noticeable changes in behaviour.<sup>5</sup>

*... can be analysed using high-frequency data*

One way to overcome these difficulties and identify cause-effect relationships is to analyse high-frequency data. In actual fact, daily infection figures are available for almost all countries. The scale of the constraints owing to government containment measures can be approximated using a stringency index developed by the University of Oxford.<sup>6</sup> High-frequency

### Pandemic and economic indicators for G20 countries\*



Sources: Johns Hopkins University, Oxford COVID-19 Government Response Tracker, national statistics and Bundesbank calculations. \* Excluding EU aggregate. GDP weighting at market exchange rates for restrictions and economic activity. <sup>1</sup> Values of zero indicate no containment measures; values of 100 represent strictest possible containment measures.

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mobility data are analysed as a chain in the causal link between government-imposed or self-imposed constraints, on the one hand, and economic output, on the other. For instance, the data on the movement patterns of mobile phone users show significant shifts around

<sup>5</sup> In Sweden, which initially imposed very few administrative measures, relying instead on behavioural guidelines, GDP shrank by just over 8% in the second quarter of 2020 and thus by only slightly less than Germany's GDP.

<sup>6</sup> Inputs to the index calculations include government restrictions on schools, businesses, public transport, events and gatherings as well as various restrictions on the mobility of citizens. Index values of zero indicate no containment measures, while values of 100 represent the strictest possible containment measures. For a description of the index, see Hale et al. (2021).

## The reasons for the Chinese economy's comparatively good performance in the pandemic

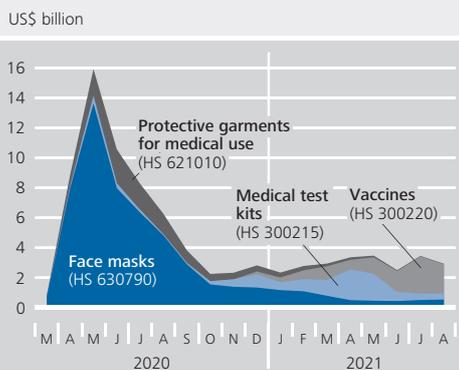
China, the country in which the pandemic originated, had already endured a massive decline in economic activity at the beginning of 2020. It recovered surprisingly quickly from this slump, which affected several services sectors as well as the industrial sector. Whilst other countries' economies were getting caught up in the downward spiral of the pandemic, China's real gross domestic product had already returned to pre-crisis levels by the second quarter of 2020. Shortly thereafter, it even returned to its original growth trajectory.

The Chinese authorities' rigorous containment policy accounted for a material share of the dynamic recovery; it brought infection counts down quickly and sustainably. High-contact services, in particular, were the beneficiaries, whereas industrial production recovered rapidly on the back of, above all, foreign business.<sup>1</sup> In 2020, China's goods exports (on a US dollar basis) picked up by 3½% even though global import expenditure dropped by around 6% in the same year.<sup>2</sup>

The decisive reason why Chinese exports performed remarkably well lay in the ability of Chinese industry to deliver quickly and in large quantities those goods for which demand picked up on account of the pandemic. Such goods initially included medical personal protective equipment. In addition, the transition of many employees to working from home caused a global spike in additional demand for IT equipment. Moreover, global consumer demand shifted as well: owing to containment measures or voluntary changes in behaviour, households strongly curbed their consumption of high-contact services but conversely increasingly acquired goods such as electronic devices or furniture. Chinese exporters, which are specialised in consumer goods, therefore benefited enormously from this.

In order to quantify the significance of the product range effect for China's successful export performance, we decompose Chinese exports for the past two years into approximately 5,000 product groups and compare each to global exports.<sup>3</sup> We then ask what China's export revenues for 2020 would have been if, in each product group, the country had participated in global trade growth at 2019 product-specific global market shares. It turns out that the hypothetical export value calculated in this fashion for 2020 would have been merely 1.4%

**China: pandemic-related windfalls in selected export categories\***



Source: Bundesbank calculations based on Trade Data Monitor. \* Export value less the average export value for the same month in 2018 and 2019.  
 Deutsche Bundesbank

<sup>1</sup> The considerable expansion in public investment activity was an additional key reason.

<sup>2</sup> China's goods imports in 2020, on the other hand, did not quite sustain their 2019 levels in value. The sharp fall in commodity prices was the decisive factor, however. If these products are factored out, the result is an increase of just under 3%. German exporters, too, benefited from China's essentially quite strong import demand (see Deutsche Bundesbank (2020)).

<sup>3</sup> The disaggregation is based on the classification of goods in the Harmonized Commodity Description and Coding System (HS) at the six-digit level. Data were taken from the Trade Data Monitor database.

below 2019 export revenues, whereas global trade contracted by 6%.

The product range effect therefore had a stabilising effect on Chinese exports in a difficult global economic environment. However, the fact that Chinese exports actually rose requires further explanation. In individual product groups, China gained considerable global export shares. This increase was particularly impressive for personal protective equipment products, which include, for instance, face masks, global demand for which veritably skyrocketed within just a few weeks after the outbreak of the pandemic. China succeeded in extremely ramping up its production capacity within a short period of time and was thus able to almost single-handedly accommodate the increase in global demand. On the whole, pandemic-related medical products contributed just over 2½ percentage points to Chinese export growth in the past year.<sup>4</sup>

The aggregate economic upturn in China decelerated markedly in the first three quarters of this year. Exports, in turn, were an important factor in this development, too. They continued to expand briskly in the first quarter. However, as the pandemic receded and goods consumption in the industrial countries began to return to normal, the export boom seems to have been dissipating since then.<sup>5</sup> The Chinese economy is thus once again increasingly dependent on drivers of domestic growth.

<sup>4</sup> These included not only face masks (HS code: 630790) but also protective garments for medical use (621010), medical test kits (300215), disinfectants (380894) and diagnostic or laboratory reagents (382200).

<sup>5</sup> Although revenue from goods exports was still up nearly 25% year-on-year in the third quarter of 2021, this was probably due in large part to price increases.

times when waves of the pandemic occurred. Whilst infection rates were high, the time users spent at home generally increased considerably; conversely, far fewer individuals were at the workplace, and consumers stayed away from restaurants and recreational facilities.

A Bundesbank empirical study based on work by the IMF on developments during the first few months of the pandemic analyses these relationships using a broad-based measure of mobility<sup>7</sup> for a large group of countries spanning 128 economies.<sup>8</sup> One topic of particular interest is the mobility response to a tightening of government-imposed restrictions<sup>9</sup> as well as to rising infection numbers, based on which voluntary changes in behaviour are assumed to have taken place.<sup>10</sup> Owing to the high frequency of data, assumptions about the incubation period and the length of political decision-making processes allow pandemic shocks to be identified.<sup>11</sup>

*Empirical estimates for a large group of countries*

<sup>7</sup> For each country, this can be calculated from the mean values of the following sub-indices of the national Google mobility reports: retail and recreation, grocery and pharmacy, transit stations, and workplaces. Each sub-indicator taken by itself measures the percentage change in visitor numbers as compared to the reference date in January-February 2020. To reduce fluctuations over the course of the week, the mobility index is included in the estimates as a seven-day moving average. See Google LLC (2021).

<sup>8</sup> See International Monetary Fund (2020b) and, for a more detailed discussion of the approach and results, Caselli et al. (2021).

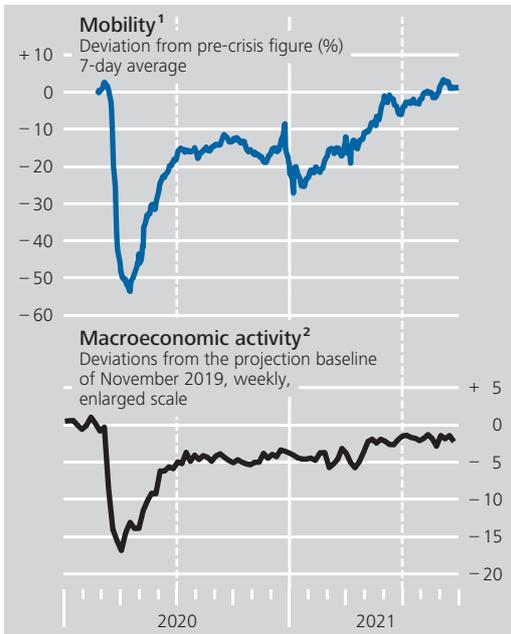
<sup>9</sup> Measured using the stringency index of the Oxford COVID-19 Government Response Tracker, adjusted for the influence of public information events.

<sup>10</sup> Infection rates are captured using the number of new infections per 100,000 inhabitants within seven days, as taken from the data provided by Johns Hopkins University. The choice of indicator is based on the assumption that the population adapts its behaviour to current infection rates rather than on the basis of indicators which only provide a lagged picture of developments in the pandemic. Persistent differences in national testing strategies are taken into account in the estimates through country fixed effects. Specifications that use death counts as pandemic indicators instead produce results of similar quality.

<sup>11</sup> Specifically, it is assumed that unexpected changes to government containment measures or unforeseen developments in infection rates directly affect mobility. Mobility shocks, on the other hand, are only assumed to have a lagged impact on the other variables.

### High-frequency mobility and economic indicators

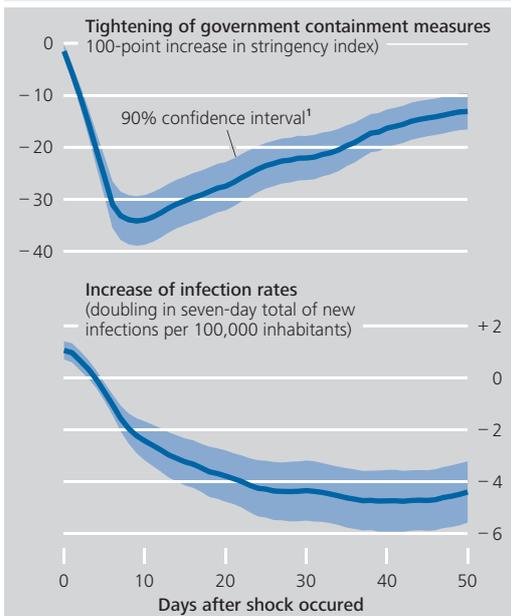
Median values across all available countries



Sources: Google COVID-19 Community Mobility Report, OECD and Bundesbank calculations. **1** Mean of the following sub-indices of the national Google mobility reports: retail and recreation, grocery and pharmacy, transit stations, and workplaces. **2** According to the OECD Economic Activity Tracker. Deutsche Bundesbank

### Global mobility responses to pandemic shocks\*

%



Source: Bundesbank calculations. \* Impulse-response function derived from local projections. Estimation equations regress mobility indices on contemporaneous and lagged indicators of the stringency of government containment measures and pandemic developments as well as time and country fixed effects. **1** Based on clustered standard errors. Deutsche Bundesbank

The impulse-response functions estimated using local projections for the period from January 2020 through June 2021 suggest that government restrictions did, in fact, strongly curb mobility.<sup>12</sup> They show that the immediate introduction of the strictest containment measures, which involved nationwide stay-at-home requirements and extensive business closures, inter alia, reduced mobility by almost 35%.<sup>13,14</sup> After just over one week, the estimated effects gradually start to wear off, probably mainly due to the success of the measures in slowing down the rate of infection and a subsequent easing of the restrictions. The results also show that, in and of themselves, increasing infection rates caused a clear decline in mobility. In any case, after a doubling of the seven-day total of new infections per 100,000 inhabitants, mobility decreased by just under 5% on average, and had barely recovered even almost two months later. Given that government restrictions initially remained unchanged, this response was probably largely due to the public taking their own safety precautions.<sup>15</sup> Because the number of infections not only doubled, but multiplied several times over in each of the last pandemic waves, voluntary changes in behaviour probably played a key role in the observed declines

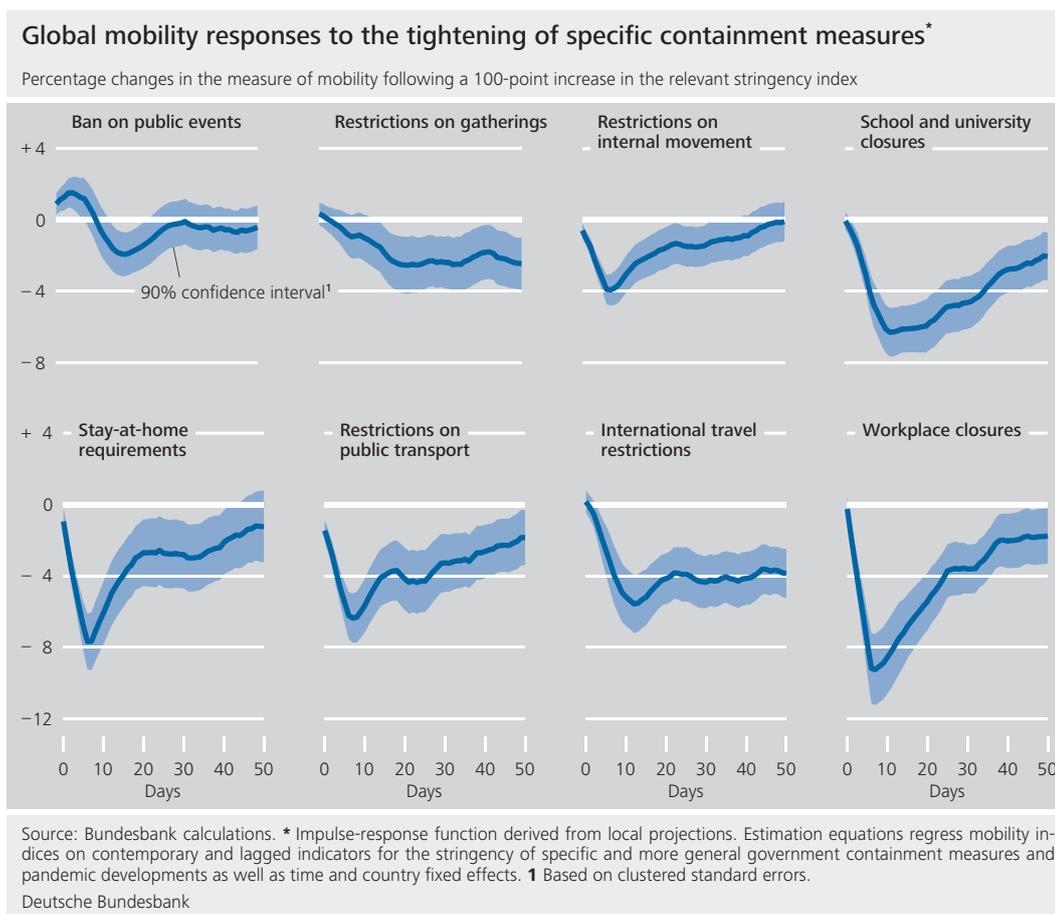
*Higher infection rates and containment measures strongly curbed mobility*

**12** The impulse-response functions reflect the estimated coefficients of regressions that explain future developments in mobility using the pandemic and containment variables. The projection equations also take into account realisations of all variables (including the dependent variables) during the previous two weeks, as well as time and country fixed effects. This approach is therefore broadly equivalent to an estimate using a panel vector autoregression (VAR) model. See also Jordà (2005) as well as Plagborg-Møller and Wolf (2021).

**13** Because the mobility indices capture the percentage deviation of mobility from a reference level in January-February 2020, the impulse-response functions reflect, strictly speaking, the responses attributable to the measures in percentage points. This is approximately equal to the percentage change in the mobility level. All responses described here are significantly different from zero at the 10% level at least.

**14** In countries such as Italy, where similarly strict rules were briefly in force in the second quarter of 2020, this corresponds to around half of the decline in mobility actually observed.

**15** The effects, which initially increase over time, probably also reflect the lagged tightening of containment measures to at least some extent, however. A correlation of this kind is suggested, inter alia, by separately estimated impulse-response functions for the adjustment of containment measures after a doubling of infection numbers.



in mobility and activity alongside government-mandated containment measures. This observation is consistent with the IMF's findings for the first few months of the pandemic as well as a large number of academic studies on this topic.<sup>16</sup>

*Strict bans, stay-at-home requirements and workplace closures particularly limiting*

A closer look at the individual containment measures reveals that they had very different effects on mobility and thus also on economic activity and the course of the pandemic.<sup>17</sup> For example, although behavioural recommendations alone – such as those regarding on-site working or social distancing – also noticeably reduced mobility,<sup>18</sup> mandatory measures such as government-imposed workplace closures or stay-at-home requirements had a much greater impact. This is also true in comparison to regulations that encroached on other areas of public and private life. While strict workplace closures and stay-at-home requirements by themselves reduced mobility by almost 10% and 8%, respectively, the impact of restrictions on gath-

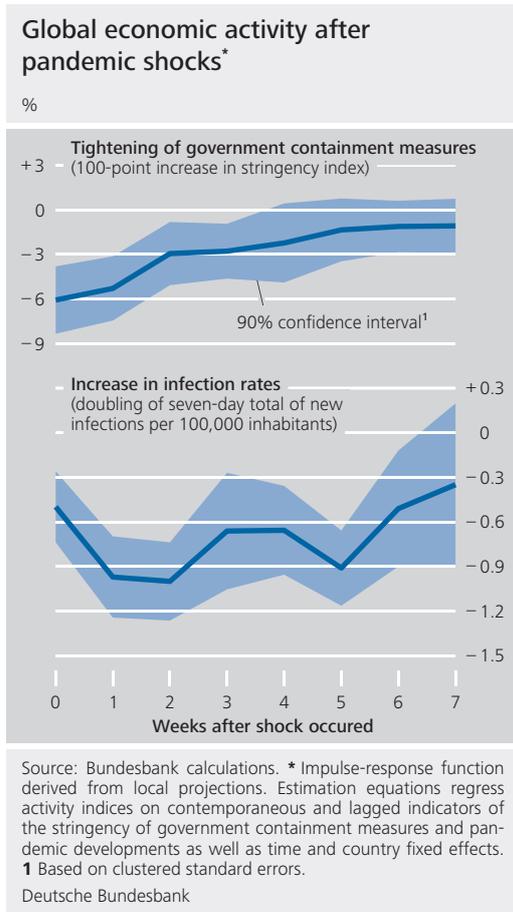
erings, international travel and public events was much smaller.<sup>19</sup> All in all, the results therefore suggest that those measures that probably

**16** Chernozhukov et al. (2021), for instance, confirm that stay-at-home orders and business closures were highly effective. However, other studies, including Gupta et al. (2020) and Goolsbee and Syverson (2021), note that considerable changes in mobility behaviour were already visible before the tightening or easing of containment measures and highlight the role of self-imposed behavioural adjustments. Even the strong deterioration in the US labour market in the first few months of the pandemic can probably only partly be explained by government containment measures; see, for instance, Baek et al. (2021) as well as Kong and Prinz (2020).

**17** In the following analyses, in addition to the respective measure in question for a given type of containment measure, the local projections incorporate a second indicator that summarises the stringency of the restrictions in all other categories.

**18** This distinction takes advantage of the fact that, at the level of the components of the Oxford COVID-19 Government Response Tracker, behavioural recommendations are differentiated from mandatory measures of varying degrees of magnitude.

**19** However, it also appears that measures – such as restrictions on international travel – that have become part of everyday life in many places since the outbreak of the pandemic were accompanied by mobility restrictions that persisted for comparatively long periods.



entailed particularly severe economic costs had the strongest impact on mobility behaviour.

*Economic activity also strongly impaired*

Because measures of economic activity are generally only available on a quarterly basis, analysing GDP losses using a high-frequency dataset is not entirely straightforward. However, the OECD evaluates internet search queries on key economic topics every week and tracks overall economic activity on this basis.<sup>20</sup> The resulting indicators, which are available for 46 countries, provide at least a rough high-frequency picture of GDP trends since the start of 2020. Analysing local projections based on these data confirms, for instance, that both self-imposed and government-imposed changes in behaviour during the pandemic were associated with considerable declines in activity. Taken in isolation, tightening government containment measures to the greatest extent possible would directly reduce economic activity by around 6% below the expected baseline before the pandemic.<sup>21</sup> The effects of

a doubling of the infection rate are also statistically significant. According to the estimation, they reduce GDP by up to 1%.

## Differences in how the euro area countries' economies were affected

The analysis up to now has largely excluded the heterogeneity between countries. However, the pandemic has weighed on the individual countries to differing degrees and at different times. A comparison of China with the rest of the world illustrates this in particular. In that country, many production plants came to a standstill as early as in January 2020. A few months later, economic activity then slumped elsewhere. A part was played by the disruption to international value chains as a result of supply shortfalls for Chinese products (see the box on pp. 52 ff.).

*Economic effects of the coronavirus crisis relatively heterogeneous across countries*

The euro area economies also pulled through the crisis very differently. This already became apparent in the first half of 2020. At the peak of the crisis in the second quarter, GDP losses (in each case compared with pre-crisis levels) ranged from 4½% in Lithuania to 22% in Spain.<sup>22</sup> Even one year later, following a rapid but partly bumpy recovery, the situation has remained mixed. While GDP in some Member States had exceeded its respective pre-crisis level once again as early as in the second quar-

*Drops in activity varied widely in the euro area*

<sup>20</sup> See OECD (2020).

<sup>21</sup> This is a fairly conservative estimate. Identifying the effects of government containment measures in this study is made more difficult by the fact that many of the mostly advanced economies in the sample tightened or eased restrictions in the same week. Much of the variation is therefore explained by time fixed effects. If these are stripped out of the estimations, the calculated decline in economic activity after tightening government containment measures to the greatest extent possible is almost three times as large.

<sup>22</sup> Ireland recorded only a slight decline in real GDP in the second quarter of 2020 and economic activity already exceeded its pre-crisis level in the following quarter. However, the statistical reporting of economic output in Ireland has been largely determined by the strategic planning of multinational enterprises for several years (see Deutsche Bundesbank (2018)). For this reason, Ireland is excluded from the following analyses.

ter of 2021, in Spain it remained just over 8% lower. The backlogs were somewhat lower in Italy, at 4%, as well as in Germany and France, each at 3%.

*Pandemic developments, containment measures and mobility behaviour correlate strongly with direct economic losses*

The mixed picture across countries is partly attributable to differences in infection rates. Simple correlation analyses indicate this, at least. Particularly in the first half of 2020, economic losses clearly coincided with the intensity of the pandemic.<sup>23</sup> The stringency of government containment measures<sup>24</sup> and the mobility indicator<sup>25</sup> turn out to be even more closely associated with GDP losses in the first half of 2020. Overall, the findings support the hypothesis that, above all, the countries which had to shoulder sharp declines in GDP were those that were hit particularly hard by the pandemic, in which stringent and/or more protracted containment measures were in force, and whose residents restricted their mobility more sharply.

*Relationships become weaker over time*

However, the relationship between pandemic developments and mobility, on the one hand, and economic developments, on the other, later weakened. The correlation of the indicators with GDP losses cumulated since the onset of the pandemic fell. This is likely to be due, inter alia, to enterprises adapting better to the pandemic conditions through the deployment of hygiene measures and increased remote working, and households' increased use of contactless distribution channels on account of the restrictions.

*Countries with significant hotel and restaurant industry or tourism sector so far worst affected by the crisis*

As contacts were reduced during the pandemic, economic sectors such as the food and beverage and accommodation sectors, but also transport services and cultural activities suffered heavy losses. Economies for which these sectors play a key role were thus hit particularly hard. The correlation analysis suggests that the significance of the economic structure for GDP growth even increased over time. For instance, it reveals a close relationship between the share of the accommodation sector in aggregate gross value added<sup>26</sup> and cumulative GDP losses up to the second quarter of 2021. A broadly

### Correlation of GDP losses in the euro area with selected indicators\*

Item	Mean GDP losses <sup>1</sup> up to ...	
	... Q2 2020	... Q2 2021
Direct and indirect effects of infection rates		
COVID-19 death rates <sup>2</sup>	0.53	0.27
Oxford index <sup>3</sup>	0.65	0.77
Mobility behaviour <sup>4</sup>	-0.72	-0.38
Economic structure		
Share, tourism <sup>5</sup>	0.70	0.74
Share, hotel and restaurant sector <sup>6</sup>	0.51	0.66
Fiscal support measures		
Change in government fiscal balance <sup>7</sup>	-0.44	-0.50

\* Euro area excluding Ireland. Table looks at difference between the mean values in Q1 and Q2 2020, and from Q1 2020 to Q2 2021. **1** Calculated as the mean difference in real GDP to the level of Q4 2019. **2** Number of deaths of or with COVID-19 over seven days per 100,000 inhabitants. **3** Oxford COVID-19 Government Response Tracker (excluding the influence of public information campaigns); a higher index level indicates stricter restrictions (no data are available for Malta). **4** Mean of the sub-indices of the national Google mobility reports: retail and recreation, grocery and pharmacy, transit stations, and workplaces. Each sub-index, taken in isolation, measures the percentage change in the number of visitors compared with the reference day in January/February 2020 (no data are available for Cyprus). **5** OECD indicator: share in gross value added of the sectors directly related to tourism (2018 or the earlier, most recently available year; no data are available for Belgium and Cyprus). **6** Share of gross value added (2019). **7** Difference between the current general government fiscal balance for 2020 and the value forecast in the macroeconomic projections published by the Eurosystem in December 2019; as a percentage of GDP from 2019.  
 Deutsche Bundesbank

**23** The intensity of the pandemic is approximated using official death figures. For a comparison of how different countries were affected by the pandemic, it is preferable to use death rates as an indicator rather than infection rates, as the latter largely depend on the respective testing strategy.

**24** As before, the stringency of government containment measures is approximated using the stringency index of the Oxford COVID-19 Government Response Tracker (excluding the influence of public information campaigns).

**25** The broad-based measure of mobility is again used as a mean of the sub-indices of the national Google mobility reports: retail and recreation, grocery and pharmacy, transit stations, and workplaces.

**26** Shares in aggregate gross value added from 2019 were taken into account.

## The role of the disruption of Chinese supply chains in production slumps in the United States and the EU in spring 2020

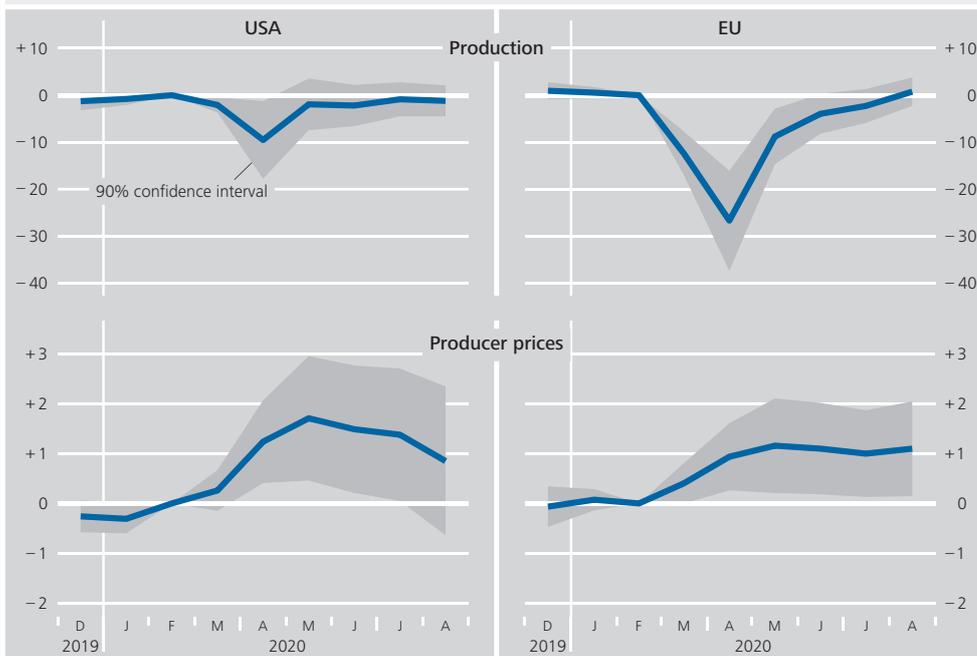
The government of the People's Republic of China responded to the outbreak of the coronavirus pandemic as from the end January 2020 by ordering businesses to shut down and imposing extensive restrictions on labour mobility. Owing to the major importance of Chinese firms for international goods trade, this disrupted numerous supply chains. Many industrial firms the world over cited this as a key factor limiting production in March and April 2020. However, in many places the burdens caused directly by the pandemic increased more or less simultaneously, too. This makes it all the more difficult to identify the role played by those value chain disruptions that are attributable to China in the global production slump in spring 2020.

One way of approximating these effects is to compare developments in sectors which are dependent to varying degrees on inputs supplied by China. To this end, we use input-output tables to calculate a measure of dependence at a detailed level of breakdown of industries in the United States and the European Union.<sup>1</sup> All sectors are broken down into more highly exposed and less highly exposed industrial sectors based on

<sup>1</sup> For the United States, we use the input-output tables of the Bureau of Economic Analysis for 2012 and customs values provided by the US Census Bureau for 2019. Only intermediate inputs and capital goods are included in the calculation. For the EU, we use Eurostat's supply and use tables for 2017 and customs values for 2019.

### Impact of large dependence on Chinese inputs in spring 2020\*

%, baseline period: February 2020



Sources: Federal Reserve Board, Bureau of Economic Analysis, Census Bureau, Haver Analytics, Eurostat and Bundesbank calculations.  
 \* The sample contains US and EU manufacturing sectors. The data refer to differences between sectors which are particularly dependent on Chinese inputs and less-dependent sectors.

Deutsche Bundesbank

the cost shares of inputs from China.<sup>2</sup> In a panel data analysis with monthly data on sectors' production, employment and producer prices, we can then gauge the impact of large dependence on Chinese inputs.<sup>3</sup>

The estimations show that, in industries that are highly dependent on Chinese input supplies, production dropped off significantly more sharply in March and April 2020 than in other industries. The difference in April was nearly 10% for the United States and even approached 27% for the European Union. This discrepancy did not persist, however. As from July 2020, there have been no significant differences between industrial sectors that are more dependent on or less dependent on Chinese inputs. This is likely to be due to the rapid lifting of restrictions in China, as a consequence of which its foreign trade had already recovered fully in April.

**2** The median share of Chinese inputs in production costs is roughly 1% in both the United States and the EU. In those industries with above-median exposure to Chinese inputs, the average share is well above 2%.

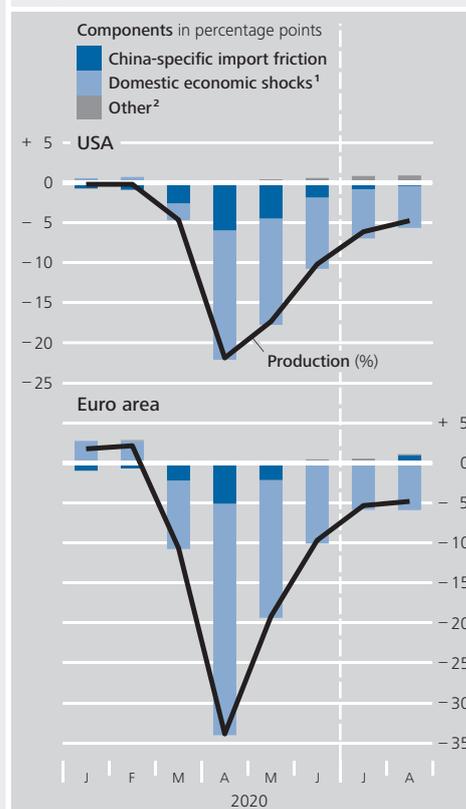
**3** For the United States, the analysis incorporates the four-digit NAICS manufacturing industries over the January 2019 to March 2021 period from the G.17 Release of the Board of Governors of the Federal Reserve System. For the EU, data from Eurostat's (primarily three-digit) NACE manufacturing sectors are available for the same period. The regression controls for time fixed effects and industry-specific fixed effects. It also controls for general dependence on imported inputs and the degree of trade openness over time. Some sectors which could be particularly affected by domestic restrictions were omitted from the analysis, such as transport goods and clothing production. See Khalil and Weber (2021). Meier and Pinto (2020) present a similar analysis for the role of international value chains at the beginning of the pandemic in the United States. In addition, Santacreu et al. (2021) also shed light on the role of large exposure to imported inputs.

**4** The fuel and coal processing industries were omitted from the study in order to factor out energy price developments.

**5** It can be shown for the United States, for which detailed employment data are available, that increased dependence on China also considerably dampened employment in spring 2020. This indicates that there are complementarities between inputs and labour in the manufacturing sector, at least in the short term.

### The role of China-specific import frictions in the slump in industrial production in spring 2020\*

Compared to December 2019



Sources: Federal Reserve Board, Bureau of Economic Analysis, Census Bureau, Haver Analytics, Eurostat and Bundesbank calculations. \* Contributions of contemporaneous and past realisations of shocks derived from a recursively identified structural VAR model. **1** Direct shocks to domestic consumption or to domestic industrial production. **2** Disruptions to trade with the rest of the world and deterministic component.

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In addition, the estimates show that producer prices in industries that are particularly dependent on Chinese inputs picked up slightly at the outbreak of the pandemic, whereas prices in less exposed industries fell. In April and May 2020, prices in particularly dependent sectors were 1% to 2% higher for the United States. In the EU, where developments were very similar, the corresponding price differential was around 1%.<sup>4</sup> Thus, shortfalls in intermediate goods imports from China probably resulted in supply-side disruptions in large parts of the US and EU manufacturing sector.<sup>5</sup>

Alongside the sector-level impact of Chinese supply shortfalls, the macroeconomic effects are also of interest. An analysis using a structural vector autoregressive (SVAR) model is a promising way of capturing these effects. Private goods consumption, manufacturing production, goods imports from the rest of the world (excluding China) and goods imports from China all feed into the model, which is estimated separately for the United States and the euro area.<sup>6</sup>

A historical shock decomposition based on the estimation results initially shows that the decline in US and euro area goods imports from China in February and March 2020 can be attributed to China-specific trade frictions.<sup>7</sup> This turmoil also contributed to the considerable production shortfalls in the US and euro area manufacturing industry in the spring months of 2020. These shortfalls subsided distinctly in both regions within just a few months. According to the shock decomposition, however, domestic economic developments in each of those regions constituted the more important factor accounting for the drop-off in industrial production.

To sum up, therefore, the analyses indicate that the disruptions to cross-border value chains resulting from the Chinese containment measures markedly weakened industrial activity in the United States and the euro area at the outbreak of the pandemic. The disruptions in trade with China, however, were not the main reason for the slump in production at that time. Moreover, the strains were short-lived as China was able to ramp up the manufacture of inputs relatively quickly. Based on this experience, it also stands to reason that the latest production disruptions caused by local flare-ups of the coronavirus in some emerging market economies will not result in any se-

vere and lasting damage to the global economy.

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<sup>6</sup> All data for the United States are seasonally and price adjusted. For the euro area, private goods consumption is approximated by retail sales in value terms (excluding private motor vehicles). All data for the euro area are seasonally adjusted. By ranking the variables and through recursive identification, it is assumed in the model that goods imports from China contemporaneously respond to unexpected disruptions in private consumption, industrial production and trade with third countries. China-specific trade disruptions, in turn, impact directly only on goods imports from China; other variables respond with a time lag. The approach is based on Kilian et al. (2021) and is described in more detail by Khalil and Weber (2021). The European Central Bank's BEAR toolbox was used for the estimations (see Dieppe et al. (2016)).

<sup>7</sup> For both regions, the slump in imports from China can be explained almost entirely by China-specific trade disruptions, whereas other shocks do not play any significant role.

defined tourism indicator<sup>27</sup> also correlates somewhat more strongly with the cumulative losses in activity than with the depth of the immediate slump in the first half of 2020. This is probably a reflection of the fact that, in later waves of the pandemic, administrative containment measures were focused almost exclusively on high-contact services sectors, whilst, in the first wave of the pandemic, even all economic sectors seen as not directly essential were temporary shut down.

The euro area's relatively poor economic performance was probably partly down to differences in the course of the pandemic and in the responses taken to it. Already in the first wave of infection, the self-imposed and government-mandated behavioural adjustments were more stringent in the euro area than in the United States. This also applied to the responses to the resurgence of the pandemic at the turn of 2020-21. Economic policy might also have been a key factor. Although monetary policy was eased swiftly and decisively on both sides of the Atlantic, at the beginning of the crisis, there was greater scope for doing so in the United States. The sequence of extensive stimulus packages in the United States also suggests that US fiscal policy might have supported the economy to a greater extent.<sup>30</sup>

*Pandemic and economic policy as possible explanatory factors*

*Fiscal measures particularly sizeable in the worst affected countries*

To cushion the economic fallout from the pandemic, the euro area countries took extensive fiscal measures. The deviation of the general government fiscal balance for 2020 from the value forecast in the last pre-crisis Eurosystem projection can be used as an indicator for the overall fiscal stimulus.<sup>28</sup> It reveals a close relationship with economic development; that is, in countries with more pronounced GDP losses, the deficit widened even more. This is likely to reflect the fact that, in particularly hard hit countries, the automatic stabilisers responded robustly and governments took extensive fiscal measures.

These questions are addressed in our own empirical analysis below. Structural vector autoregression (SVAR) models provide a framework for analysing the relative significance of the various explanatory factors.<sup>31</sup> In the model used, the relationship between economic activ-

*According to SVAR analysis, more stringent restrictions on behaviour in euro area significant*

## Causes of the transatlantic growth differential

*Gap in growth between United States and euro area since outbreak of pandemic*

There were also considerable differences in economic developments between the euro area as a whole and the United States during the coronavirus crisis.<sup>29</sup> Real GDP in the euro area contracted by 6.5% in 2020. In the United States, the decline was roughly half this amount. In addition, from the final quarter of 2020 and the first quarter of 2021 onwards, recovery in the euro area was rather bumpy. In the second quarter of 2021, economic output in the euro area was still 3% lower than its pre-crisis level, whilst in the United States it already slightly exceeded its pre-crisis level. These differences also remain when taking into account the stronger economic growth in the United States in the period prior to the crisis.

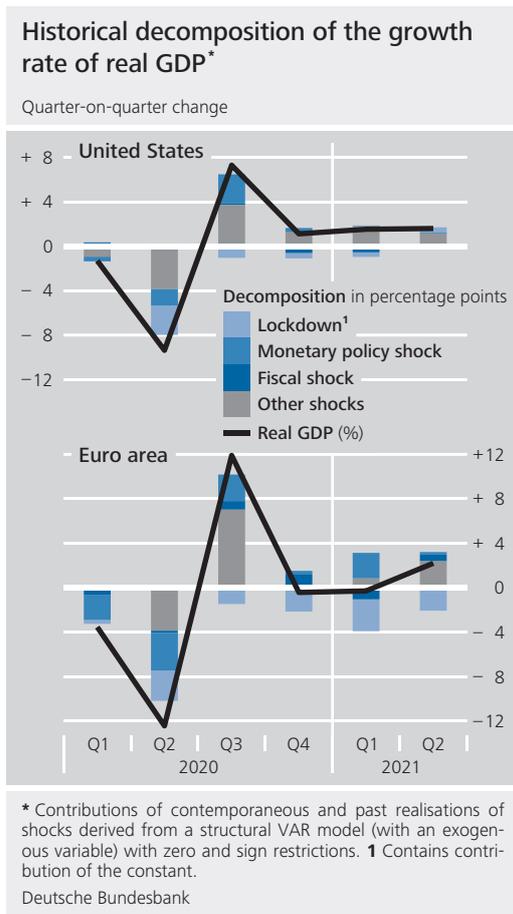
<sup>27</sup> The indicator captures the share in gross value added of the sectors directly related to tourism and reflects both domestic and overseas tourism. See OECD (2021a).

<sup>28</sup> Compared with the value from the macroeconomic projections published by the Eurosystem in December 2019; the fiscal balance was referenced in each case to nominal GDP in 2019. See European Central Bank (2019).

<sup>29</sup> A number of institutions, including the European Central Bank (2021), the International Monetary Fund (2021) and Banco de España (2021), as well as economists at the Banque de France (Chatelais (2021)), looked into the growth differential between the United States and the euro area or Europe. These partly descriptive, partly model-based analyses saw more stringent administrative and self-imposed restrictions in the euro area as the key factor behind the transatlantic growth differential. In addition, differences in fiscal support, the economic structure, the degree of openness, and the underlying pace of growth also played a certain role.

<sup>30</sup> For an evaluation of the latest major stimulus programme, see Deutsche Bundesbank (2021a).

<sup>31</sup> The models described below were estimated using Bayesian methods employing the European Central Bank's BEAR toolbox. See Dieppe et al. (2016).



ity, monetary and fiscal policy indicators<sup>32</sup> and restrictions on behaviour<sup>33</sup> during the pandemic are estimated separately for each economic area. According to a historical shock decomposition based on these estimations, the weaker economic development in the euro area overall since the outbreak of the coronavirus crisis was primarily attributable to more stringent containment measures and behavioural adjustments. It indicates that the extent of extraordinary fiscal and monetary policy measures did not play a major role. However, the model only shows those responses that go beyond the usual responses relative to the intensity of the crisis as being fiscal or monetary policy shocks.<sup>34</sup>

*According to NiGEM simulations, greater US fiscal expansion also significant*

In order to reflect the effects of monetary and fiscal policy responses in a more comprehensive way, i.e. including automatic stabilisers and conventional policy responses, the NiGEM<sup>35</sup> global macroeconomic model is used. In this context, the impact of monetary and fiscal pol-

icy is estimated based on counterfactual simulations which assume a scenario where all forms of support provided by economic policy during the past one-and-a-half years are excluded and monetary policy interest rates, government expenditure and tax rates are set as expected before the crisis.<sup>36</sup> According to the simulations, considerably stronger fiscal policy responses by the United States go a long way towards explaining its more favourable economic development in comparison with the euro area.<sup>37</sup> The relative explanatory contribu-

**32** The fiscal policy stance is approximated based on the cyclically adjusted primary balance as a percentage of potential output, incorporating measures on the expenditure and revenue sides (such as tax cuts). Unexpected fiscal policy measures are identified with the help of sign restrictions. It is assumed that these reduce the cyclically adjusted primary balance and, at the same time, stimulate GDP growth. The monetary policy stance is approximated based on the shadow rate (according to estimates by Krippner (2013)). Monetary policy shocks lower the shadow rate and, at the same time, boost real GDP growth and consumer price inflation. It is also assumed that they do not have an immediate impact on the cyclically adjusted fiscal primary balance.

**33** On the basis of the Goldman Sachs Effective Lockdown Index, both government-mandated measures (according to the Oxford COVID-19 Government Response Tracker) and self-imposed behavioural adjustments (according to Google mobility reports) are taken into account. See Hatzius et al. (2020).

**34** The model takes into account not only the major role played by automatic stabilisers in the euro area owing to the social security systems (according to Dolls et al. (2012), automatic stabilisers in the euro area cushion around 49% of the idiosyncratic unemployment shock; in the United States the figure is only 34%), but also the fact that the United States frequently pursues an active stabilisation policy in times of crisis.

**35** NiGEM is the global economic model developed by the UK-based National Institute of Economic and Social Research (NIESR). It models economic interconnectedness between 60 economies and regions via foreign trade and the interest rate-exchange rate nexus. The model has New Keynesian features, especially forward-looking elements on the financial and labour markets. For further information, see <https://nimodel.niesr.ac.uk>

**36** Here, six fiscal policy variables (government consumption, public investment, transfers, income tax, corporation tax and VAT rates) and the short-term interest rates from the first quarter of 2020 onwards were replaced by values set by the NIESR in the NiGEM forecast baseline from January 2020.

**37** For example, fiscal policy in the United States contributed around 3½ percentage points to the average quarterly growth rate since the beginning of the coronavirus crisis, whilst in the euro area this effect was estimated to be 1¼ percentage points. In the simulations for the euro area, the funds from the Next Generation EU programme were not yet taken into account as they have not yet been deployed.

tion of monetary policy for the growth differential was significantly smaller.<sup>38</sup>

## Summary and economic policy conclusions

*Various reasons behind differences in how individual economies were affected*

All in all, the findings point to a series of important reasons why countries' economies were affected to differing degrees by the coronavirus pandemic. The pandemic did not rage everywhere to the same extent. There were also differences in the containment measures taken by governments. Sectoral particularities in individual economies likewise played a role. For example, the Chinese economy benefited from its range of exports, which suited people's needs particularly well during the pandemic. Conversely, the major importance of tourism not least in some euro area countries is likely to have contributed to the comparatively sharp contraction in economic output. Finally, both in the euro area and in the United States, the fiscal and monetary policy responses cushioned the immediate impact of the crisis considerably; in the United States the supporting effects were probably even greater.

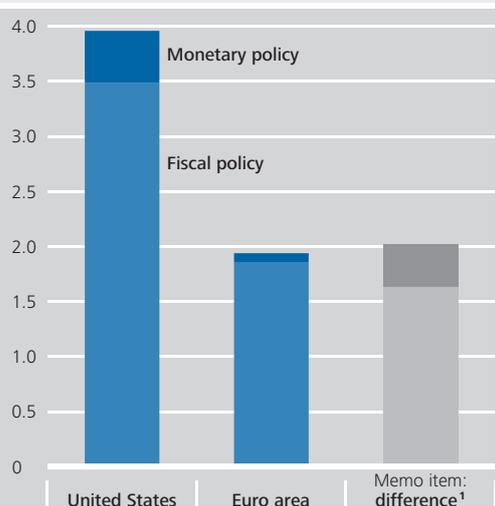
*Recovery process not entirely smooth*

The economic recovery has now made good progress in many places. The increasing percentage of the population that is fully vaccinated has contributed significantly to this. In addition, households and enterprises have learned to deal with the challenges of the pandemic and government containment measures are being used in a more targeted manner and more sparingly. The recovery has not been entirely smooth, however. Drags on growth include shortages of key intermediate inputs and delivery delays. Pandemic-induced shifts in demand contributed significantly to this. The unexpectedly rapid speed of the recovery itself was probably another reason.

While the short-term economic consequences of the pandemic are now better understood, its longer-term impact has only been able to be roughly estimated so far. The IMF recently an-

### Supporting effects of monetary and fiscal policy since the beginning of the pandemic according to NiGEM simulations\*

Mean deviations of real GDP from the baseline (%)



Source: Bundesbank calculations based on the NiGEM global macroeconomic model. \* Estimates based on the simulated development of the respective economy under the assumption that the monetary and fiscal policy instruments would have followed the paths expected prior to the outbreak of the pandemic. Effects are averaged over the period from Q1 2020 to Q2 2021. <sup>1</sup> Difference between the effects of economic policy in the United States and the euro area in percentage points.

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anticipated that in 2024 global economic output would remain 2¼% below the level expected prior to the outbreak of the pandemic.<sup>39</sup> As is already the case for the short-term effects, the picture is mixed across countries. For the advanced economies, the longer-term damage will tend to be fairly minor. By contrast, in many developing and emerging market economies where vaccination campaigns have often been progressing at only a sluggish pace, a comprehensive recovery will be lagged. This increases the risk that economic scars will remain.

*Longer-term impact of the crisis probably relatively low in industrial countries ...*

<sup>38</sup> However, such estimates of the relative significance of different factors for economic development during the pandemic are subject to a particularly high degree of uncertainty. First, the findings depend crucially on the challenging measurement of economic policy drivers and pandemic-related restrictions. Second, it is not known to what extent experience from previous economic cycles which underlies all models can be applied to the exceptional situation of the past two years.

<sup>39</sup> This would mean losses would be significantly smaller than following the global financial and economic crisis of 2008-09, where they amounted to 8¾% after four years, measured in terms of predictions by the World Economic Outlook in October 2007.

## Remote working and its impact on labour productivity

The coronavirus pandemic has seen an increase in remote working, meaning that there has been a surge in the use of associated digital technologies (such as video conferences and cloud services). This development is frequently accompanied by the hope that it will prove sustainable and is potentially a sign of a broader push towards digitalisation<sup>1</sup> that could strengthen productivity growth over the coming years.

In the case of Germany, the results of a representative survey of firms conducted by the Bundesbank in May 2021 indicate that almost three-fifths of enterprises have made greater use of working from home arrangements since the onset of the crisis.<sup>2</sup> This ratio was significantly higher in some services sectors, such as the financial and insurance activities sector or in the information and communication sector, while naturally far fewer enterprises made use of such arrangements in more contact-intensive sectors, including the accommodation and food service activities sector, the retail trade and also the construction sector. Larger enterprises, in particular, also made more extensive use of remote working.<sup>3</sup> Very similar

developments can be seen in other industrial countries, too, in which remote working also increased broadly in response to the pandemic.<sup>4</sup>

The main reason for the sudden rise in working from home was the necessity to practise social distancing owing to the pandemic. Working from home arrangements are also likely to be used more frequently after the crisis than before on account of the investments made, learning and network effects, as well as the wealth of posi-

<sup>1</sup> Alongside remote working, the use of online distribution channels (e-commerce) and digital payment systems, for example, has also received a boost. For instance, online retailers' sales have risen strongly in both the USA and the EU.

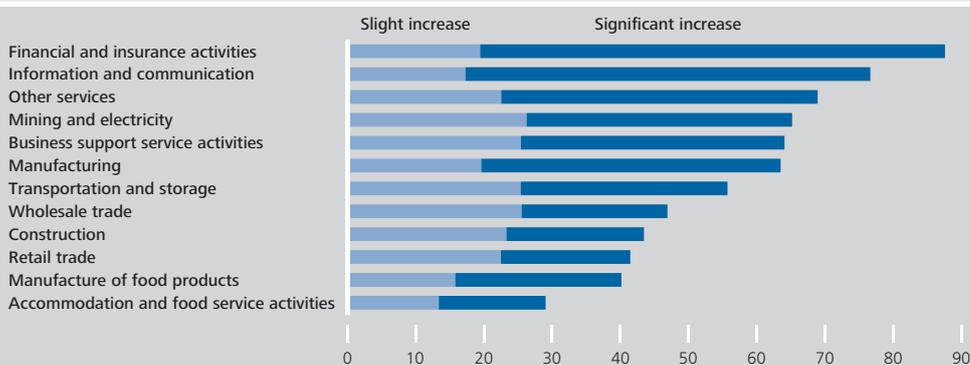
<sup>2</sup> This is a regular survey of firms conducted by the Deutsche Bundesbank. The participating enterprises make up a representative selection of Germany's corporate landscape; see Deutsche Bundesbank (2021b).

<sup>3</sup> These findings are consistent with those of other studies; see, for example, Alipour et al. (2020).

<sup>4</sup> For instance, according to Eurostat, the share of employees in the EU who worked at least partly from home increased by around one-half on the year to just under 23% in 2020. The American Time Use Survey reported that this share increased from 22% in 2019 to 42% in 2020 in the USA.

### Increase in working from home\*

Percentage of enterprises



Source: Bundesbank Online Panel Firms (BOP-F). \* Percentage of enterprises that provided the response "increased slightly" or "increased significantly" to the question "How has the use of the following digital technologies in your enterprise changed since the onset of the coronavirus pandemic?" in the section entitled "Working from home/teleworking."

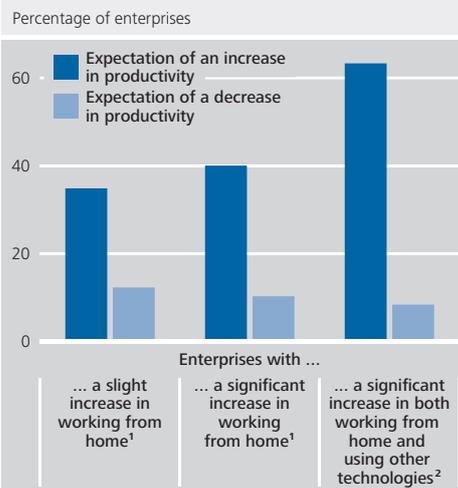
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tive experiences with using this working model.<sup>5</sup>

It is still difficult to predict what impact this development will have on labour productivity. However, a number of studies based on experiments or on corporate or employee surveys indicate that employees are at least as productive when working from home as they are when working in traditional offices.<sup>6</sup> Amongst other factors, the possibility of structuring the working day more flexibly and also the time saved from not having to commute play a significant role in this context. By contrast, other studies find evidence of productivity-reducing effects.<sup>7</sup> This view is mainly supported by increased communication costs in some cases and potentially shortened periods of focused work. In addition to these direct effects, however, increased remote working could also lead to improved job matching in the longer run, with positions being filled by qualified employees from other regions or even other countries, thereby enabling efficiency gains.<sup>8</sup> The use of remote working could likewise reduce expenditure on workplace infrastructure, for instance for office rents, and thus have a productivity-enhancing effect. In view of the reduction in spatial frictions, the trend towards remote working could also result in productivity-boosting reallocation effects between enterprises and sectors. It is conceivable that the more productive members of the workforce will increasingly switch to more successful and attractive enterprises, which might bolster the success of these enterprises and augment aggregate productivity.<sup>9</sup>

The results of the Bundesbank's survey of firms support an optimistic assessment overall. The vast majority of the surveyed enterprises that relocated activities to a home working structure during the crisis expect this development to be conducive to their enterprise's productivity.

### Expected impact of the increase in working from home on firm productivity\*



Source: Bundesbank Online Panel Firms (BOP-F). \* Distribution of responses to the question "How do you expect the increased use of digital technologies in your enterprise to affect productivity in your enterprise in the long term?" in conjunction with changes in the use of the digital technology "working from home" previously reported by the surveyed firms. **1** Enterprises that have increased "working from home" slightly or significantly and, at the same time, reported no increase in the use of other digital technologies included in the survey (excluding video conferences). **2** Enterprises that have significantly increased "working from home" as well as the use of at least one other digital technology included in the survey.  
 Deutsche Bundesbank

Overall, there is therefore some evidence to suggest that the surge in remote working seen since the outbreak of the crisis could have a moderate productivity-enhancing effect. However, a considerable amount of further research is still required with regard to this relationship. It also still remains to be seen whether the pandemic has triggered a more extensive and broader-based productivity-boosting push towards digitalisation.

<sup>5</sup> Studies supporting this assessment can be found, for example, in Ozimek (2020), Alipour et al. (2021), Barrero et al. (2021), Erdsiek (2021) and OECD (2021b). Network effects in this context arise from the use of video conferencing applications, for example. If these applications are used by many people, then their usefulness increases for individual users.

<sup>6</sup> See Angelici and Profeta (2020), Barrero et al. (2021), Bloom et al. (2015), Deole et al. (2021), Erdsiek (2021), Etheridge et al. (2020) and Statistics Canada (2021).

<sup>7</sup> See Gibbs et al. (2021) and Morikawa (2021).

<sup>8</sup> See Kakkad et al. (2021) and Wolter et al. (2021).

<sup>9</sup> In the longer term, however, the greater concentration of enterprises potentially associated with this development could also reduce incentives to innovate and impair productivity growth.

*... also owing to economic policy support measures*

In the industrial countries, longer-term damage is likely to also be limited by the rapid fiscal and monetary policy response. It boosted macroeconomic demand and employment,<sup>40</sup> averted numerous corporate insolvencies<sup>41</sup> and prevented major turmoil in the banking and financial systems. This created an environment in which investment activity was able to hold up relatively well. Overall, government measures made a substantial contribution to containing the negative impact on labour and capital input and aggregate productivity.<sup>42</sup>

*Productivity boost through accelerated digitalisation?*

Certain developments could even provide the economy with additional momentum in future, including, in particular, the push towards digitalisation triggered by the pandemic. The pandemic conditions forced many enterprises to digitalise their processes or business models. This could fuel productivity growth over the next few years. This is also suggested by the expectations of enterprises in Germany with regard to the increased use of remote working (see the box on pp. 58 f.).

*Global vaccination campaign needs to be driven forward*

A turning point in the pandemic was the development of effective vaccines. A large part of the population is now vaccinated in the industrial countries; however, in most cases vaccination rates are not high enough to enable all protective measures to be lifted. In many developing and emerging market economies, vaccines are still in scarce supply. In the world's poorest countries, just 1½% of the population has been fully vaccinated so far. This not only means that millions of people have largely no protection against the virus but it is also encouraging more dangerous strains of the virus to develop. In addition, new waves of infection could trigger renewed economic setbacks in the developing and emerging market economies. This would also affect the industrial countries via international trade and the global financial system. It thus remains a priority issue

for the international community to push ahead with vaccination campaigns around the world.

Economic policy in the industrial countries should support macroeconomic recovery until the end of the pandemic and thus try to avoid knock-on damage. Thereafter, however, fiscal consolidation needs to be tackled. Here, it is not just a question of avoiding overstimulating and thus "overheating" the economy. The past one-and-a-half years have also shown how important it is to have fiscal policy buffers in times of crisis.

*Fiscal policy should not support economic recovery for longer than necessary*

Beyond this, thought should already be given today to the fact that the coronavirus crisis will probably result in longer-term changes to the economic structure. Certain business models might no longer be sustainable in the long term. However, many of the measures taken during the crisis were rightly targeted at keeping firms from going under in the light of the high degree of uncertainty. In this way, the number of market exits has fallen distinctly since the onset of the crisis, not least on account of the insolvency moratoria adopted in many countries. As the pandemic is gradually overcome, these forms of assistance should be scaled back so that the necessary structural change is not hindered.

*Structural change should not be hindered once pandemic has been overcome*

<sup>40</sup> For example, during the crisis relatively few jobs were lost in the advanced economies. The unemployment rate, having been as low as 4.8% in 2019 for the group of advanced economies, rose to 6.6% in 2020 in the aftermath of the dramatic economic slump at the beginning of the pandemic. The increase was considerably smaller outside the United States, and there, too, the unemployment rate then began to go back down rapidly. As a result, the longer-term effects on the potential labour force are likely to be modest in the current crisis.

<sup>41</sup> For example, in Germany in 2020, the number of corporate insolvencies fell by around 15% compared with the previous year and was thus at its lowest level since the introduction of the current insolvency framework in 1999 (see Federal Statistical Office (2021)). According to Eurostat data, the EU as a whole recorded a decline of around 23%. For the United States, too, Crane et al. (2021) find evidence of fairly low exit rates since the outbreak of the crisis.

<sup>42</sup> For a model-based analysis of the measures taken in Germany, see Hinterlang et al. (2021).

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