INVESTMENT REPORT
2021/2022

European Investment Bank
The EU bank

# Recovery as a springboard for change

## Chapter 2

# The state of investment in the European Union: Government, corporate, infrastructure, climate

EUROPEAN INVESTMENT BANK INVESTMENT REPORT
2021/2022

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## Part I Taking stock of macroeconomic, policy and investment trends

## Chapter 2

# The state of investment in the European Union: Government, corporate, infrastructure, climate

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**Investment Report 2021/2022: Recovery as a springboard for change.**


**About the Report**
The EIB annual report on Investment and Investment Finance is a product of the EIB Economics Department. It provides a comprehensive overview of the developments and drivers of investment and its finance in the European Union. The report combines an analysis and understanding of key market trends and developments with a more in-depth thematic focus, which this year is devoted to Europe's progress towards a digital and green future in the post-COVID-19 era. The report draws extensively on the results of the annual EIB Investment Survey (EIBIS) and the EIB Municipality Survey. It complements internal EIB analysis with contributions from leading experts in the field.

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The mission of the EIB Economics Department is to provide economic analyses and studies to support the Bank in its operations and in the definition of its positioning, strategy and policy. The director of Economics Department, Debora Revoltella, heads a team of 40 economists.

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Chapter 2

# The state of investment in the European Union: Government, corporate, infrastructure, climate


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# Chapter 2

## The state of investment in the European Union: Government, corporate, infrastructure, climate

**Despite the far-reaching economic effects of the COVID-19 crisis and the large decline in output, investment in the European Union fell less than expected.** Governments' timely and ample fiscal response and central banks' enhanced monetary stimulus supported investment in a difficult economic environment. The decisive policy mix arrested the decline in household incomes and prevented corporate finances from further worsening. Government investment was not affected and continued to increase throughout the pandemic.

**The investment decline was most acutely felt in machinery and equipment, while investment in structures and buildings rebounded quickly after a dip in the second quarter of 2020.** Corporate investment contributed the most to the contraction in total investment. It experienced the sharpest decline and was the slowest to rebound.

**Overall, however, investment rebounded strongly in 2021 and had broadly returned to pre-pandemic levels by mid-year, thanks to the resilience of household and government investment.** Large and innovative firms resisted the economic shock better. Innovative firms were also more likely to have increased their workforce compared to before the pandemic. Some firms, however, are still holding off on investments.

**For many firms, uncertainty remains a key obstacle.** While public support allowed firms to restart operations when countries came out of lockdown or other restrictions, weaker corporate finances caused by the pandemic might suppress corporate investment once government support is withdrawn.

**The COVID-19 crisis adds to the challenges created by years of low productivity growth and the sometimes radical economic transformation required to adapt to a more digital world.** Firms should therefore seize the opportunity offered by current public policies and invest in innovation and digitalisation to increase their competitiveness. Some firms have already embarked on this course, including innovative firms that are more likely to invest in the digital transformation. That said, the European Union has a higher share of firms that are not innovating compared to the United States.

**Investing for the green transition, which is being actively promoted by the European Green Deal and the recovery plan for Europe, will help firms improve their competitiveness in the post-pandemic world.** Investment in climate change mitigation in the European Union increased modestly in 2020. To meet its targets, the European Union has to substantially accelerate investment. That said, the European Union spends more than the United States on climate change mitigation technologies as a share of gross domestic product (GDP), but half as much as China.

# Introduction

This chapter presents an overview of recent developments in fixed capital formation, a measure of investment, in the European Union and provides the background for the economic analysis in the rest of this report. As in 2020, the investment discussion is dominated by the pandemic's effects, which have shaped economic performance in 2020 and 2021 and influenced the near- to medium-term outlook. The chapter draws on official and publicly available aggregate data from Eurostat, the Organisation for Economic Co-operation and Development (OECD) and national statistical offices. It also uses the latest wave of the EIB Investment Survey (EIBIS) extensively. In addition, it presents the latest updates of the EU infrastructure dataset and the dataset on investment in climate change mitigation and adaptation, which are developed by the Economics Department of the European Investment Bank.

The chapter is organised into four sections. The first section presents an overview of aggregate investment dynamics, investment in different asset types, including infrastructure, and institutional sectors. The second section focuses on corporate investment through the lens of the EIBIS. It discusses the investment outlook, along with the short- and longer-term effects of the COVID-19 crisis on corporate investment and investment in intangible assets and innovation. The third outlines recent developments in investment in climate change mitigation and adaptation. The fourth and concluding section examines the implications for public policy.

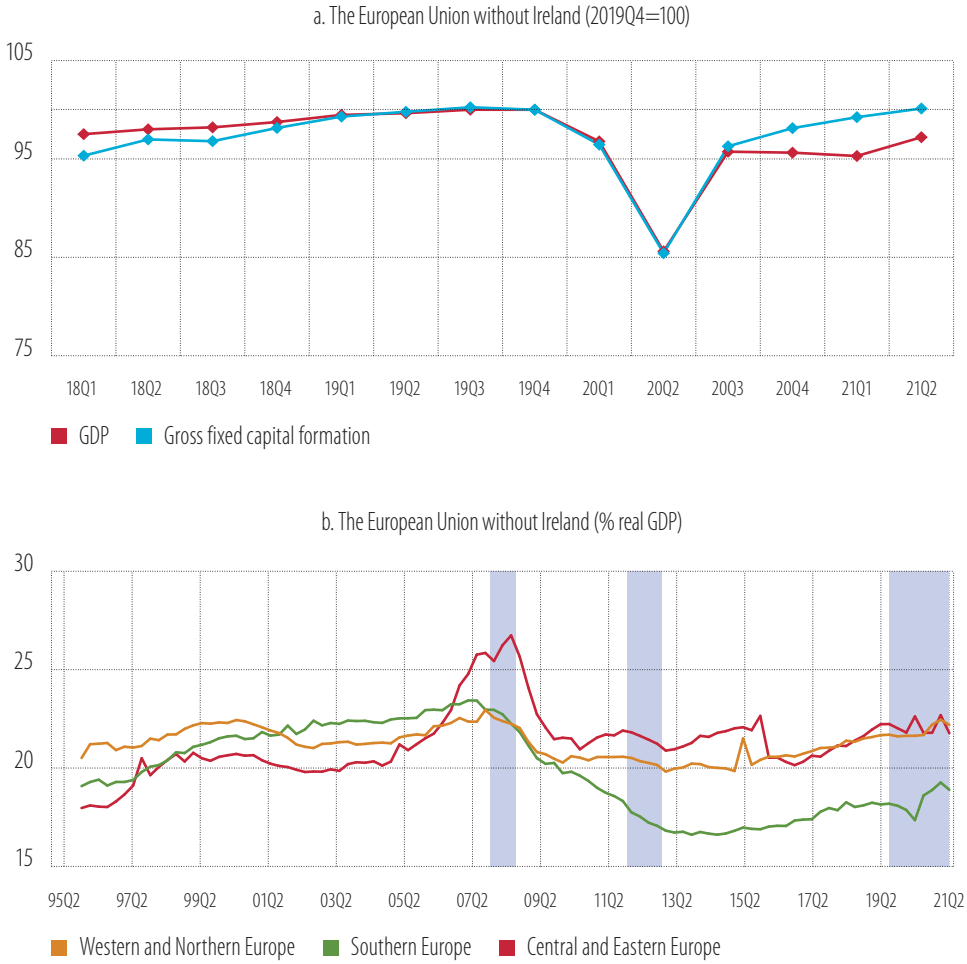
# Aggregate investment dynamics

**Gross fixed capital formation (GFCF) in the European Union declined substantially in the first half of 2020 following the coronavirus outbreak, but recovered quickly, returning to pre-crisis levels in the first half of 2021.** By the end of the second quarter of 2020, real GFCF fell 21% relative to its level in the fourth quarter of 2019. Part of this record decline was due to considerable volatility in Irish GFCF, which plunged 76% in the same period (see Box A). Excluding Ireland from the EU aggregate, real GFCF in the EU26 fell 14.6% — still a steep decline (Figure 1a). The recovery that followed brought EU real investment back to pre-pandemic levels by the end of the second quarter of 2021. By comparison, real GDP was still some 3 % away from pre-pandemic levels at the end of the second quarter of 2021.

**Despite the record decline, EU investment held up surprisingly well.** Excluding Ireland, the decline in real GFCF at the end of the second quarter of 2020 was the same as the drop in real GDP, or 14.4%. One often-cited fact is that investment is more volatile than GDP over the business cycle. The average standard deviation, a measure of volatility, of real investment growth in the European Union since 1995 is about 4.75, compared to 2.75 for GDP. Investment and GDP typically move together over the business cycle. However, the higher variation in investment causes the investment rate (the ratio of investment to GDP) to decline during recessions and increase during expansions (Figure 1b). Empirically, the investment multiplier model, a standard econometric model of investment, implies that real investment changes by about 2% for every 1% change in real GDP. In 2020, however, investment "only" declined to the same extent as GDP, which was reflected in investment rates holding broadly steady in 2020 (Figure 1b).

**The swift and determined policy response to the economic crisis stabilised household incomes and reassured businesses.** Chapters 1 and 3 of this report provide a detailed analysis of the economic effects of policy support during the pandemic. Because the initial decline in employment was contained and household disposable incomes remained stable on aggregate, businesses were reassured that as soon as the pandemic waned and restrictions were lifted, demand would increase again. The direct support for firms, on the other hand, with government contributions to social security expenses, subsidies, rescheduled payments and credit guarantees, preserved corporate finances to some extent. Despite the general success, small pockets of vulnerable firms remain.

**Figure 1**
**Real gross fixed capital formation and real GDP**

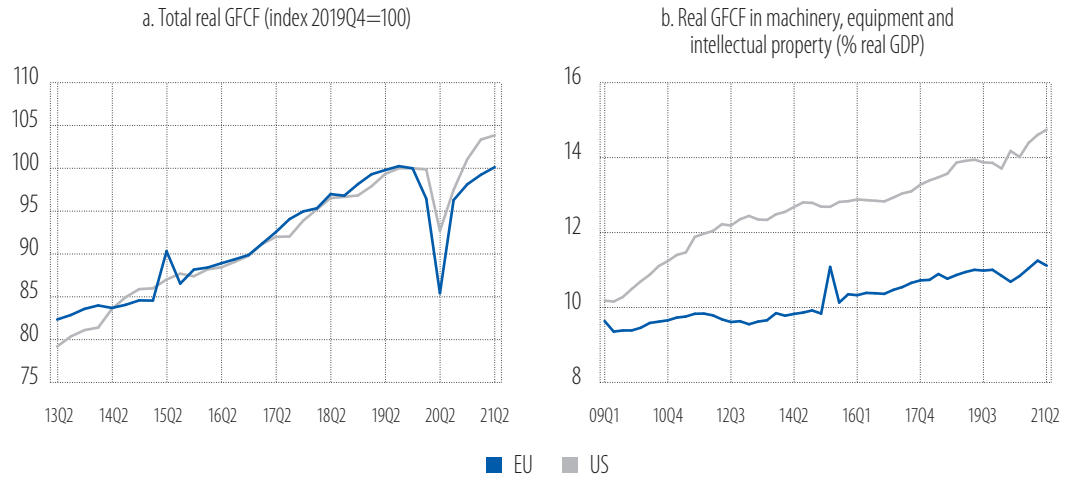



*Source:* *Eurostat and OECD National accounts, EIB staff calculations.*
*Notes:* *Western and Northern Europe without Ireland. Shaded regions on the chart denote euro area recessions as recorded by the business cycle dating committee at the Centre for Economic Policy Research.*

**Investment dynamics in the European Union and the United States were similar. However, by the end of the second quarter of 2021, EU real investment was back to pre-pandemic levels, while US real investment was back to pre-pandemic growth trends.** Real GDP declined less in the United States than in the European Union. In the second quarter of 2020, real GDP in the United States declined 9.1% from a year earlier compared with 13.7% in the European Union (14.1% excluding Ireland). The decline in US investment was, as in the European Union, commensurate with the decline in GDP (Figure 2a). That said, investment in the United States had already rebounded to its pre-crisis level and had returned to its previous growth trend by the second quarter of 2021, while in the European Union real investment had only reached the pre-crisis level. Overall, investment in the United States has grown much faster since the end of the global financial crisis. Real investment in the United States has increased by about 4% annually on average since the first quarter of 2010, whereas in the European Union it has grown at 1.7% per year.

**Since the end of the global financial crisis, a gap has emerged between the United States and the European Union in the ratio of non-residential investment to GDP, with the European Union trailing the United States by about 2 percentage points.** The different components of non-residential investment are moving in different directions. The gap in investment in machinery, equipment and intellectual property products is about 3.5 percentage points of GDP (Figure 2b). The gap in investment in buildings and structures, however, was 1.5 percentage points in the European Union's favour — closing the total gap to 2 percentage points. This composition is particularly worrying as investment in equipment and research and development (R&D) enhances productivity (EIB, 2020). The investment gap between the United States and the European Union is therefore augmenting the competitive edge of US firms.

**Figure 2**
**Total gross fixed capital formation in the European Union without Ireland**

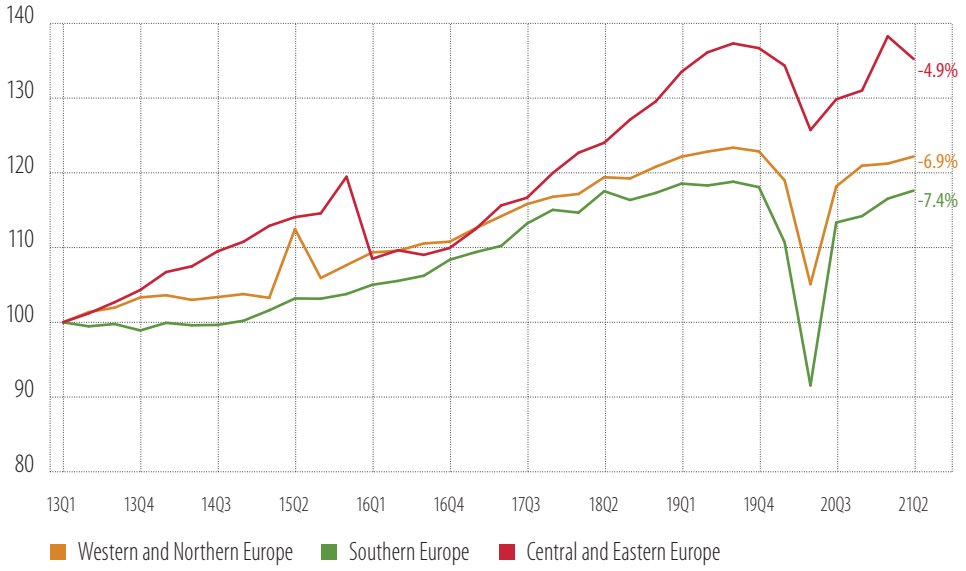



*Source: Eurostat and OECD National accounts, EIB staff calculations.*

**In the European Union, differences in the dynamics of real investment have intensified between countries.** Real investment in the European Union returned to pre-pandemic levels in the second quarter of 2021. Real investment therefore took a year to recover from its lowest point in the second quarter of 2020. Real investment is still far off its pre-pandemic trend, and those trends differ across groups of countries (Figure 3). Western and Northern Europe is 6.9% below its growth trend from 2013 to 2019. Southern Europe is 7.4% below its trend, and Central and Eastern Europe is 4.9% (see numbers in Figure 3). The average annual growth of real investment in Western and Northern Europe was 2.9% from 2013 to 2019, while in Southern Europe it was 2.4%, and in Central and Eastern Europe it was 4.5%.

**Among asset types, investment in machinery and equipment declined the most in the European Union and remained some 3.5% below pre-pandemic levels in the first half of 2021.** The contraction continued throughout 2020, accounting for half of the decline in total investment (Figure 4). Investment in machinery and equipment started increasing again in the first half of 2021, but remained 3.5% below pre-pandemic levels at the end of the second quarter of 2021. Investment in structures and buildings, including dwellings, accounted for about 40% of the decline in total investment. France, Italy and Spain, where the early effects of the pandemic were particularly marked, accounted for 88% of the decline in investment in buildings and structures. The rebound was strong, however. Investment in buildings and structures, including dwellings, rose to 1.7% above its pre-crisis levels at the end of the second quarter of 2021, including in France and Italy, although not Spain. In Central and Eastern Europe, investment in dwellings did not decrease at all during the pandemic, while investment in other buildings and structures fell and remained 3.5% below pre-pandemic levels at the end of the second quarter of 2021.

**Figure 3**
**Real gross fixed capital formation** (index 2013Q1=100)




*Source:* *Eurostat National accounts, EIB staff calculations.*
*Notes:* *Western and Northern Europe without Ireland.*

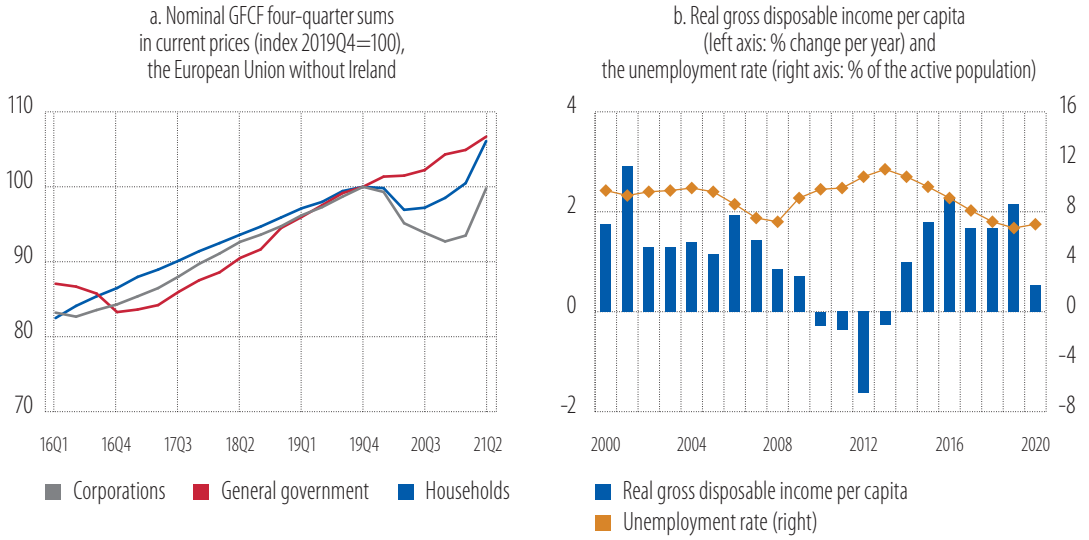
**Figure 4**
**Real gross fixed capital formation, by asset type**
(% change from the previous year)


*Source:* *Eurostat National accounts, EIB staff calculations.*

**Corporate investment declined the most, while government investment increased** (Figure 5a). At the end of the second quarter, corporate investment was just 0.22% below the level in the fourth quarter of 2019 and about 7% below its 2013-2019 trend. Household investment, which is almost entirely in dwellings, declined too, but had rebounded to its pre-pandemic trend in the second quarter of 2021. Government investment continued to rise throughout 2020 and early 2021, fuelled by the large-scale fiscal response, but also by the capital expenditure had already been budgeted in 2020, before the pandemic.

**The relative strength of household investment is rooted in timely and decisive government support as well as in the specific features of the pandemic-induced recession.** Government policies to maintain employment and income kept a tight rein on job losses and protected real disposable income (Figure 5b). These protective measures, along with low mortgage lending rates and the limited tightening of mortgage lending standards, helped maintain demand for housing. Furthermore, fewer disruptions in construction activity relative to the rest of the economy ensured a relatively stable supply of new residences and home refurbishment (Box A).

**Figure 5**
**Gross fixed capital formation, by sector and real disposable income**




*Source:* *National and sector accounts of Eurostat, EIB staff calculations.*

**Box A**
**The effect of COVID-19 on construction investment**

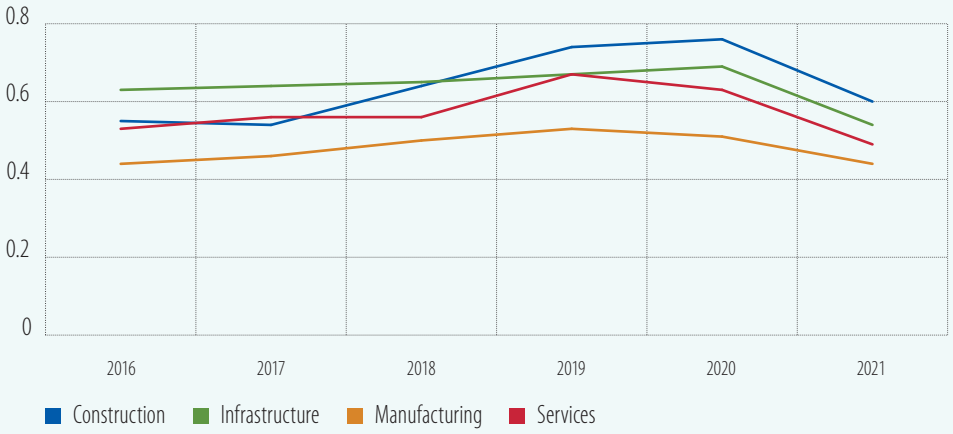
Construction activity and investment suffered relatively less during the pandemic. While investment and economic activity in the construction sector tend to be strongly pro-cyclical, the pandemic was felt less in construction than in sectors. Total gross value added in the construction sector fell less than for the EU economy as a whole overall: -1.3% in 2020 against -4% for the EU27. Activity held stable or increased in most EU countries, helping to offset the extent of the contraction in the economy and investment.

EIBIS data further corroborate the relative resilience of the sector. Fewer construction firms state that they had to abandon or delay investment plans compared to infrastructure, services and manufacturing firms, and a higher share reports working at full capacity or above (Figure A. 1). The

pandemic's effect was less severe for several reasons. Many firms had full order books at the start of the pandemic; they were less sensitive to the disruption in global supply chains, which strongly affected many manufacturing firms, and their activity was less disrupted by lockdowns. These factors allowed construction to sail through the worst of the pandemic.

**Figure A.1**

**Firms** (in %) **operating at or above capacity, by year**



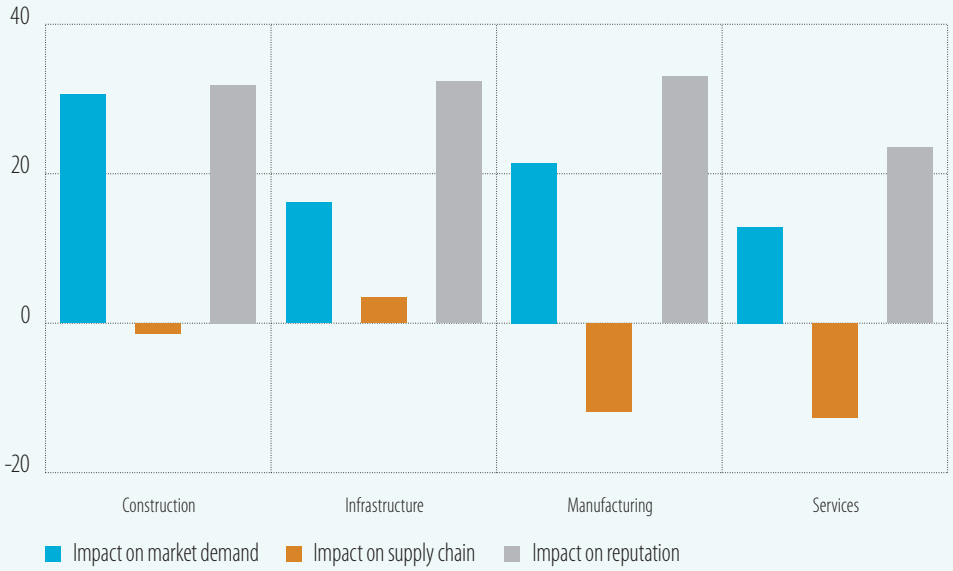

*Source:* *EIBIS, 2016-2021.*
*Base:* *All firms.*
*Note:* *Full capacity is the maximum capacity attainable under normal conditions, namely the company's general practices regarding the utilisation of machines and equipment, overtime, work shifts, holidays etc.*
*Question:* *In the last financial year, was your company operating above or at maximum capacity attainable under normal circumstances?*

Policy measures helped to maintain demand for housing and construction activities. Measures to stabilise household incomes and employment, along with low interest rates and the time people spent at home during lockdowns, supported demand for housing. Compared to past crises, government transfers insulated household incomes from the decline in economic activity. Many workers in more high-skilled, better-paid jobs on permanent contracts were relatively shielded from the worsening labour market. Many people watched their savings increase as their consumption declined. At the same time, sometimes mandatory teleworking shifted demand to housing that could better accommodate the remote working. Housing investments held up well as the cost of financing remained very low and lending conditions relatively lenient. Investment in construction by the public sector added to demand.

The construction sector stands to benefit from a favourable outlook due to good recovery planning and structural shifts in the economy. Part of the relative resilience that the construction sector has shown during the pandemic may also reflect other factors. While the majority of firms expect climate change to have an impact on their business (64%, the highest in the sectoral comparison), most see it as a positive factor, notably for demand (Figure A. 2). The European Union's reinforced commitment to climate action and the timely release of recovery funds are likely to increase demand for renovation and more energy-efficient buildings over the next few years. At the same time, demand for affordable and more energy-efficient housing should increase.

While longer-term shifts in consumption and working patterns are still uncertain, construction activity could also benefit from the conversion of commercial real estate to housing and urban renewal measures.

**Figure A.2**
**Impact of EU carbon emissions reduction over the next five years** (in %)




*Source:* *EIBIS 2020.*
*Base:* *All firms.*
*Note:* *Net effect in percentage points.*
*Question:* *What impact will the transition to a reduction of carbon emissions have on market demand / the supply chain / reputation over the next five years?*

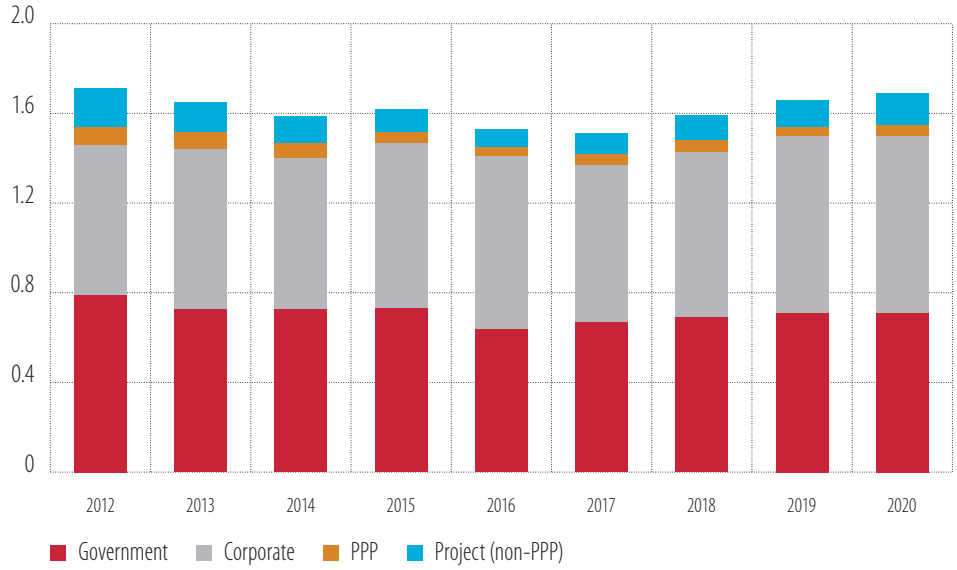
## Infrastructure investment

**Infrastructure investment is a subset of investment in other buildings and structures.** Governments and non-financial firms, including companies focused on one specific project, typically make these kinds of investments. Given the importance of infrastructure for economic and social development, this report pays special attention to infrastructure trends.

**In the wake of the pandemic, infrastructure investment declined slightly less than EU GDP** (Figure 6). Infrastructure investment had been somewhat subdued since the global financial crisis, notably in southern EU members. From 2018, the share of infrastructure investment in EU GDP started increasing again, after hitting a low of 1.5% of GDP in 2017. Despite contracting in nominal terms in 2020, infrastructure investment's share of EU GDP marginally increased again, reaching 1.7%, mainly because of the larger contraction in GDP. In the breakdown by EU region, infrastructure investment's share of GDP remained constant in Western and Northern Europe. In Southern as well as in Central and Eastern Europe, its share increased, driven by government and corporate investment.

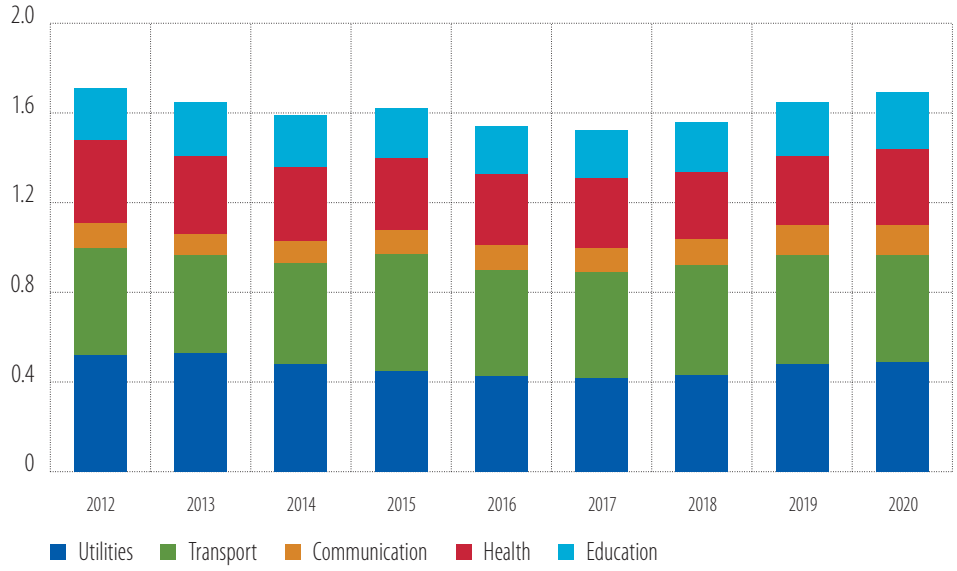
**Communication and utilities have driven an increasing share of infrastructure investment, with health and education also making some headway** (Figure 7). In the breakdown by asset, transport and utilities, including energy, jointly make up some 60% of infrastructure investment. Utilities' share has risen in recent years and represented just over half of infrastructure investment in 2020. Health's share has also increased since 2017, representing 25% in 2020. By far the largest increase since 2013 has been in communications, however, rising from 9% to 13% in the same period.

**Figure 6**
**EU infrastructure investment** (% GDP)**, by institutional sector**




*Source:* *EIB calculations, European PPP Expertise Centre (EPEC), Eurostat, IJGlobal.*
*Note:* *The bars show estimates of annual infrastructure investment in the European Union by institutional sector as a share of EU GDP, expressed as a percentage. Annual infrastructure investment expenditure in the European Union here is estimated using the methodology outlined by Wagenvoort et al. (2010). Non-government infrastructure investment is split into general corporate infrastructure investment, labelled Corporate, and investment by project companies benefiting from project finance. These project companies are further split into public-private partnerships, labelled PPP, and non-PPP investments, labelled Project (non-PPP).*

**Figure 7**
**EU infrastructure investment** (% GDP)**, by economic sector**

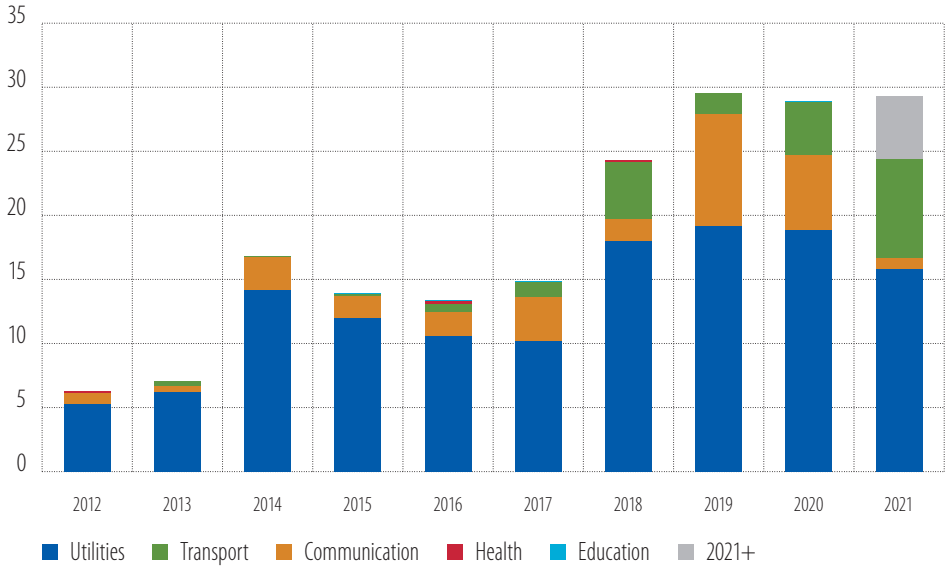



*Source:* *EIB calculations, EPEC, Eurostat, IJGlobal.*
*Note:* *Annual infrastructure investment in the EU by infrastructure asset, as a share of GDP, expressed as a percentage. Relevant data are not published for Belgium, Croatia, Lithuania, Poland and Romania. Where sector-specific data are not yet available, the sector share is assumed to have remained constant. The number of data points for 2020 remains insufficient to provide full confidence.*

**Volumes of infrastructure projects not involving public-private partnerships are stable, although they are declining for public-private partnerships, according to initial data for 2021. These projects make up only a small part of total infrastructure investment, however** (Figure 6). Volumes of projects not involving public-private partnerships have remained steady since 2019 (Figure 8). The way these projects are structured may have helped them resist the crisis. After remaining steady in 2020, however, the volume of projects using public-private partnerships collapsed in 2021 (Figure 9). With the exception of utilities, the disruption caused by the pandemic was broad-based and particularly stark for transport, the principal asset type. While the factors driving this contraction are unclear, a certain wait-and-see approach might be at play. To begin with, the preoccupation of governments with their national recovery and resilience plans in 2021 would have tied up administrative capacity. Furthermore, the prospect of significant recovery funds, such as those provided by **NextGenerationEU**, might have affected procurement.

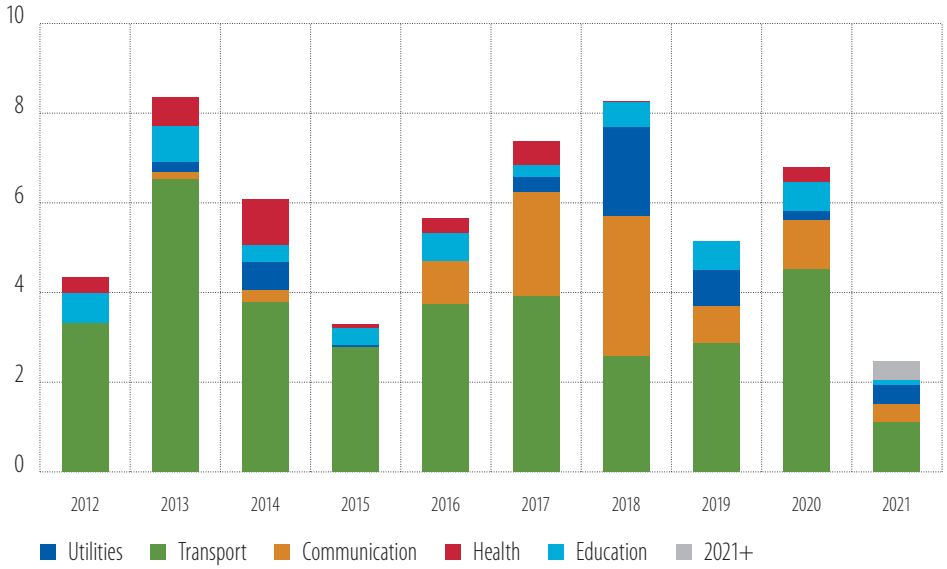
**Figure 8**

**Value of projects without public-private partnerships obtaining financing** (EUR billion), **by asset class**




*Source:* *IJGlobal.*
*Note:* *Total annual value in euros of public-private partnership projects brought to financial close in the European Union. 2021 includes deals brought to financial close by 13 October 2020. The grey "2021+" part of the 2021 column provides a simple indication of possible outstanding 2021 volumes.*

**Figure 9**
**Value of public-private partnerships obtaining financing** (EUR billion)**, by sector**




*Source:* *EPEC.*
*Note:* *Total annual value of public-private partnerhips reaching financial close in the European Union, in billions of euros. 2021 includes deals brought to financial close by 13 October 2020. The grey "2021+" part of the 2021 column provides a simple indication of possible outstanding 2021 volumes.*

## Government investment

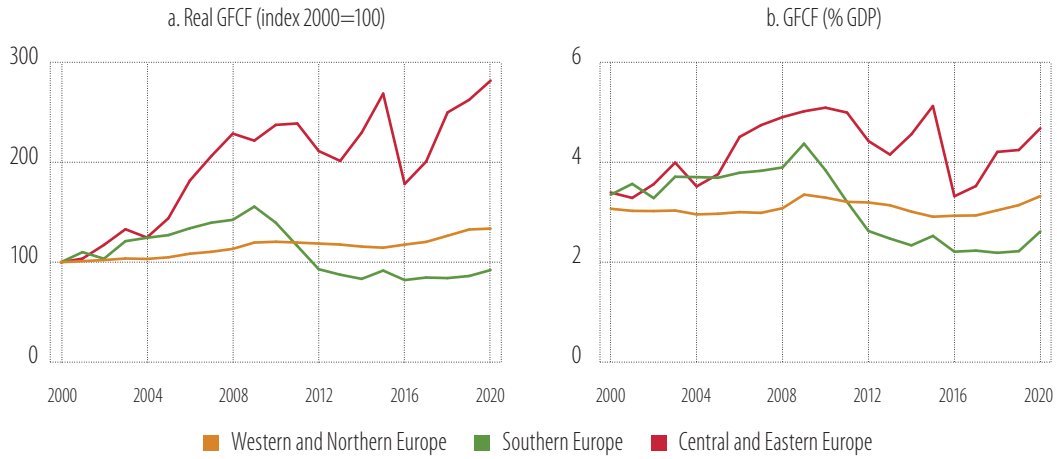
**Real investment by the government increased in almost all EU members in 2020, despite the pandemic** (Figure 5a, Figure 10a). Compared to 2019 levels, real investment rose about 7% in Southern and Central and Eastern Europe, and slightly less than 1% in Western and Northern Europe. This development reflects the strong countercyclical response of fiscal policy in the European Union. At the same time, much of the capital expenditure was budgeted before the pandemic hit.

**The substantial decline in GDP in 2020 further lifted investment rates (the ratio of investment to GDP) across the European Union** (Figure 10b). The rate of government investment in Western and Northern Europe increased to just  below its 25-year high. In Central and Eastern Europe, the overall investment rate scraped historical highs, too. Government investment as a share of GDP rose to 2.6%, which is still well below the historical average. The increase, however, is a long-awaited and welcome development.

**Other government capital expenditure also increased in 2020.** In additional to normal investment, governments provide investment grants and other capital transfers, which make up a portion of capital expenditure. Investment grants typically include investment subsidies and incentives that cover part of the costs of acquiring fixed assets. Other capital transfers include transfers to firms or other organisations to cover losses for events beyond the control of the enterprise or debt cancellation, among other things.

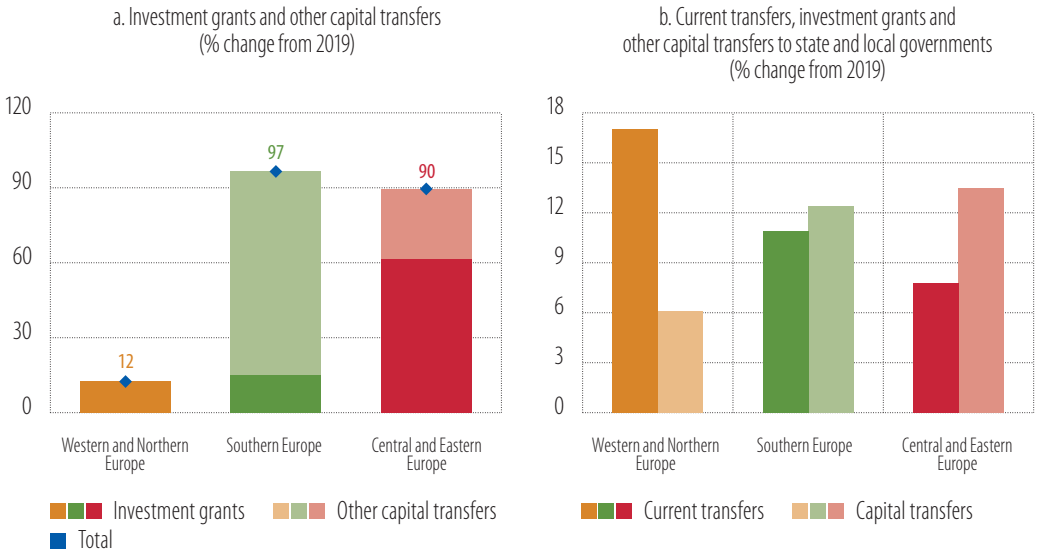
**Capital transfers and investment grants rose in 2020, nearly doubling in Southern Europe (97%) and in Central and Eastern Europe (90%).** In Western and Northern Europe, these forms of capital expenditure grew by 12% compared to 2019 (Figure 11a). Governments in Southern Europe mostly increased "other" capital transfers not related to investment grants. Those transfers accounted for four-fifths of the increase in the two categories. In Central and Eastern Europe, as well as in Western and Northern Europe, governments relied heavily on investment grants. Governments used transfers and grants as tools to support the economy during the pandemic. While in Southern Europe, governments focused on covering business losses, they focused on investment incentives in the rest of the European Union.

**Figure 10**
**General government gross fixed capital formation and net lending**




*Source: Eurostat National accounts, EIB staff calculations.*

**Figure 11**
**Government investment grants and other capital transfers in 2020**

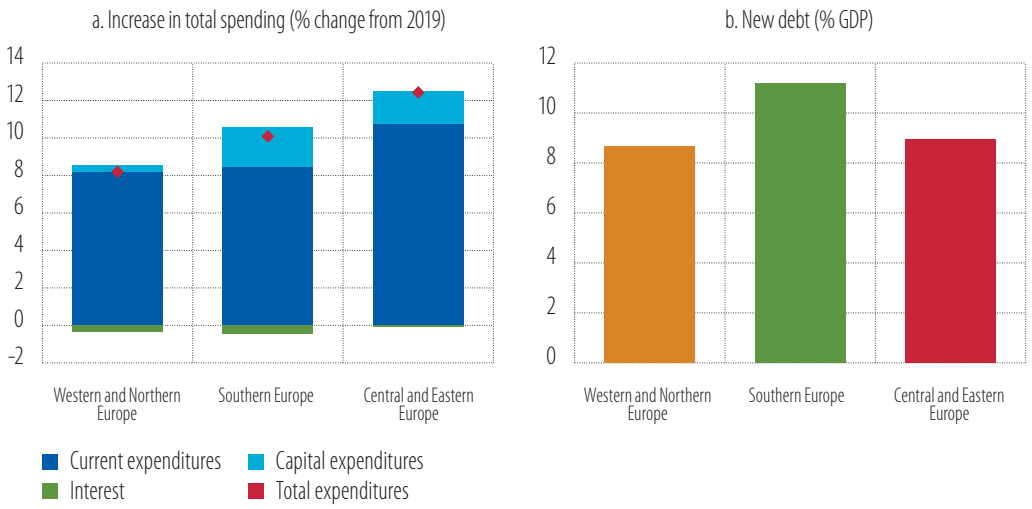



*Source: Eurostat National accounts, EIB staff calculations.*

**State and local governments increased investment in Southern Europe, but they kept investment levels largely steady in the rest of the European Union.** Unlike the recession in 2008-2009 that hit Europe after the global financial crisis, state and local governments in Southern, Central and Eastern Europe did not run up deficits to pay for the new investment. In Western and Northern Europe, state and local governments did register some budget deficits, but those deficits were much lower than in 2008. The difference this time was that the higher spending by state and local governments was mostly funded with transfers from the central government. Transfers to state and local governments increased by 8% to 17% in 2020, compared to 2019, while investment grants and other capital transfers rose 6% to 14% (Figure 11b).

**The investment increase in 2020 occurred despite the significant, unplanned rise in other government expenditures** (Figure 12a). Total government expenditure rose 8% in Western and Northern Europe and more than 12% in Central and Eastern Europe. Much of the increase was for current spending, but capital expenditure also rose and represented up to 15% of the total spending increase in Southern and Central and Eastern Europe. Governments across the European Union were able to increase borrowing and cover the large deficits (Figure 11b) resulting from the exceptional policy measures in 2020, thanks to the suspension of the European Union's Growth and Stability Pact rules and the willingness of the European Central Bank (ECB) to buy government bonds.

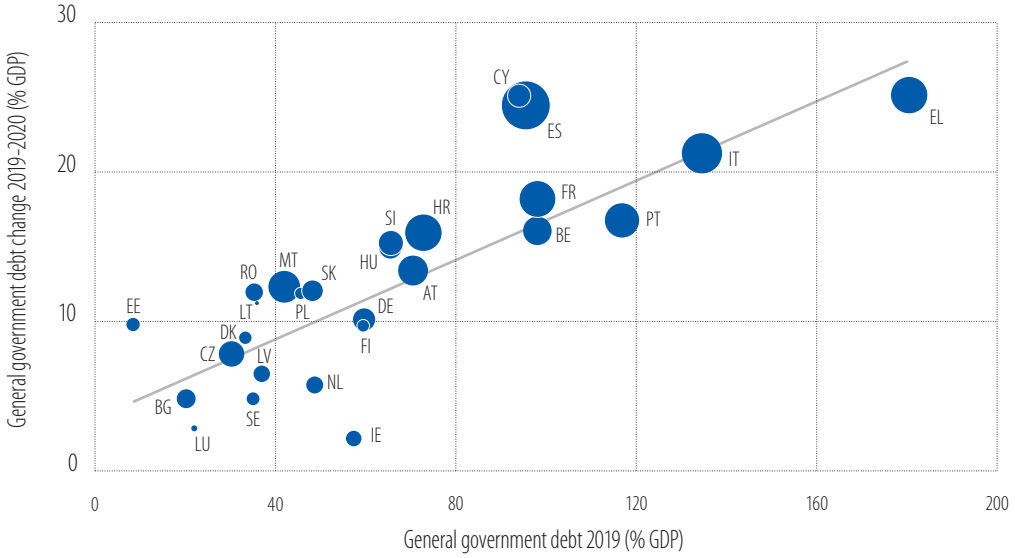
**Figure 12**
**General government expenditure and debt in 2020**




*Source:* *Eurostat National accounts, EIB staff calculations.*

**GDP declined most in countries with higher debt levels, many of which were in Southern Europe** (Figure 13). Governments that were already carrying very high levels of debt saw their debt increase significantly. While their borrowing costs are not facing any pressure for the time being, this situation could change quickly. EU fiscal rules of some kind are likely to be reinstated in 2023, and the ECB might decide to wind down its purchases of government bonds if higher inflation persists. EU members should therefore be planning credible policies to rein in debt and to preserve their investment plans. To facilitate the process, the European Union is intensively discussing mechanisms to shield government investment from future belt-tightening. Previous efforts to trim spending relied disproportionately on cuts to government investment. Cutting investment would be very costly at a time when major spending is needed for digitalisation and climate change.

**Figure 13**
**General government debt and growth in 2020**



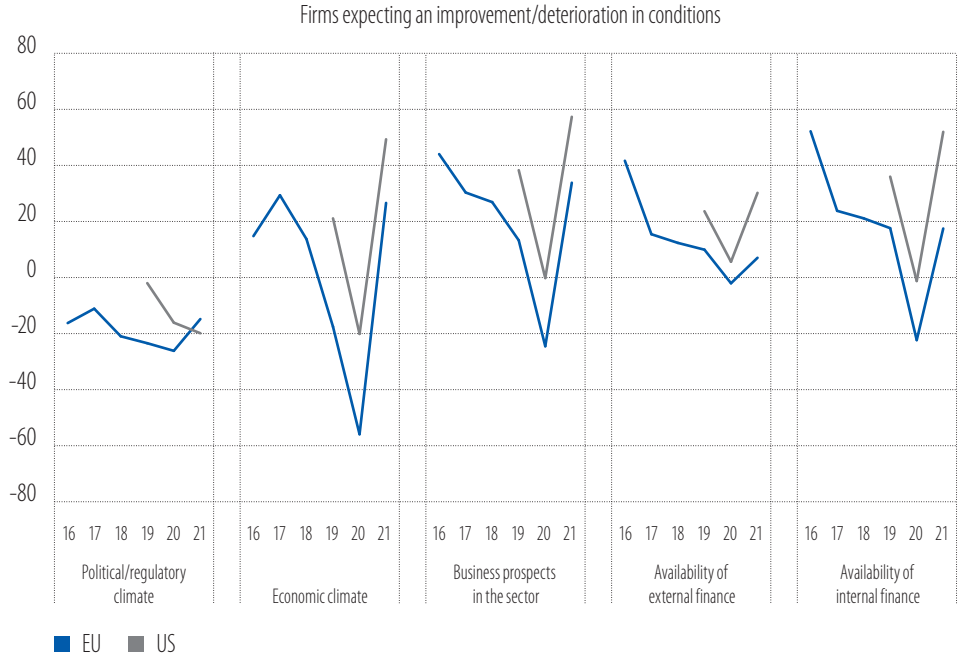

*Source:* *Eurostat National accounts, EIB staff calculations.*
*Note:* *The size of the bubble reflects the size of the decline in real GDP in 2020.*

# Corporate investment seen through the EIB Investment Survey

## Investment cycle and outlook

**The short-term outlook in the European Union has improved substantially in 2021** (Figure 14). While the pandemic is not over yet, high vaccination rates in most EU members have paved the way to a gradual return of normal business activity. Compared to recent years, a higher share of firms in the European Union think the political, regulatory and economic climate is improving, along with business prospects. The share of firms expecting to be able to finance their investments with their own resources is the same as in 2019. While the share of firms saying that the availability of external finance has improved is somewhat lower than in 2019, the sentiment has improved since 2020. To compare, the share of firms in the United States that think the economy and business prospects are improving is higher than in the European Union and above 2019 levels, although US firms are less enthusiastic about the political and regulatory climate.

**Figure 14**
**Business sentiment in the European Union and the United States** (net balance, in %)



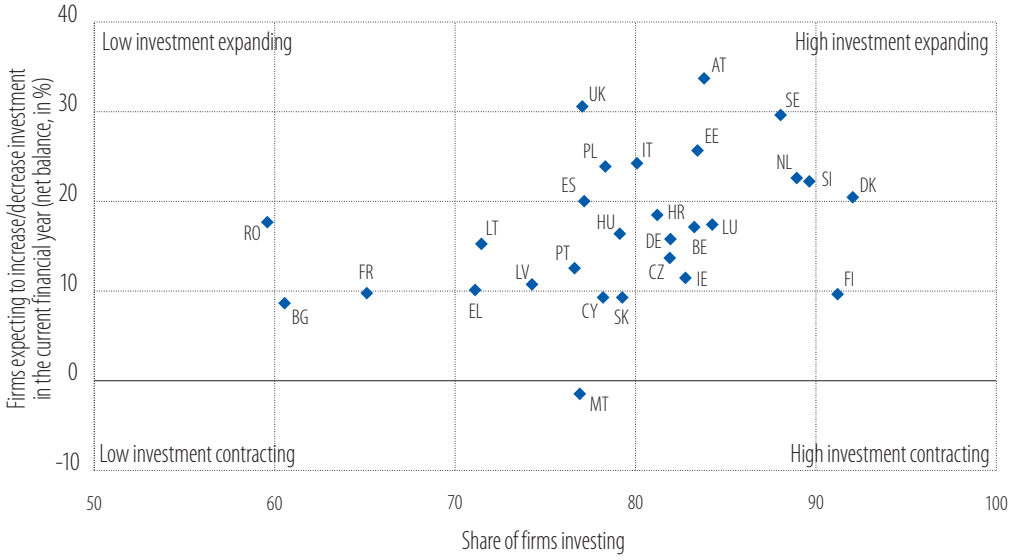

*Source:* *EIBIS, 2016-2021.*
*Base:* *All firms (excluding don't know/refusals to respond).*
*Question:* *Do you think that each of the following will improve, stay the same, or get worse over the next 12 months?*

**The share of firms expecting to increase their investment in the current financial year has bounced back from the dismal levels of 2020** (Figure 15). In addition to an improving outlook, the share of firms expecting to increase investment in 2021 has returned to levels seen in the years leading up to the pandemic. The caveat is that investment is expected to rise from a very low base, as many firms cut investment in 2020. Wide differences exist among countries, however, and investment is often influenced by the near-term outlook along and pandemic indicators such as vaccination rates.

**The lack of availability of staff with the right skills has returned as the most important impediment to investment in the European Union** (Figure 16). In 2020, uncertainty about the future was the main barrier to investment in the European Union, after being in second place for the two previous years. But in 2021, firms are faced with renewed demand as the pandemic wanes, and they are finding it increasingly difficult to hire workers with the right skills. The lack of availability of staff with the right skills is clearly the most commonly cited impediment to investment in Western and Northern Europe — 80% against 68% for uncertainty. In Central and Eastern Europe, the availability of skills (82%) and uncertainty about the future are of equal concern (81%). In Southern Europe, uncertainty about the future is clearly the most reported impediment (88%), well ahead of business and labour market regulations (75%) and the availability of skilled labour (73%).

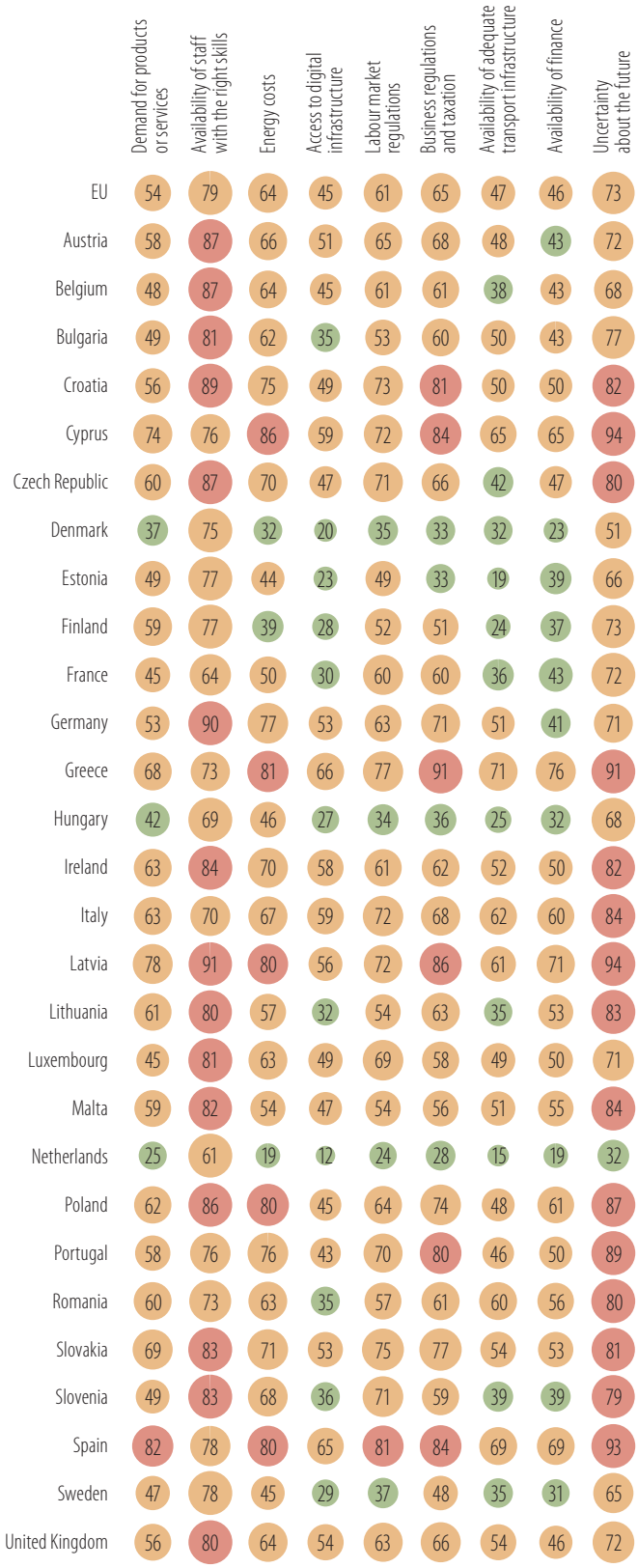
**Energy costs have joined business and labour market regulations as the next biggest impediments to investment.** Increased energy costs stemming from rising carbon prices and demand for energy are a concern for European firms. This is especially true in Central and Eastern Europe (69%), where energy costs ranked third in the list of investment impediments. In the rest of the European Union, energy costs ranked after business and labour market regulations, but were nevertheless an important concern for a large share of firms (73%). Box B discusses how a rapid rise in primary energy costs influences investment in climate change mitigation and prepares sectors for the energy transition.

**Figure 15**
**Investment cycle**




*Source:* *EIBIS, 2020 and 2021.*
*Base:* *All firms (excluding don't know/refusals to respond). Share of firms investing shows the percentage of firms whose investment per employee is greater than EUR 500. The y-axis crosses the x-axis at the EU average in the previous four waves of the survey.*
*Note:* *Net balances show the differences between firms expecting to increase investment activities in the current financial year and firms expecting to decrease them.*

**Figure 16**
**Barriers to investment**




*Source:* *EIBIS 2021.*
*Base:* *All firms (excluding don't know/ refusals to respond).*
*Note:* *A red circle means that the share of mentions of a particular obstacle is in the top quartile; a green circle means that it is in the bottom quartile; an orange circle that it is between the two. The size of the circle and the number inside indicate the share of firms mentioning an area (as either a minor or a major obstacle).*

**Box B**

## Will high energy prices drive or deter investment?

The global economic recovery in 2021 brought a sharp rise in the price of energy, particularly gas. Many short-term factors were responsible for the most dramatic price movements, and many EU energy suppliers were able to hedge against higher prices and limit the immediate impact on consumers as winter approached. That said, energy prices are likely to remain high for some time.

A number of concerns have been raised as a result, notably that economic growth could be undermined, or that the determination to push ahead with the green transition could be destabilised. For corporate investment, high fossil fuel prices could push green investment. However, energy costs are also frequently cited by firms as an obstacle to investment. High energy prices could therefore ultimately turn out to be a positive or a negative factor. This box discusses the implications and the likely policy response.

### What is driving the current rise in energy prices?

A number of short-term factors influenced the scale and timing of the spike in gas prices in the autumn of 2021. The global rebound in economic activity was one factor, as was the relative energy intensity of output during the autumn, since consumers focused more on manufactured goods while services were slower to recover. The relatively cold winter in Europe in 2020-2021 and low wind-power generation the following summer also led to low levels of gas storage at the start of the autumn.

However, the spike in gas prices also reflects a number of long-term trends and structural factors. European oil and gas production is undergoing a rapid decline as reserves are depleted, reducing the ability of European gas production to act as a buffer to global supply or demand shocks. At the same time, increased demand from Asia has stretched the global liquefied petroleum gas (LNG) market, also limiting its effectiveness as a buffer (BloombergNEF, 2021). At the same time, strategic gas storage capacity (which could cushion shocks beyond the regular yearly cycle) is not uniformly developed or well-coordinated across Europe. The European Emissions Trading System, meanwhile, has functioned as it was designed, with the price of emissions rising with the price of gas to deter substitution by more emissions-intensive alternatives, namely coal.

### What is the role of the climate transition?

The global climate transition is increasing the need for energy supply buffers, while the development of new buffers is lagging. The switch to renewables, in China as well as in Europe and elsewhere, comes with greater exposure to weather extremes and a need for investment in energy storage, energy interconnections and increased reserves. Alternative buffers could be provided by hydrogen storage and next-generation nuclear or battery technology further down the line, but the technological development and large-scale infrastructure investment needed to utilise these sources are still lacking. Natural gas storage will remain critical in the medium term, but there is a lack of strategic gas storage in many EU members and limited coordination of this storage at the EU level.

Pushing ahead with the climate transition could solve the current bottlenecks. The climate transition will gradually tackle underlying issues by lowering dependency on energy imports and enhancing the security of the energy supply. For example, investment in energy efficiency will reduce demand for energy, particularly for winter heating, while increased investment in renewables in Europe will boost the amount of energy generated from local clean sources. The development of long-range energy interconnections will help manage irregularity in the power supply resulting from renewables, and other supply or demand shocks. Looking ahead, the climate transition will also entail the development

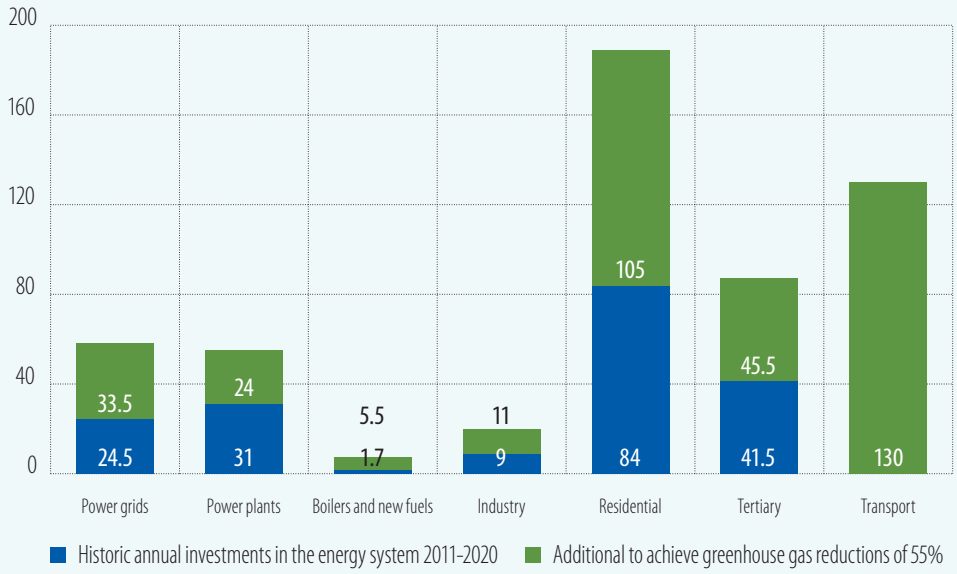
and implementation of some combination of new technologies to increase stores of energy that can be used as a buffer, such as hydrogen, large-scale battery storage and new-generation nuclear energy.

Europe is paying the price for a lack of progress in some areas, and it will continue to be vulnerable to energy fluctuations, at least during the current decade. Accelerating investment in green energy is essential. With a new, hard deadline of 2050 for reaching net-zero carbon emissions, earlier investment in renewable energy, transmission networks and energy efficiency would have reduced the world's dependence on gas and increased gas's ability to act as an energy buffer. Earlier investment in the development of alternative storage technologies could have helped as well.

As things stand, gas will continue to play a major role in energy systems, and global gas and LNG markets are likely to be under pressure for the rest of this decade, if not longer, with implications for European energy security. The more Europe can accelerate investment in clean energy, including in renewable energy, energy networks and storage, energy efficiency and technological R&D, the faster this vulnerability will be overcome. The European Commission's impact assessments provide estimates on how fast the clean energy transition needs to go to reduce emissions 55% by 2030 and to put Europe on track to achieve net-zero emissions by 2050 (Figure B. 1).

**Figure B.1**

**Average annual investment from 2011 to 2020 and additional annual investment needed form 2021 to 2030 to reduce greenhouse gas emissions by 55%** (EUR billion)




*Source:* *European Commission, 2020, "Stepping up Europe's 2030 climate ambition, impact assessment," SWD(2020) 176 final.*
*Note:* *Transport only shows additional, green investments.*

## What would high energy prices mean for corporate investment?

High energy costs could negatively affect overall investment by firms and slow down the rate of energy efficiency improvements. Firms see energy costs as a constraint that weighs negatively on their profitability and general propensity to invest. EIBIS data show a strong relationship between national electricity prices and firms reporting energy costs to be a long-term obstacle to investment (Figure B. 2). This relationship is broadly confirmed by comparing energy prices and the EIBIS indicator

(energy costs as an obstacle to investment) since the introduction of the EIBIS in 2016 (Figure B. 3). Persistently high energy costs could therefore adversely affect corporate investment, including investment that renews the existing capital stock. This could have the perverse effect of hampering advancements in energy efficiency, as well as the adoption of greener energy sources and fuels in industry, the tertiary sectors (retail, offices, etc.), and commercial transport. Older, less energy-efficient machinery, equipment and buildings might be kept in service for longer, despite higher energy costs.

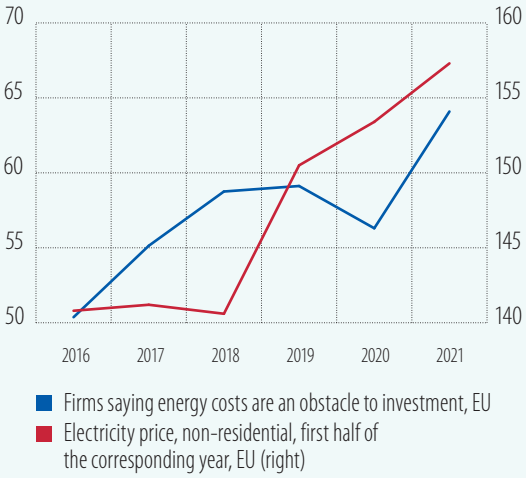
**Figure B.2**

**Firms saying energy costs are a major obstacle to investment, vs. electricity prices** (2016-2021 averages)


*Source:* *EIBIS, Eurostat.*
*Base:* *All firms.*
*Question:* *Thinking about your investment, to what extent are energy costs an obstacle?*

**Figure B.3**

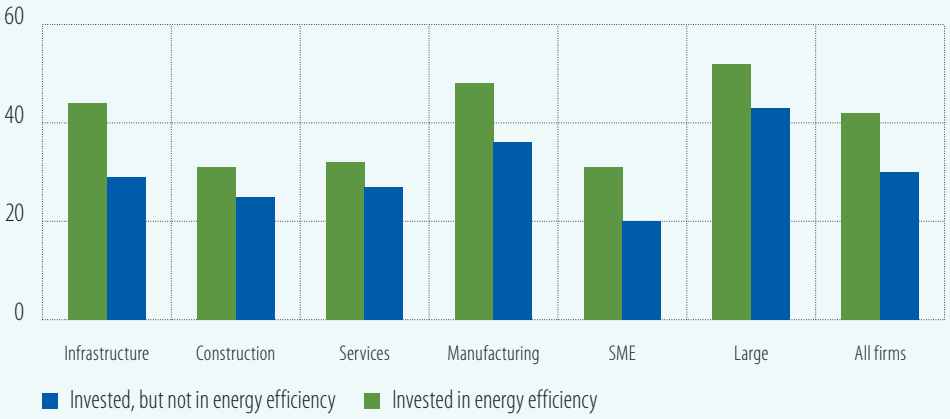
**EU firms** (left axis: in %) **saying energy costs are an obstacle to investment and EU average electricity prices** (right axis: EUR/MWh, 2016-2021)




*Source:* *EIBIS, Eurostat.*
*Base:* *All firms.*
*Question:* *Thinking about your investment, to what extent are energy costs an obstacle?*

**Figure B.4**

**Firms** (in %) **perceiving energy costs as a major constraint, by investment in energy efficiency**




*Source:* *EIBIS 2021.*
*Base:* *All firms.*
*Question:* *Thinking about your investment, to what extent are energy costs an obstacle?*

However, high energy costs could also push firms to invest in energy efficiency. Energy costs, unlike many other obstacles to investment, are something that firms can partially tackle themselves, through investment that lowers their energy consumption per unit of output. EIBIS data reveal an unsurprising correlation between whether a firm sees energy costs as a constraint to investment in general, and whether it invests in energy efficiency specifically (Figure B. 4). Moreover, higher energy costs will tend to accelerate the depreciation of older, less energy-efficient assets (because improving energy efficiency requires replacement, rather than refurbishment, as in the case of vehicles and much machinery and equipment), and so could potentially also lead to a higher rate of investment overall.

Tackling other barriers to investment can tamp down the negative impact of high energy costs. While energy costs weigh on overall profitability, investment decisions also depend on factors such as financing conditions, policy uncertainty, the availability of skills, the regulatory context, infrastructure constraints and demand. It may be hard to avoid increased energy costs at this stage of the climate transition, but their impact on general investment can be counterbalanced.

### Policy implications

The green transition should be seen as the solution to high energy prices, rather than the cause. While it is important to soften the burden on vulnerable consumers, it is also crucial that the policy response eschews market intervention that would promote a switch to coal or reduce incentives for green investment, including by increasing uncertainty about climate policy going forward.

While gas will continue to play a role for some time, accelerating innovation in new technologies would help provide additional energy buffers. Natural gas will continue to play a critical role as a buffer in the medium term. In this context, governments need to devote their attention to improving Europe's capacity for gas storage as well as long-distance interconnections. These efforts will require EU-level coordination. Greater EU-wide energy systems and energy market integration could help cushion energy shocks. At the same time, accelerating R&D investment in next-generation storage and capacity technologies — such as hydrogen, batteries and new nuclear energy — is critical, even if there is still uncertainty about the role each of these technologies will eventually play.

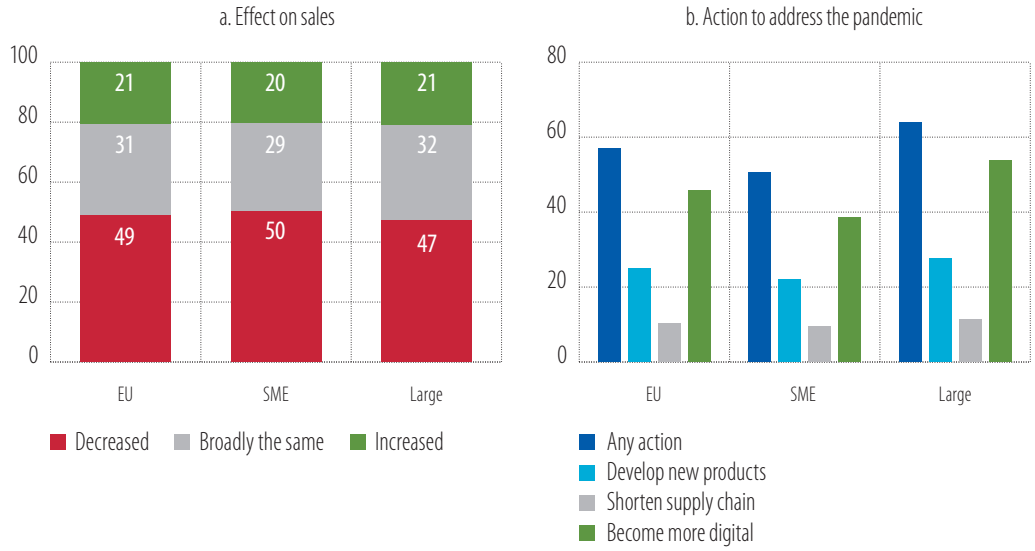
With energy prices likely to remain high in the medium term, an environment conducive to investment is critical for facilitating the needed climate investment. Investment obstacles other than energy costs must therefore be tackled to ensure that energy prices are a help, and not a hindrance, to accelerating the adoption of greener and more efficient technologies.

## The pandemic's short-term effects on investment

**The social distancing measures and restrictions on movement introduced to curb the spread of the virus have had a major effect on businesses' sales** (Figure 17a). Half of non-financial firms in the European Union have experienced declining sales due to COVID-19. Smaller firms are more affected than larger ones. The depth of the decline is different across different firms and sectors. Sales fell less than 25% for about 27% of firms. About 16% of firms says sales declined 25% to 50%, while around 7% of firms experienced sales drops of more than 50%. Some 21% of firms have, on the other hand, increased their sales during the pandemic.

**Firms have taken different steps to face the challenges posed by the pandemic.** In the European Union, about 46% of firms have addressed the pandemic by becoming more digital (Figure 17b). More large firms increased digitalisation (54%) than small firms (38%). Many firms (25%) also used the pandemic as an opportunity to develop new products or services. Some 10% of firms have adjusted their supply networks to address difficulties.

**Figure 17**
**Effects of the pandemic on the activity of non-financial firms** (in %)

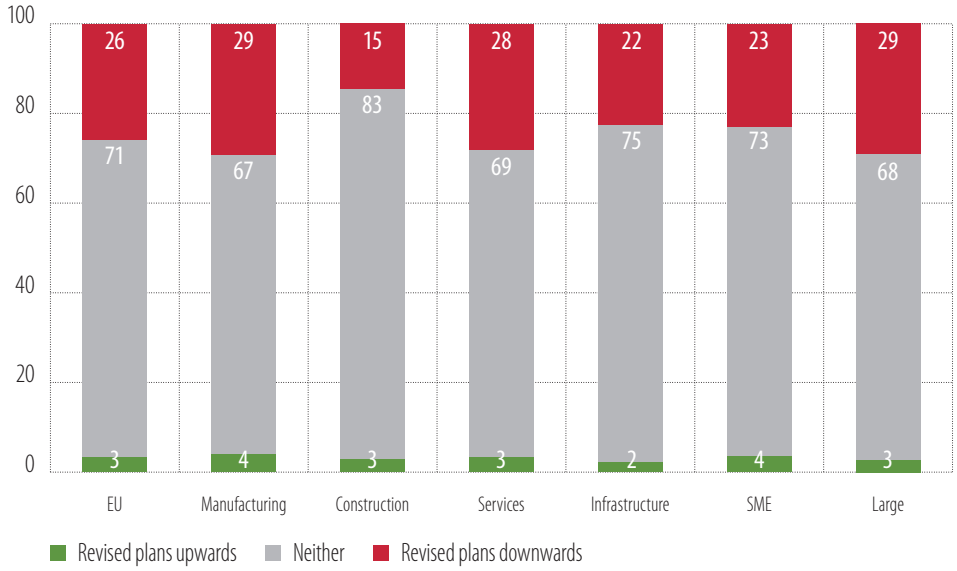



*Source:* *EIBIS 2021.*
*Note:* *SME refers to small and medium-sized enterprises.*
*Base:* *All firms (excluding don't know/refusals to respond).*
*Questions:* *What has been the impact so far of the COVID-19 pandemic on your company's sales or turnover compared to the beginning of 2020? (panel a); As a response to the COVID-19 pandemic, have you taken any actions or made investments to…? (panel b)*

**The pandemic has weighed heavily on corporate investment in the European Union.** Since the beginning of the pandemic, 26% of firms have cut back on their investment plans, while only 3% planned to increase spending (Figure 18). Manufacturing firms cut back the most (29%) compared to the other sectors covered in the EIBIS, while construction reported the smallest reduction in investment plans (15%, see also Box A). A bigger share of large firms (29%) reduced planned investment due to the COVID-19 crisis than smaller firms (23%).

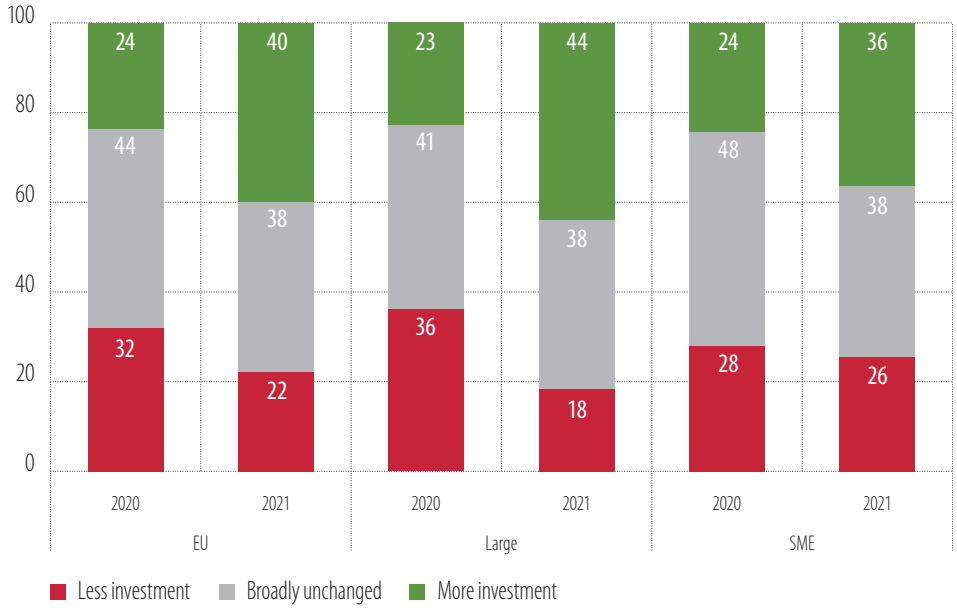
**The significant share of firms that reduced investment in 2020 was offset by the large number of firms that increased investment in 2021; big firms accentuated the swing** (Figure 19). In the European Union, 32% of firms reduced investment in 2020, while 24% increased it. Previous waves of the survey from 2016 to 2019 showed that on average, 18.6% of firms reduced investment relative to the previous year, while 36.7% increased it. This trends clearly changed in 2021, as the share of firms increasing investment exceeded the previous five-year average, and the share of firms reducing investment fell significantly. Large firms are largely responsible for these swings in investment, especially the decline in the share of firms reducing investment. Large firms seem to have adopted a wait-and-see approach amid the uncertainty caused by the pandemic. This conclusion is supported by evidence from EIBIS 2020. About half of the firms that decided to reduce investment in 2020 said that they were merely postponing their investment plans (EIB, 2021).

**Figure 18**
**Change in investment plans due to COVID-19** (% of firms)




*Source:* *EIBIS 2021.*
*Base:* *All firms (excluding don't know/refusals to respond).*
*Questions:* *Has your company taken any of the following actions as a result of the COVID-19 pandemic? You mentioned revising your investment plans due to the COVID-19 pandemic. Did you revise them upward or downward?*

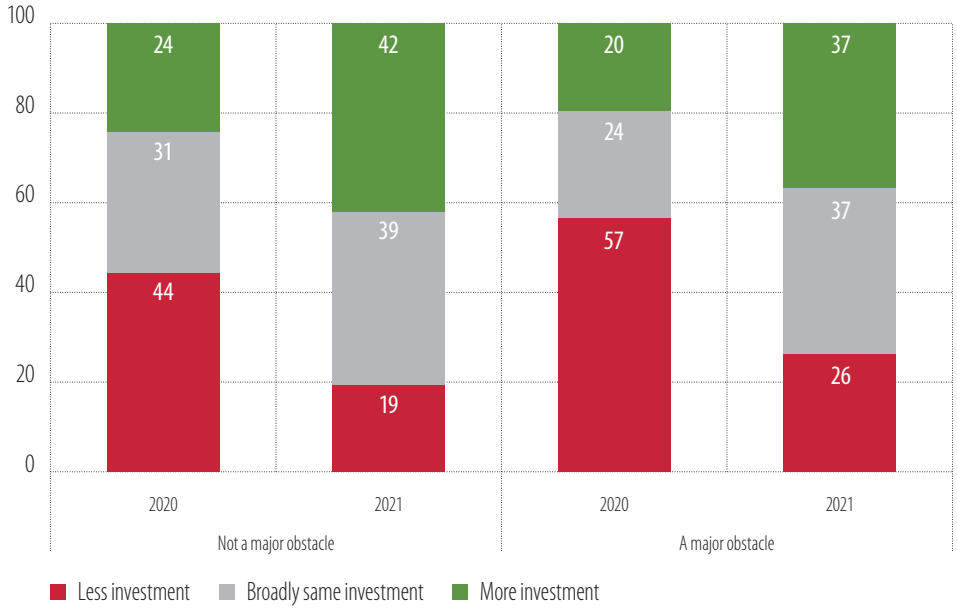
**Figure 19**
**Investment in 2020 compared with 2019** (in %)




*Source:* *EIBIS 2021.*
*Base:* *All firms (excluding don't know/refusals to respond).*
*Questions:* *Overall, was this more, less or about the same amount of investment as in the previous year? For the current financial year, do you expect your total investment spend to be more than last year, about the same or less?*

**Uncertainty about the pandemic and about the effectiveness of government intervention depressed investment in 2020** (Figure 20). In 2020, 57% of firms that said uncertainty was a major obstacle to investment planned to reduce investment compared to 2019. In 2021, only 26% of firms that thought uncertainty was a major obstacle to investment planned to reduce investment compared to 2020.[1] Furthermore, expectations of a recovery in 2021, aided by vaccination programmes and ample government support, reassured firms that postponing their investment plans for 2020 until the following year was a good strategy.

**Figure 20**
**Investment and perceptions of uncertainty** (in %)

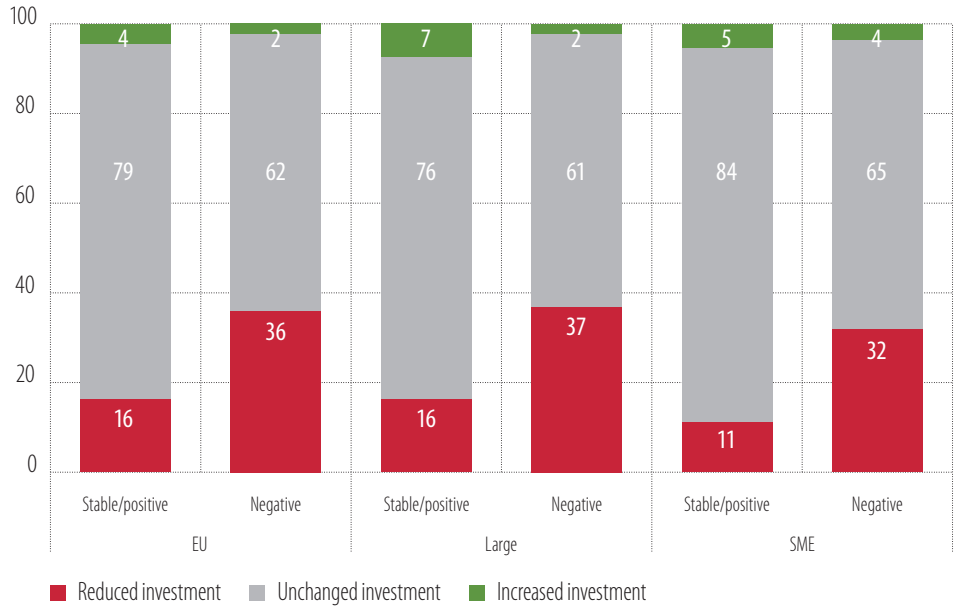



*Source:* *EIBIS 2020, EIBIS 2021.*
*Base:* *All firms (excluding don't know/refusals to respond).*
*Questions:* *For the current financial year, do you expect your total investment spend to be more than last year, about the same or less? To what extent is uncertainty about the future an obstacle to your investment: a major obstacle, a minor obstacle or not an obstacle at all?*

**A drastic drop in sales made many firms worry that they could not finance investments internally, which led firms to reduce investment in 2020 to preserve their own funds and to avoid over leveraging.** The effect the pandemic had on sales caused many firms to revise their investment plans (Figure 21). The share of firms that reduced investment is much higher among firms that saw sales decline (36%) than among firms whose sales were stable or even growing (16%). This dynamic can be seen across firms of different sizes. In addition, the effect the pandemic had on sales is positively associated with how firms viewed the availability of internal and external finance, business prospects and uncertainty about the future.

1 For each wave of the EIBIS, we run ordered logistic regression analyses on the relationship between investment change and uncertainty as a major impediment, with controls for country, sector and firm size. The results confirm the exceptionally high effect uncertainty had on the likelihood that firms would change their investment plans in 2020, compared to other waves of the EIBIS.

**Figure 21**
**The pandemic's effect on sales and investment** (in %)




*Source:* *EIBIS 2021.*
*Base:* *All firms (excluding don't know/refusals to respond).*
*Questions:* *What has been the impact so far of the COVID-19 pandemic on your company's sales or turnover compared to the beginning of 2020? Has your company taken any of the following actions as a result of the COVID-19 pandemic? You mentioned revising your investment plans due to the COVID-19 pandemic. Did you revise them upward or downward?*

**About 16% of all firms reduced investment in 2020, and either maintained the lower level or reduced it further in 2021.** The share of firms reducing investment is significantly above EIBIS results in years before the pandemic (9%). Firms that cut investment have generally grown less over the past three years, and they are much more likely to report that they have not invested enough over the past three years to remain competitive. The worry is that these firms might not be viable, and rising number of such firms may lead to the inefficient allocation of resources in the economy and negatively affect productivity.

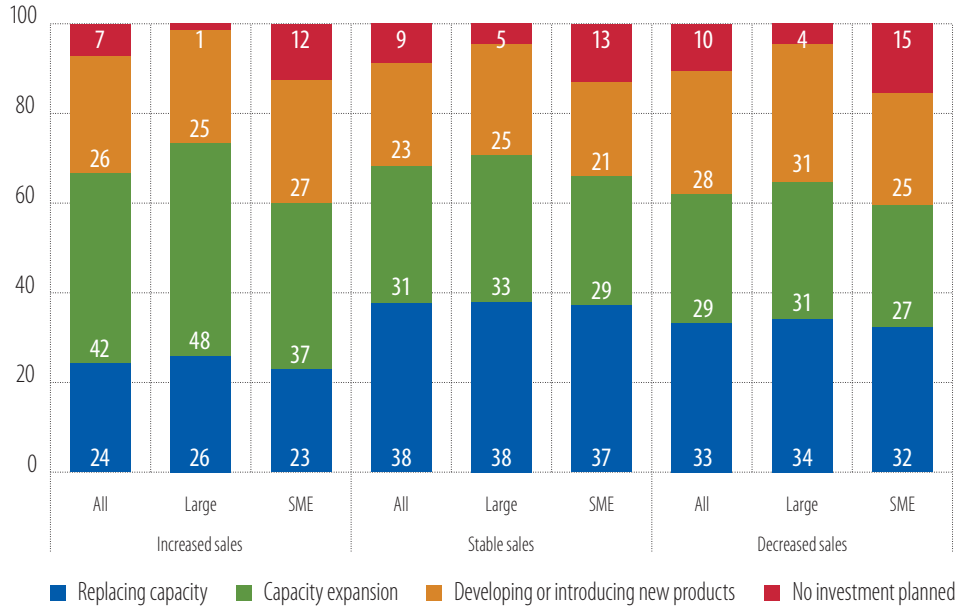
## The pandemic's longer-term effects

**COVID-19 affected not only firms' current investment plans, but also their plans for the medium term.** Firms' investment plans for the next three years differ depending on the impact the pandemic had on their sales (Figure 22). The higher demand behind the increase in sales prompted some firms to plan to expand capacity (42%). Firms with declining sales were less likely to plan expansions (29%). However, firms with stable sales, thanks to established products generating stable demand, were less inclined to invest in new products (23%) than those with lower sales (28%). Firms with lower sales were looking to offset sales declines with new product lines, while those with increased sales (26%) were eager and able to capitalise on higher demand.

**The differences in medium-term investment plans between large firms and small and medium-sized enterprises (SMEs) reflects the difficulties the European financial system has to support firm growth and innovation.** Large firms (48%) were significantly more likely to plan to expand capacity during the pandemic than SMEs (37%). Differences, albeit smaller, in plans to expand capacity and invest in new products also exist among firms with stable or lower sales. The problem with growth and innovation finance in the European Union is well-known and largely due to the oversized role bank finance plays in most European economies (EIB, 2020).

**Figure 22**

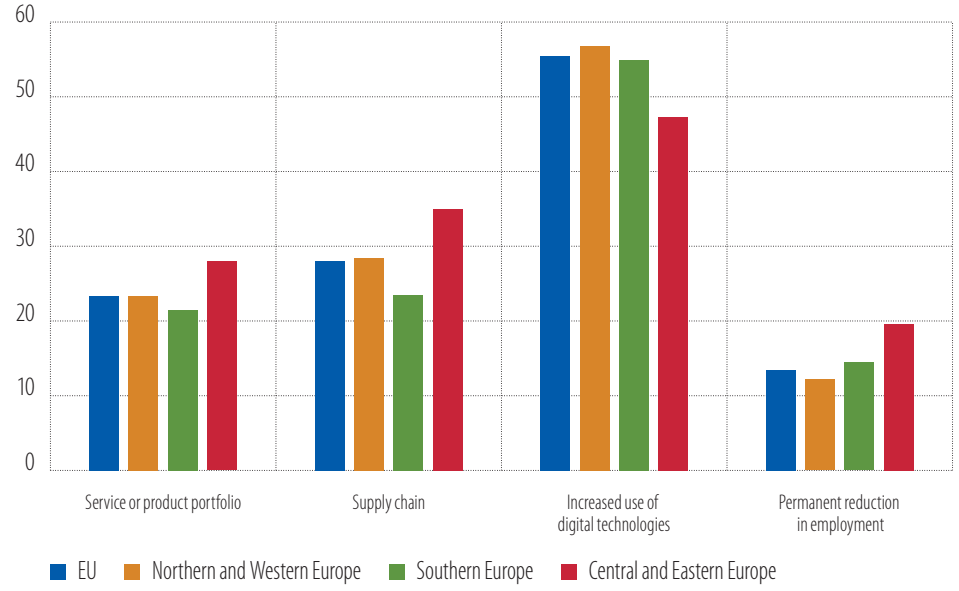
**Investment plans in the next three years and COVID-19's effect on sales** (in %)




*Source:* *EIBIS 2021.*
*Base:* *All firms (excluding don't know/refusals to respond).*
*Questions:* *What has been the impact so far of the COVID-19 pandemic on your company's sales or turnover compared to the beginning of 2020? Looking ahead to the next three years, which of the following is your investment priority: Replacing capacity; capacity expansion; Developing or introducing new product; No investment planned?*

**Figure 23**

**Long-term effect of COVID-19** (in %)



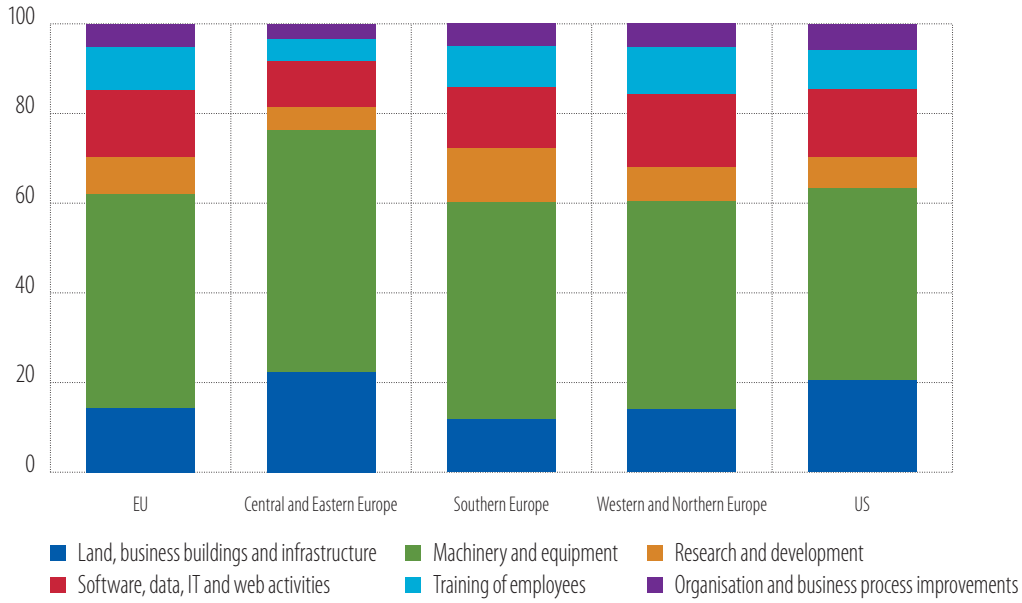

*Source:* *EIBIS 2021.*
*Base:* *All firms (excluding don't know/refusals to respond).*
*Questions:* *Do you expect the COVID-19 outbreak to have a long-term impact on any of the following: your service or product portfolio; your supply chain; increased use of digital technologies; permanent reduction in employment?*

**EU firms expect the pandemic to substantially change how they do business: 72% expect the pandemic to underscore the need for digitalisation, changes in global value chains, more innovation and a permanent decrease in employment.** About 55% of EU firms see the increased use of digital technologies as a lasting effect of the pandemic. There is, however, a 10 percentage point difference between firms in Western and Northern Europe (57%) and those in Central and Eastern Europe (47%). Nearly 28% of firms expect the pandemic to prompt enduring changes in their supply chains, while 23% expect changes in their product portfolios as a result of the pandemic. The share of firms expecting these changes is significantly higher in Central and Eastern Europe than the EU average: 7 percentage points more for supply chain changes and 4.6 percentage points for changes in the product portfolio. About 13% of EU firms expect the pandemic to permanently reduce employment. The share of Central and Eastern European firms expecting reduced employment is 7.5 percentage points higher than the share of Western and Northern European firms.

## Intangible investment and innovation

**Intangible assets — such as R&D, software and databases, employee training and organisation and business process improvements — represents more than one-third of total investment.** Intangible assets have become so important that they warrant a special focus in this chapter. According to EIBIS data, EU firms allocated 38% of their total investment to intangible assets in 2020, which is slightly above the US average of 36% (Figure 24). Within the European Union, the share of investment spent on intangible assets is lower in Central and Eastern Europe (24%) than in Western and Northern Europe (39%) or Southern Europe (40%).

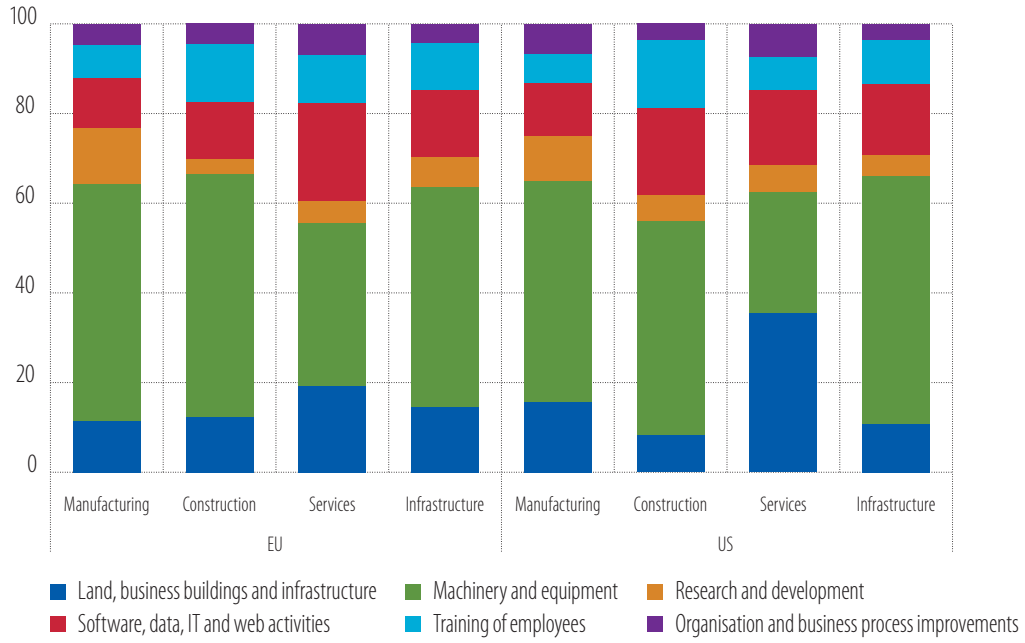
**Figure 24**
**Composition of investment** (in %)




*Source:* *EIB Investment Survey 2021.*
*Note:* *Firms are weighted by value added.*
*Question:* *In the previous financial year, how much did your business invest in each of the following with the intention of maintaining or increasing your company's future earnings?*

**Manufacturing firms tend to invest more in R&D, while firms in services allocate a higher share of investment to software and data, IT and web activities.** Manufacturing firms in the European Union allocated 13% of total investment to R&D and 11% to software and data in 2020 (Figure 25). During the same period, EU firms in services only allocated 5% to R&D but close to 22% to software and data. The pattern for US firms is very similar. Overall, machinery and equipment remains the most important investment area for all firms, even for those in services.

**Figure 25**
**Composition of investment** (in %)**, by sector**




*Source:* *EIBIS 2021.*
*Note:* *Firms are weighted by value added.*
*Question:* *In the previous financial year, how much did your business invest in each of the following with the intention of maintaining or increasing your company's future earnings?*

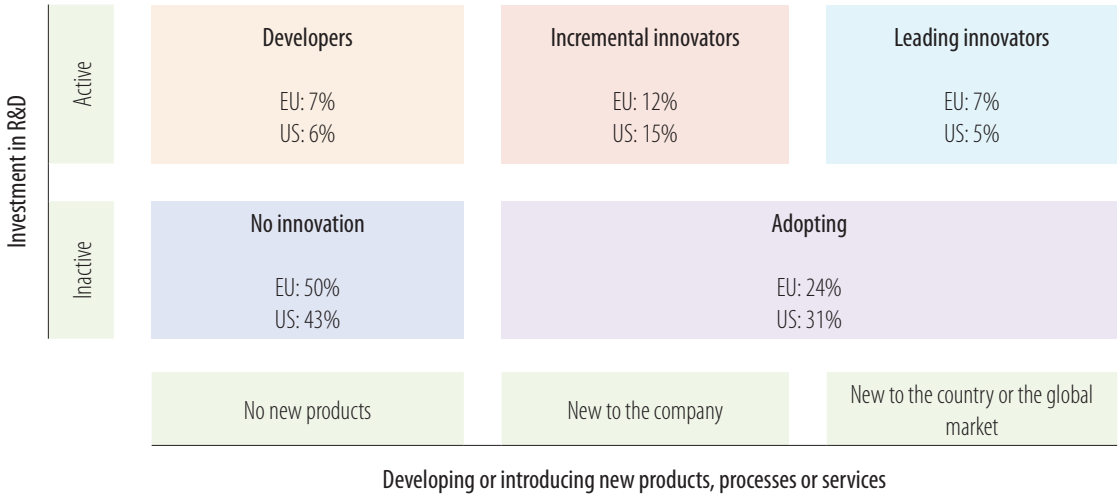
**Firms that invest more in intangible assets tend to perform better.** They are more likely than other firms to develop or introduce new products, processes or services, and are more likely to export their products or services. They also grow faster, are more competitive and have higher productivity (EIB, 2018). While R&D investment, including the acquisition of intellectual property, strengthens firms, investment in software and databases and in organisation and business processes is also important. Overall, the tendency of intangible assets to complement each other helps spur innovation (Haskel and Westlake, 2017; Brynjolfsson, Rock and Syverson, 2018; Thum-Thysen, Voigt and Weiss, 2021).

**The European Union has a higher share of firms that do not innovate than the United States.** Firms can be classified under five different innovation profiles based on R&D investment and innovation activities (Veugelers et al., 2019). The five innovation profiles are: firms that do not innovate, adopting firms, developers, incremental innovators and leading innovators (Figure 26). The share of firms that do not innovate — firms that do not invest in R&D and do not develop new products and services — is higher in the European Union than in the United States. A better-tailored innovation policy in Europe could help incentivise investment.

**Within the European Union, the share of innovative companies that maintained their innovation activities during the pandemic is higher in Northern and Western Europe than in Southern Europe and Central and Eastern Europe.** 41% of innovative firms in Northern and Western Europe report they

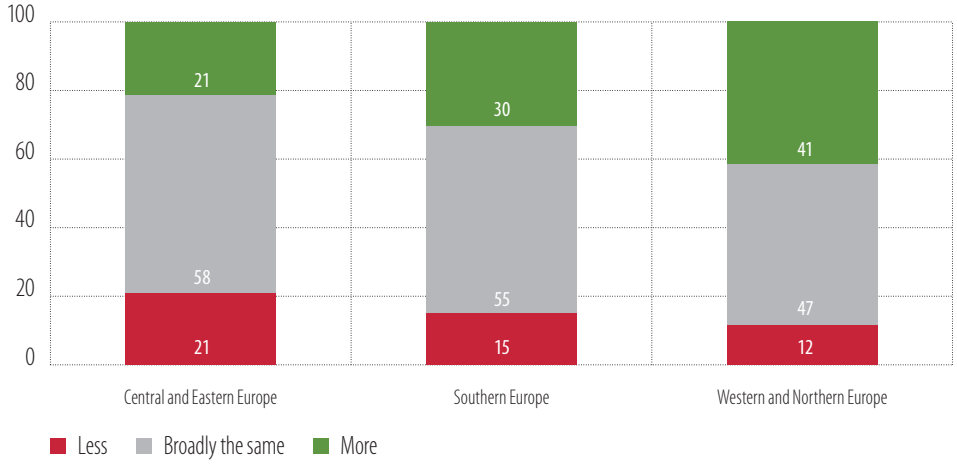
invested more in developing new products, processes or services in 2020 than they would have under normal circumstances (prior to COVID-19). Innovative firms in Southern Europe (30%) and Central and Eastern Europe (21%) report the same thing (Figure 27). In Central and Eastern Europe, the firms that innovated less in 2020 (or did not invest in innovation at all) expect their lack of attention to innovation to weaken their competitiveness (23%), compared with 13% in Southern Europe and only 5% in Northern and Western Europe (Figure 28).

**Figure 26**
**Innovation profiles in the European Union and the United States**



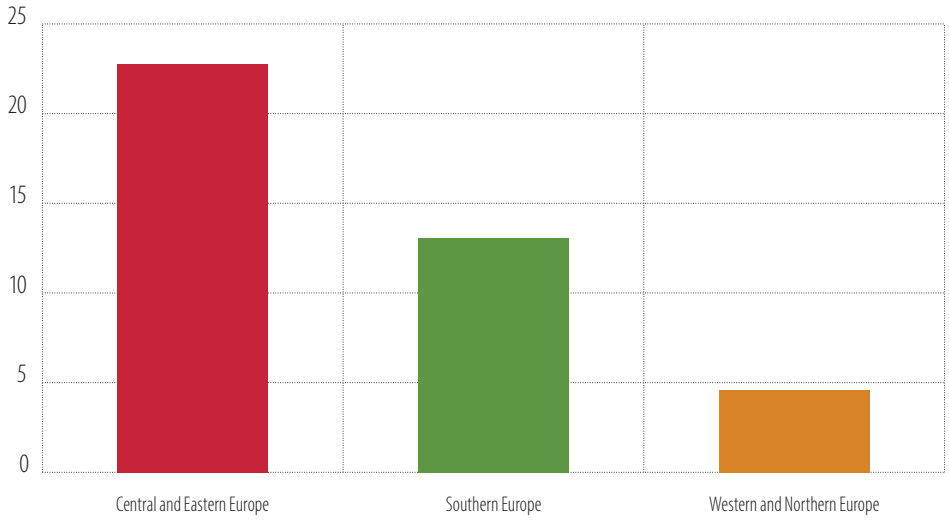

*Source:* *EIBIS 2021.*
*Note:* *R&D inactive refers to firms with an R&D investment intensity (R&D investment divided by turnover) below 0.1%. Firms are weighted by value added.*
*Questions:* *In the previous financial year, how much did your business invest in each of the following with the intention of maintaining or increasing your company's future earnings? What proportion of the total investment in the previous financial year was allocated to developing or introducing new products, processes or services?*

**Figure 27**
**Investment by innovative firms in 2020, compared to before the pandemic** (in %)




*Source:* *EIBIS 2021 add-on module — sample of EU SMEs in manufacturing and services.*
*Note:* *The base only includes innovative firms.*
*Question* *Did you innovate less, about the same amount, or more in 2020 than you would have done under normal circumstances (prior to COVID-19)? By 'innovate' we are referring to developing or introducing new products, processes or services.*

**Figure 28**
**Firms** (in %) **expecting that less innovation in 2020 will hurt their competitiveness**




*Source:* *EIBIS 2021 add-on module — sample of EU SMEs in manufacturing and services.*
*Note:* *The base only includes firms that innovated less due to COVID-19 or did not innovate at all.*
*Question:* *Do you expect the fact that you innovated less in 2020 or did not develop or introduce new products, processes or services in 2020 to disadvantage your company's competitive position relative to others in your market?*

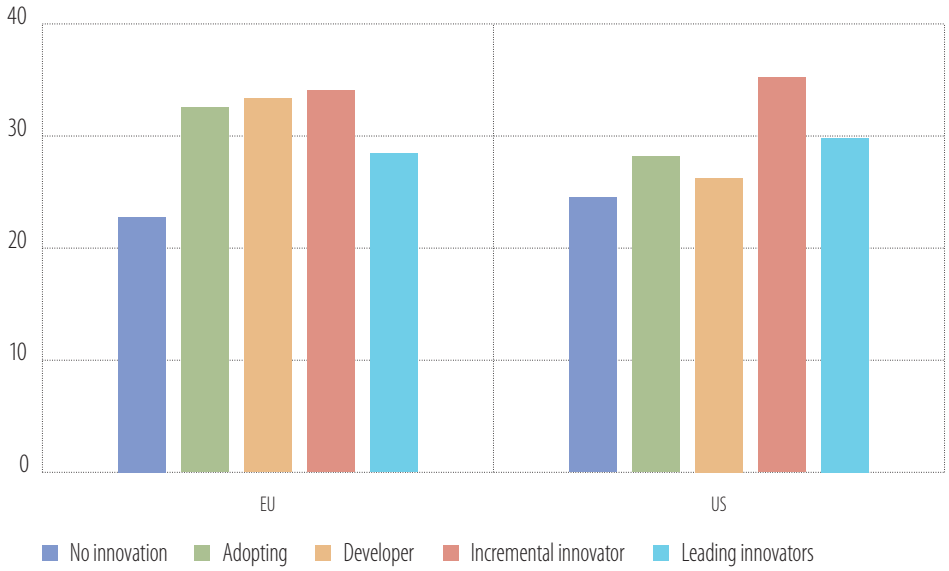
**Innovative firms are more likely to have increased their workforce during the pandemic.** Due to the various policy measures rolled out across EU countries to support jobs during the COVID-19 crisis, employment has fallen less than in the United States (see also Chapter 1 of this report). On both sides of the Atlantic, however, innovative firms are more likely to have hired more staff since the beginning of 2020 (Figure 29). The share of non-innovative firms in the European Union that increased their workforce is 23%, compared with 32% for digital adopters and active innovators (developers, incremental and leading innovators). The difference across innovation profiles is similar for firms in the United States, where innovative firms also grew faster. This result is in line with previous evidence showing that low-skilled workers in the European Union have experienced the steepest falls in employment since early 2020 (Verwey, Licchetta and Zeana, 2021), as innovative firms tend to employ more high-skilled workers. Looking ahead, innovative firms are also less likely to consider that the COVID-19 crisis will lead to a permanent reduction their workforce.

**As a response to the pandemic, innovative firms are more likely to invest in their digital transformation.** A large share of firms took steps or invested to become more digital during the crisis. But this share varies across innovation profiles. While 42% of non-innovative firms in the European Union have invested in digitalisation, the share rises to 56% for digital adopters and 64% for leading innovators (Figure 30). Addressing barriers to digital infrastructure and skills, which are both major impediments to the adoption of digital technology, should be a priority if policymakers want to support the digital transformation and bridge the growing corporate digital divide observed between the European Union and the United States (Rückert et al., 2021).

**Innovative firms are more likely to take steps to shorten their supply chain as a response to COVID-19.** Close to 20% of active innovators in the European Union invested to bring more stages of their supply chain to the same location or closer to their domestic market, compared with only 7% of firms that do not innovate (Figure 31). The difference across innovation profiles is even more pronounced for firms in the United States. The trade disruptions caused by the COVID-19 crisis are the likely reason, and innovative firms tend to invest more to address or mitigate these issues. Note also that innovative firms are often more embedded internationally, which gives them more incentives or options to revise their supply chain.

**Figure 29**

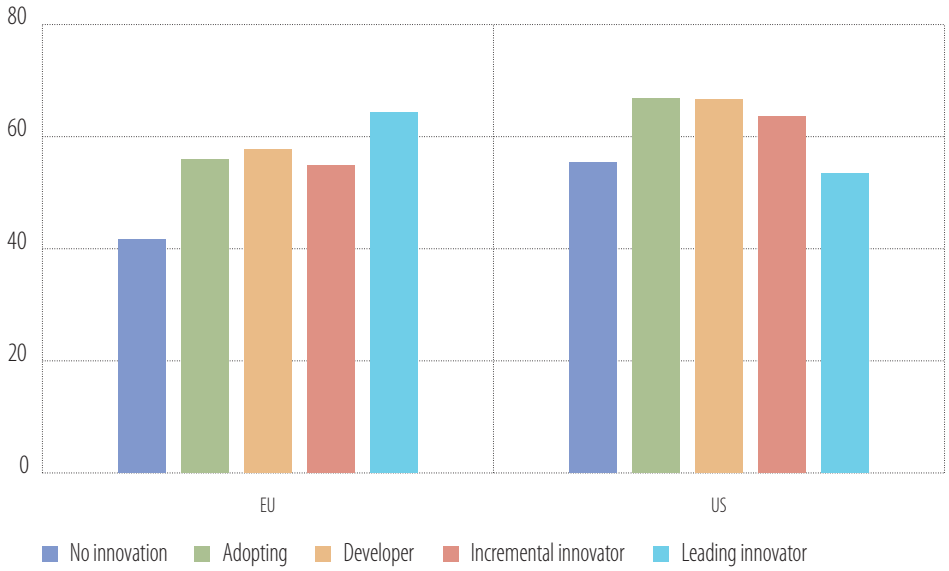
**Firms** (in %) **that increased their workforce during the pandemic**




*Source:* *EIBIS 2021.*
*Note:* *See Figure 26 for a definition of innovation profiles. Firms are weighted by value added.*
*Questions:* *How many people does your company employ either full or part-time at all its locations, including yourself? How many people did your company employ either full or part-time at all its locations at the beginning of 2020, before the COVID-19 pandemic?*

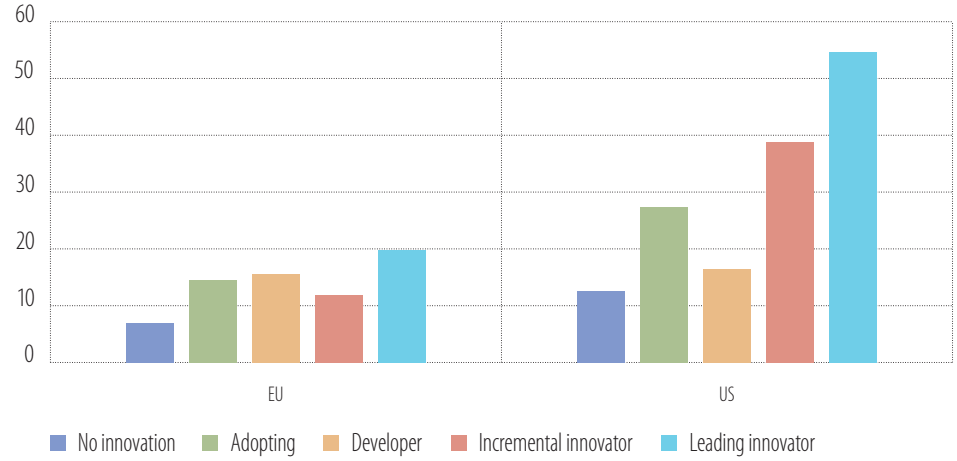
**Figure 30**

**Firms** (in %) **that have taken action or invested to become more digital**




*Source:* *EIBIS 2021.*
*Note:* *See Figure 26 for a definition of innovation profiles. Firms are weighted by value added.*
*Question:* *As a response to the COVID-19 pandemic, have you taken any actions or made investments to become more digital (e.g. moving to online service provision)?*

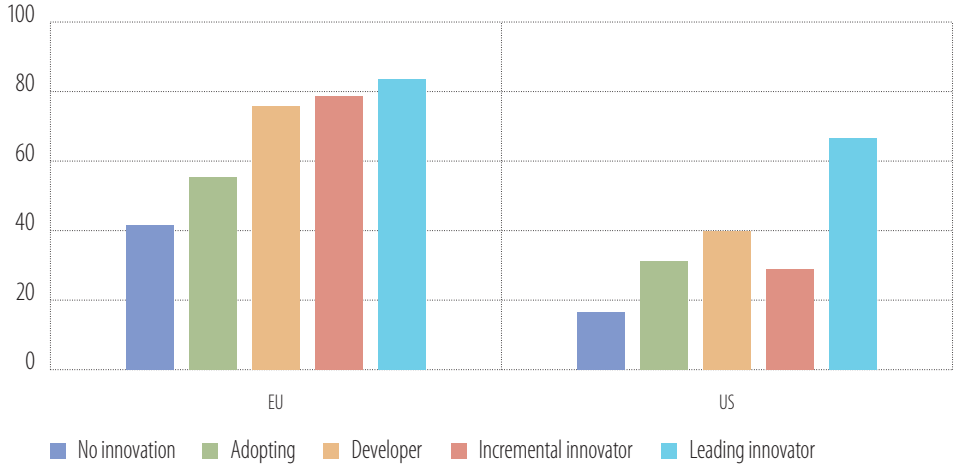
**Figure 31**
**Firms** (in %) **that took steps or invested to shorten their supply chain**




*Source:* *EIBIS 2021.*
*Note:* *See Figure 26 for a definition of innovation profiles. Firms are weighted by value added.*
*Question:* *As a response to the COVID-19 pandemic, have you taken any actions or made investments to shorten the supply chain (bring more stages to the same location or closer to your business's home country)?*

**Innovative firms are more likely to export their products and services to other countries.** Perhaps unsurprisingly, the share of exporting firms in the United States is lower due to the larger size of the domestic market. While 41% of non-innovative firms in the European Union directly export goods or services to another country, this share rises to 79% for incremental innovators and 84% for leading innovators (Figure 32). This result is also in line with studies stressing that exporters tend to be more productive and innovative because they have to compete in international markets and invest in new products to maintain their market share (Melitz and Redding, 2021). However, the correlation between innovation activities and firms' performance does not necessarily imply a causal link.

**Figure 32**
**Firms** (in %) **that directly export goods and services to another country**



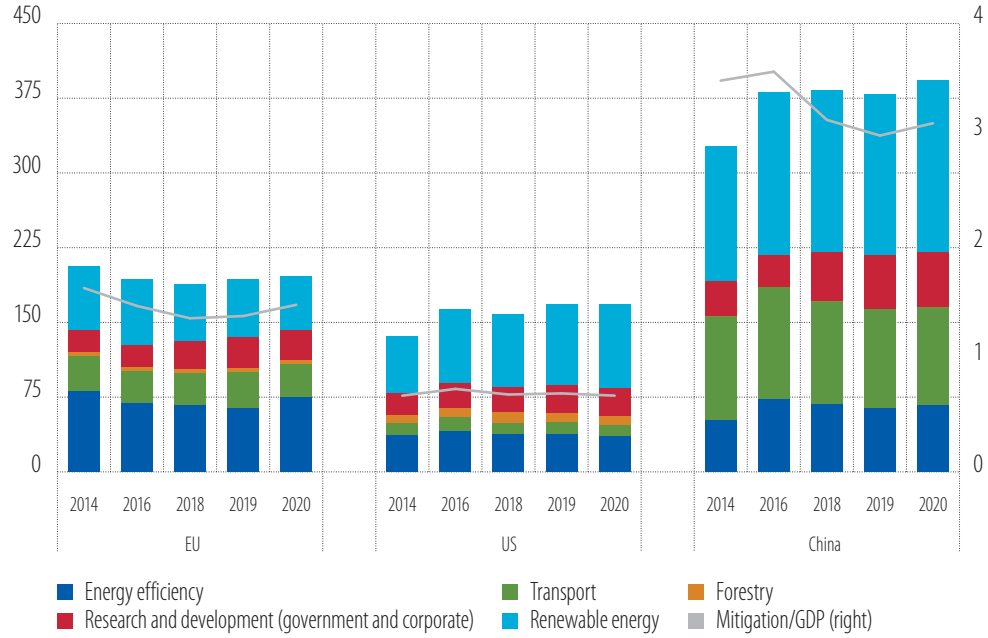

*Source:* *EIBIS 2021.*
*Note:* *See Figure 26 for a definition of innovation profiles. Firms are weighted by value added.*
*Question:* *In the previous financial year, has your company directly exported goods and services to another country?*

# Investment in climate change mitigation

**Investment in climate change mitigation as a share of GDP remained stable at 1.5% in the European Union, which is half of the level of China and slightly higher than in the United States.** China continues to dominate global clean energy investment, with high investment rates from 2014 to 2020. In 2020, China invested EUR 393 billion in clean energy, more than the European Union (EUR 196 billion) and the United States (EUR 168 billion) combined (Figure 33). China's climate change mitigation investment stood at 3% of GDP, whereas the European Union directed 1.5% of GDP and the United States slightly less with 0.9% of GDP. The investment shares have remained constant over the last five years for the European Union and the United States, while in China the share of GDP spending decreased by 0.5 percentage points in 2020.

**Figure 33**

**Climate change mitigation investment** (left axis: EUR billion in 2019; right axis: % GDP)**, per sector**

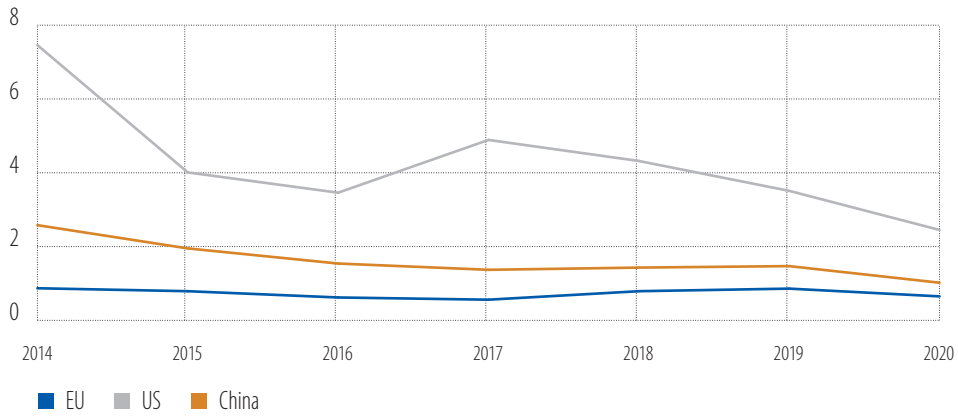



*Source:* *International Energy Agency (IEA), Eurostat, Joint Research Centre (JRC) and authors' estimates.*
*Note:* *Data for investment in forestry in China were unavailable.*

**In the European Union, investment in climate change mitigation increased modestly by 1.4% in 2020, with energy efficiency driving the upturn.** Energy efficiency investment increased by 16%, driven by a consistent rise in spending on electric heat (residential heat pump investments, for example) and electric vehicles (BloombergNEF, 2021). However, investment in renewable energy technologies declined 7% in 2020 to EUR 54 billion. A similar downturn is observed in investment in the transport sector (6.5%), forestry (9%) and research and development (3%). Falling capital costs could explain part of the drop in investment in renewables, but the declines in transport, forestry and R&D appear to stem from the pandemic.

**Investment in climate change mitigation in the United States remained stable, while China outperformed the European Union and the United States with a strong push in this area.** US investment declined 4-5% in all climate segments, except for renewables (+5%). The upward trend in renewables was probably driven by the significant increase in investment commitments made in previous years. In contrast, all segments of climate investment increased in China, except for the transport sector. Investment in renewables saw the highest growth (7%).

**Figure 34**
**The ratio of investment in fossil fuels to investment in renewables**




*Source:* *IEA.*

**Compared to the United States, the European Union and China seem more dedicated to tackling climate change by accelerating the switch to renewable energy.** Investment in fossil fuels in the European Union has declined in the last five years, and was approximately one-third lower than total investment in renewable energy in 2020 (Figure 34). In contrast, investment in fossil fuels outperforms investment in renewables in the United States — it is two-and-a-half times higher — whereas in China the two energy sources are broadly balanced. Since 2014, the United States and China have been catching up with the European Union's ratio of fossil fuel to renewable energy investment, which could be considered a sign of increased climate action. These findings are in line with the European Union's climate ambitions and the level of carbon emissions generated by the European Union, the United States and China (EIB, 2021).

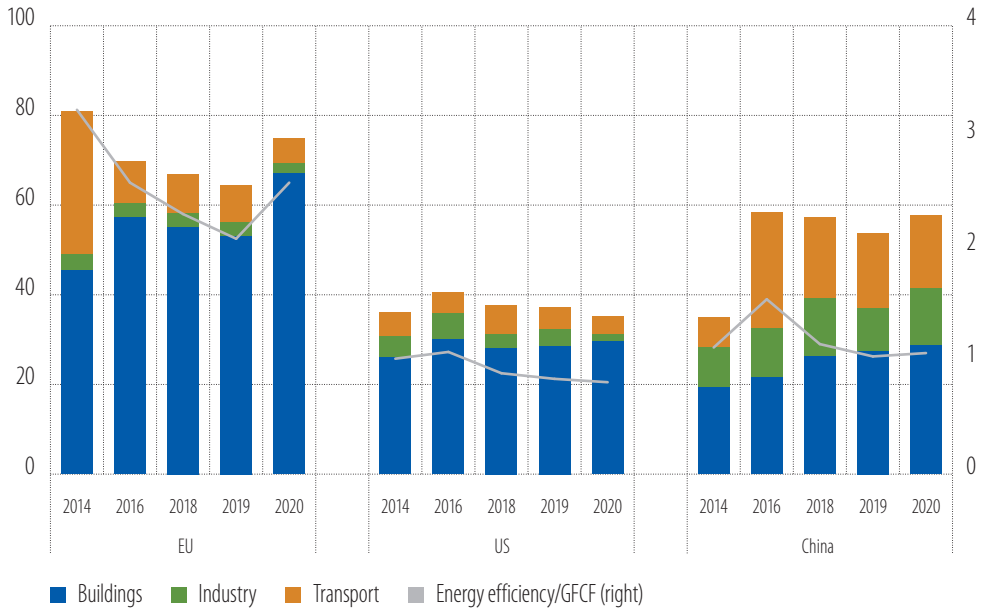
## Energy efficiency

**From 2014 onwards, the European Union's emissions reduction policies have supported a significant amount of investment in energy efficiency.** As a share of total investment expenditure, Europe has spent on average 3.5% on energy efficiency from 2014 to 2020, much higher than the 1% in the United States and 1.5% in China (Figure 35). EU support schemes and funding programmes, specifically aiming to help businesses, regions and countries to implement energy efficiency projects, played a crucial role in determining the pace of investment (International Energy Agency (IEA), 2021).[2] The European Union is by far the largest investor in this area, accounting for almost a third of global investment, followed by China (25%) and the United States (15%).

2 Construction and renovation programmes by the German development bank KfW amounted to EUR 30 billion in Germany. They were the main driver of energy efficiency investment in Europe (IEA, 2021).

**Figure 35**

**Energy efficiency investment by sector** (left axis: EUR billion; right axis: % of GFCF)




*Source:* *IEA, Eurostat, OECD.*

**Buildings attract the lion's share of energy efficiency investments across the three regions.**[3] In 2020, the share of investment in energy efficiency in buildings was much higher in the European Union (90%) and the United States (85%) compared with China (50%), highlighting the importance of buildings in the European Union's decarbonisation strategy. In absolute terms, the European Union spent EUR 67 billion on energy efficiency in buildings, more than the United States (EUR 30 billion) and China (EUR 29 billion) combined. Moreover, Europe delivered an outstanding increase in investment (27%) in 2020 from the previous year compared to the United States and China, despite the uncertainty caused by the pandemic.[4]

**Energy efficiency investments in China focus more on transport. Transport, primarily electric vehicles, makes up almost a third of energy efficiency investment in China — a much higher share than in the European Union (7%) or the United States (11%).** China's "double control system" sets efficiency targets relative to a predefined cap (15% improvement in energy intensity and total energy consumption capped at 5 gigatonnes of $CO_2$ equivalent). To achieve these targets, China has monitored the energy consumption of enterprises, pioneered natural-gas-fuelled vehicles, implemented fuel consumption standards (Sino-Italian Cooperation Program for Environmental Protection, 2016) and established the world's largest electric vehicle market (BloombergNEF, 2021). Despite all this progress, China has a long way to go, as its economy's reliance on energy (energy intensity) remains well above the global average.

3 Investment in buildings includes the building envelope (walls, windows, etc.), heating and cooling systems, control systems, appliances and lighting.

4 Collectively, buildings in the European Union are responsible for 40% of our energy consumption and 36% of greenhouse gas emissions. This means that improving energy efficiency in buildings will help the European Union to achieve its ambitious goal of carbon-neutrality by 2050 and, in parallel, be less vulnerable to external energy price shocks.

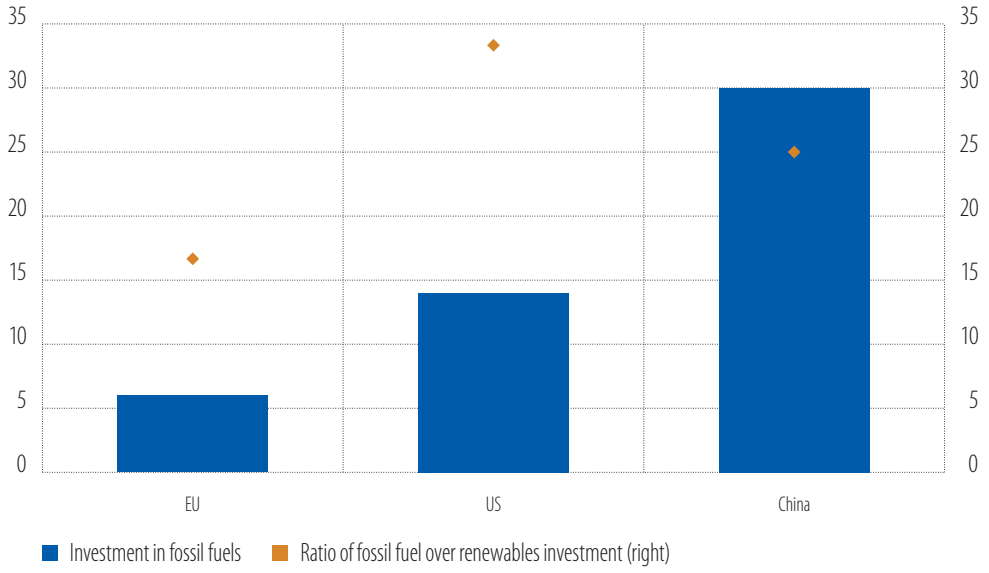
**In Europe and in the United States, investment in energy efficiency in transport and industry fell significantly in 2020 due to the pandemic.**[5] In the European Union, these investments fell by a third. In the United States, industry investment was halved and transport reduced by 20%, pushed down by curtailed operations due to the pandemic and reduced output in energy-intensive industries following the economic downturn. Public support in China helped to sustain high levels of energy efficiency investment for industry, which increased 32% in 2020.

## Renewables

In 2020, renewables and power grids continued to attract over 80% of power generation investments. The three blocs are decarbonising their power sectors, albeit at a different pace. From 2015 to 2020, the European Union invested on average six times more in renewable energy than fossil fuels. China was not far behind, as investment in renewable energy was four times higher than in fossil fuel-fired generation, and investment was three times higher in the United States. In absolute terms, China invested the most in fossil fuels (EUR 30 billion), mainly in coal-fired power plants, followed by the United States (EUR 14 billion) and the European Union (EUR 6 billion). The European Union invested in natural gas-fired plants to counter the problems of volatile energy supply inherent in the increasing deployment of renewables and the ongoing withdrawal from coal (IEA, 2021).

**Figure 36**

**Comparing investment in fossil fuels and renewables** (left axis: EUR billion; right axis: % of renewables), **2015-2020**



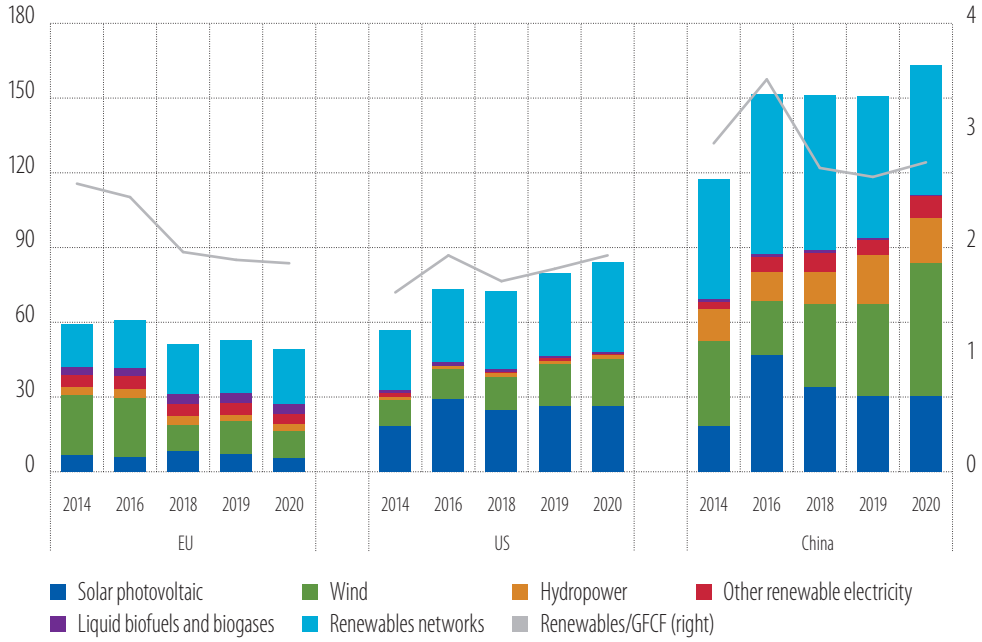

*Source:* *IEA.*

**Investment in renewable electricity generation focuses on wind, solar photovoltaics and power grids, aiming to mitigate the volatile supply inherent in renewable energy.** In 2020, the these three investment categories accounted for 70% of total investment in renewables in the European Union and up to 95% in the United States (Figure 37). Investment in power grids in all three regions is increasing each year to facilitate the growing importance of renewable sources, whose output can be volatile. The

5 Industry efficiency investment is heavily affected by the enabling efficiency policies such as energy performance standards and incentive mechanisms for energy and emissions reductions (IEA, 2021).

European Union and China invested more in wind generation than in solar photovoltaics, whereas the United States invested more in solar photovoltaics.

**Figure 37**
**Investment in renewables** (left axis: EUR billion; right axis: % of GFCF)**, by sector**




*Source:* *IEA, Eurostat.*

**Investment in wind power generation boomed in the United States and China, but not in the European Union.** In 2020 in particular, investment in wind power generation rose a sharp 44% in China and 9% in the United States, whereas in the European Union it contracted by 21%. A similar trend was observed in investment in solar photovoltaics, with a 21% drop in the European Union and a modest increase of 1% in the United States and China. However, investment commitments already made for solar generation show that investment in renewable energy will bounce back to high rates in the European Union next year (BloombergNEF, 2021).

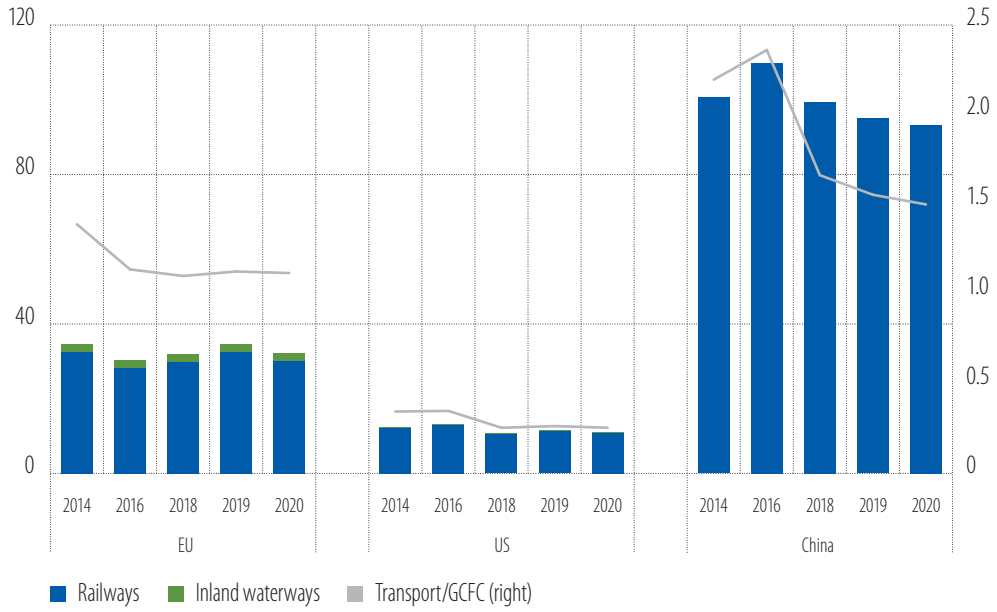
**The European Union invested twice as much in biofuels and biogas as the United States and China combined.** The European Union is the global leader in this field. In 2020, investment amounted to EUR 4 billion, compared to EUR 8 billion globally and around EUR 1 billion in the United States and China. The European Union also invested heavily in hydropower, which accounts for 16% of renewable power generation, excluding grid-related investment. Hydropower also plays a significant role in China's power generation investments. China, however, invested five times more than the European Union.

## Transport

**China is particularly focused on decarbonising its transport sector in the race to achieve net-zero emissions.** In 2020, China invested EUR 94 billion (Figure 35) in clean transport infrastructure, which accounts for 1.5% of total investment in the economy. It has a leading position in high-speed rail technology, where it has far more capacity than anywhere else in the world. EU investment in rail and inland waterways is estimated to be EUR 32 billion (1.1% of GFCF) for 2020, while the US investment stood at EUR 11 billion. The US rail-freight system is almost entirely privately owned, unlike road, air and waterways where public

ownership is significant. Investment in railway infrastructure and rolling stock in the United States is financed by private freight companies, and investments ultimately depend on earnings from freight charges, which are regulated by the government.[6]

**Figure 38**
**Transport investment** (left axis: EUR billion; right axis: % of GFCF)**, by sector**




*Source: Eurostat, OECD.*

**Investments in clean transport infrastructure account for 17% of the European Union's total investments in climate mitigation.** However, this figure is probably underestimated because it does not include all climate change mitigation projects in transport. More transport integration and city planning, better transport management and intermodal terminals would also help mitigate climate change. Nevertheless, investment in this sector is stagnating and efforts must be stepped up to facilitate the switch to less carbon-intensive modes of transport.

## Forestry

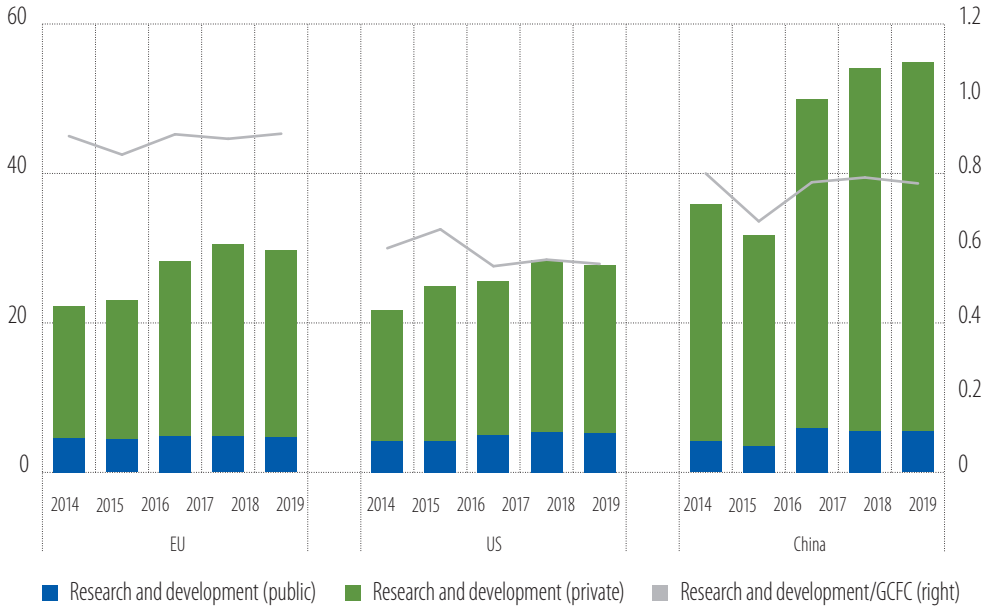
**Investments in forestry have increased steadily since 2014 in the European Union (except in 2020) in response to the urgent need to mitigate greenhouse gas emissions.** Forestry investment hit a high of EUR 4.5 billion in 2019, and stood at EUR 4 billion in 2020 (Figure 35), representing about 0.15% of EU gross fixed capital formation. Almost 70% of EU land use, land-use change, and forestry spending is concentrated in three countries: Sweden, Germany and Finland. Sweden accounts for 25% of spending, while Germany makes up 15% and Finland 13%, with the remaining EU countries representing 1-5%. In the United States, forestry investment is stable at 0.2% of its gross fixed capital formation.

6 https://railroads.dot.gov/rail-network-development/freight-rail-overview

## Research and development

**Investment in climate-related R&D only suffered a moderate decline, despite concerns at the start of the pandemic.** China is consolidating its position as world leader, investing EUR 55 billion in climate-related R&D in 2020, a figure that is almost unchanged compared to 2019. R&D investment in the European Union (EUR 30 billion) is broadly comparable with the United States (EUR 28 billion), but quite different from China. The European Union overtook the United States in 2017 and, despite a decrease of 4.3% in R&D investment for climate mitigation in 2020, is maintaining a small lead.

**Figure 39**
**Public and private climate-related R&D spending** (left axis: EUR billion; right axis: % of GFCF)




*Source:* *JRC, IEA and author's estimates.*
*Note:* ** stands for projections; the spending concerns activities in line with the EU Energy Union priorities.*

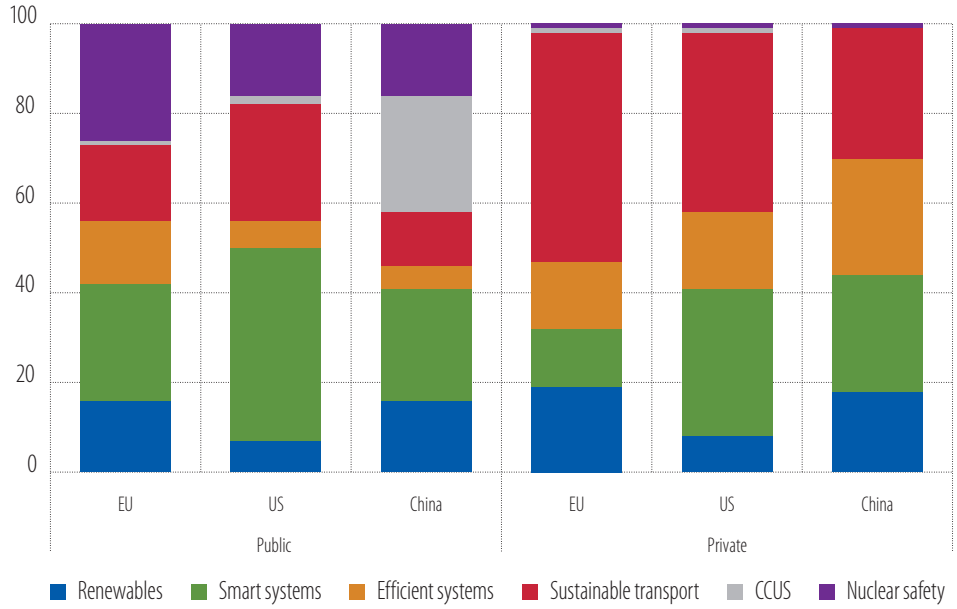
**Private R&D spending for climate mitigation accounts for the bulk of total R&D expenditure.** In 2020, private R&D spending for climate mitigations accounts for around 80% of total R&D expenditure and in China close to 90%. Despite the mild contraction, which is attributed to pandemic-induced budget cuts, the private sector's investment remained resilient from 2015 to 2020.

**Since 2015, European private investment in sustainable transport has been growing extensively, at about 10% on average.** A similar trend exists in China, while in the United States private investment in sustainable transport has increased a mild 3.4%. Government incentives supporting green transport have buoyed private R&D spending. The enthusiasm for sustainable transport contrasts with other climate investments. In 2020, private R&D investment in renewables declined 4.3% in the European Union and 4% in the United States, whereas it moderately increased in China. R&D investment in energy efficiency follows the same pattern as renewable energy.

**China led government investment in R&D for climate change mitigation in 2020, spending EUR 5.5 billion.** The European Union spent EUR 4.7 billion, placing it third after the United States at EUR 5.2 billion. Smart energy systems and carbon capture, utilisation and storage (CCUS) accounted for more than half of total public R&D investment in China. China's public spending on R&D in carbon capture, utilisation and storage was particularly outstanding compared to the European Union and the United States. Smart energy

systems also represented the main share of total government R&D spending in the European Union and the United States. From 2015 to 2020, public spending on innovation for efficient energy systems grew steadily, with EU expenditure increasing an average of 0.5% annually. However, investment in R&D for nuclear safety remained flat or decreased slightly throughout the five-year period.

**Figure 40**
**Distribution of R&D spending** (in %)**, by sector and energy priority**




*Source:* *JRC, IEA.*

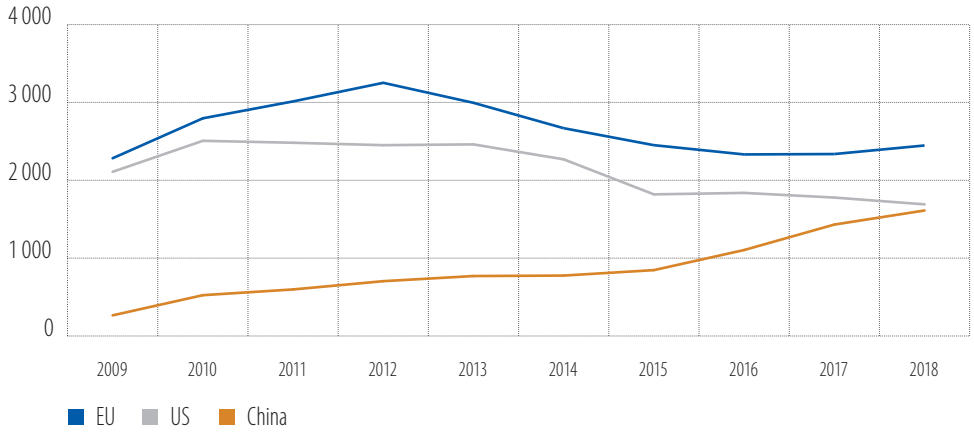
**Looking at innovation globally, Europe performs fairly well — particularly for climate-change innovation.** Overall, Patent Cooperation Treaty (PCT) applications (filed by applicants seeking international patent protection for their inventions) show that Europe is ahead of China and the United States in climate change innovation (see Chapter 5 for a brief analysis).

**China is nevertheless making more headway on internationally oriented innovation.** China is showing an impressive increase in international patent filings in climate change mitigation technologies for energy generation, transmission and distribution (Figure 41). China is therefore not only intensifying its R&D spending over time, but also its international presence by increasing the amount of innovation it produces. While energy patents are seeing a lot of activity, new patents are being issues more slowly for other sectors, such as transportation or carbon capture, utilisation and storage.

**Europe receives the most citations of its climate patents, a measure of its knowledge impact, while China has less of an impact than the United States and the European Union.** Figure 42a shows that the European Union creates most patents related to climate change that are actually being used in further development. For the number of forward citations received per cited patent, the European Union and the United States are in close competition, with the United States dominating slightly. In addition, while China was consistently lagging the European Union and the United States on climate patents until 2016, it appears to have changed course in 2017, although no clear trend has emerged.

**Figure 41**

**Evolution of patent applications in climate change mitigation technologies for energy generation, transmission or distribution** (patent count)**, 2009-2018**

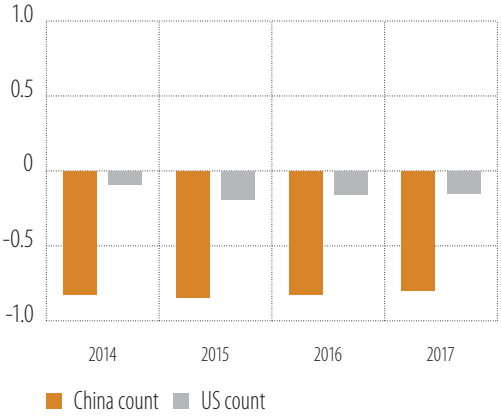



*Source:* *PATSTAT (PCT) data prepared in collaboration with the Centre for Research and Development Monitoring (ECOOM).*

**Figure 42**

**Forward citation counts**

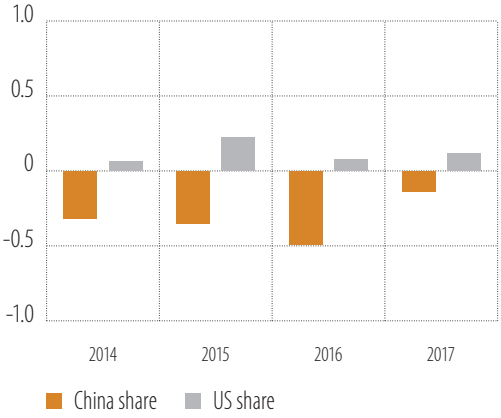
a. Forward citations for climate change patents originating in the European Union (0 = EU baseline)




*Source:* *PATSTAT (PCT) data prepared in collaboration with ECOOM.*

*Note:* *The bars measure the count of patents with forward citations (providing an indicator of the "breadth" of the impact or the number of times knowledge is used) relative to the EU count. Only data until 2017 are shown because forward citations of patents take time to materialise.*

b. Average number of forward citations per climate change patent originating in the European Union (0 = EU baseline)




*Source:* *Authors' calculations based on PATSTAT (PCT) data in collaboration with ECOOM.*

*Note:* *The bars measure the average number of times a patent with forward citations gets cited in a three-year window relative to the EU baseline. This share is computed as the ratio of a patent's forward citations to the overall number of patents with forward citations (providing an indicator of the 'depth' of the impact an individual patent has). Only data until 2017 are shown because forward citations of patents take time to materialise.*

## Conclusion and policy implications

**Gross fixed capital formation in the European Union declined substantially in the first half of 2020.** Despite a record initial decline and the large fall in GDP, investment ultimately fell less than expected and rebounded swiftly. Lockdowns and other restrictions on movement, high uncertainty and decreasing cash flows all weighed on firms' investment plans. But timely government support and vaccination campaigns enabled many firms to simply postpone investment from the first half of 2020 to later in the year or to 2021. At the same time, governments maintained, and in some countries, increased their investment, providing an additional boost to the economy.

**Corporate investment suffered the most during the pandemic.** It declined the most and took more time to pick up again. Evidence in this report suggests that the decline would have been much greater without the massive support provided by governments. As the recovery advances, governments will have to begin phasing out and recalibrating support policies. While a significant number of businesses now enjoy booming demand, a minority of firms continue to experience difficulties, and those difficulties will be exacerbated when governments adjust their support.

**The European Union's investment needs have grown since the start of the pandemic.** The European Union has experienced a decade of low productivity growth and rising investment needs, particularly to meet the green and digital transition. At the same time, the gap between EU and US investment in machinery and equipment continues to widen, reaching about 3.5% of EU GDP. Furthermore, the green transition will require massive investment, as much as EUR 350 billion per year.

**Both the private and the public sector require significant investment.** The private sector is constrained by uncertainty, the availability of skills and regulation. For government investment, maximising delivery and impact remains crucial. Governments should use the valuable opportunity offered by the low cost of debt and suspended fiscal rules to continue investing in the transformation of their economies, but also to devise a credible plan for putting their finances on a sustainable path.

**Box C**

### Volatility of gross fixed capital formation in Ireland

The Irish economy is an extremely open economy, with the value of imports and exports in 2020 amounting to 225% of Irish GDP. Foreign multinationals have long operated in Ireland, especially in the pharmaceutical and technology sectors. According to the Irish Development Agency, all ten of the world's top pharmaceutical companies have a significant presence in Ireland and the country is the third-largest exporter of pharmaceuticals globally. In technology, nine of the top ten global technology companies operate in Ireland, including Google, Microsoft, Intel, Apple and Facebook. The complex nature of these firms can make it difficult to say how much of the benefit of the economic activity taking place in Ireland is accruing to Irish residents vs. foreign residents.

Economic activity such as investment and GDP are measured according to the statistical principles set out in the European System of Accounts 2010 (ESA2010), which replaced a framework dating back to 1995 (ESA1995). ESA2010 updated rules for measuring the economy to take into account the increasingly global nature of production and the key role played by intangible assets, such as intellectual property and research and development (R&D) in modern economies. In addition, trade was measured according to a "change in ownership" principle[7]. These new statistical methods had a profound impact on the Irish national accounts.

7 The explanations of the statistical problems in Ireland in this box borrows heavily from the "Report of the Economic Statistics Review Group" (2016) from the Irish Central Statistics Office and from Fitzgerald, John, (2016), "Problems with the Irish National Accounts and Possible Solutions", *mimeo*, Trinity College Dublin.

Under the move to ESA2010, expenditure on intellectual property or R&D previously recorded as intermediate consumption became part of investment spending, pushing up investment and GDP. The scale of this spending is large and volatile in Ireland and mainly relates to assets owned and held by foreign multinational enterprises. These enterprises have increasingly relocated intellectual property to Ireland over the last decade. Total investment in Ireland was EUR 70 billion in real terms in 2015 (25% of GDP) but hit EUR 19 billion in 2019 (54% of GDP) before dropping to EUR 147 billion (39% of GDP) in 2020. In both 2019 and 2020, intangible investment accounted for more than 70% of total investment.

This volatility is compounded by a "contract manufacturing" issue. If a foreign multinational wishes to open a production facility in another country, the typical approach is to set up a legally separate subsidiary. In this case, all the operations of the subsidiary are included in the national accounts of the country in which the subsidiary resides. However, in certain industries, these enterprises prefer to have their products manufactured on contract by other companies. This is more common in the IT industry where significant intellectual property is involved in production but the parent company may be unwilling to transfer that intellectual property to a subsidiary in a country with weaker property rights. However, from a statistical viewpoint, the new rules mean the output of the foreign contract production company must be booked in the national accounts of the country where the multinational enterprise is residing. The output of a manufacturing plant in Asia contracted to produce goods or services for a US multinational operating in Ireland will therefore show up in the Irish national accounts.

The other well-known issue in the Irish data is the impact of the aircraft leasing sector. It is estimated that Ireland commands a 60% share of the global leasing market, with more than 50 aircraft leasing companies including 14 of the world's top 15 leasing firms. HSBC Ireland reports the industry has more than USD 140 billion of assets under management. Aircraft that are purchased by an Irish resident, such as a multinational, are deemed to be Irish assets and this boosts investment in Ireland, even if the aircraft may be leased to overseas airlines and never enter Irish territory. Quantitatively, however, the non-tangible investment issue is more important than issues surrounding transport equipment. The share of this type of transport equipment in total real investment peaked at 18% of investment spending in 2018 but was less than 10% in 2019 and 2020, when Irish investment surged.

**Figure C.1**

**Real investment in the European Union and the EU without Ireland** (EUR billion), **quarterly data**

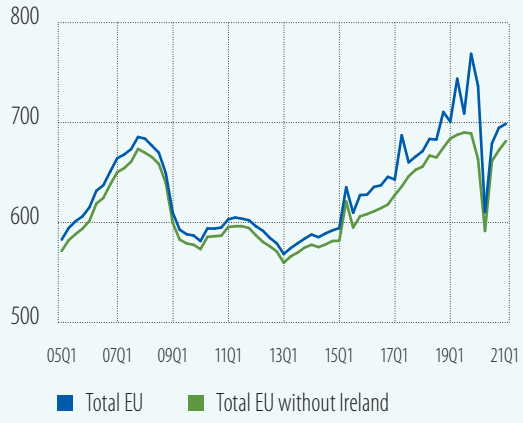
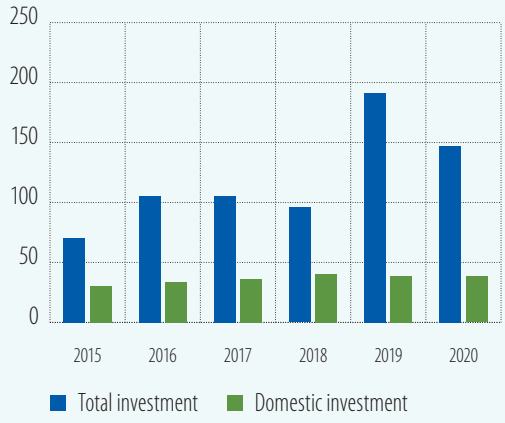



**Figure C.2**

**Irish real investment** (EUR billon), **total vs. domestic**




*Source:* *Eurostat, Central Statistics Office of Ireland.*

Investment in Ireland has grown to the point that it is significantly influencing overall European investment. Figure C. 1 shows real investment in the European Union including and excluding Ireland. The key role intellectual property and R&D from overseas companies plays in Irish investment has prompted the Irish statistical office to publish a modified estimate of investment, which seeks to take out, as far as is feasible, non-domestic intellectual property, R&D and aircraft leasing. As shown in Figure C. 2, domestic investment in Ireland has been relatively flat over the last six years, but total investment fluctuates strongly owing to the activity of multinational enterprises, driven by intellectual property and R&D.

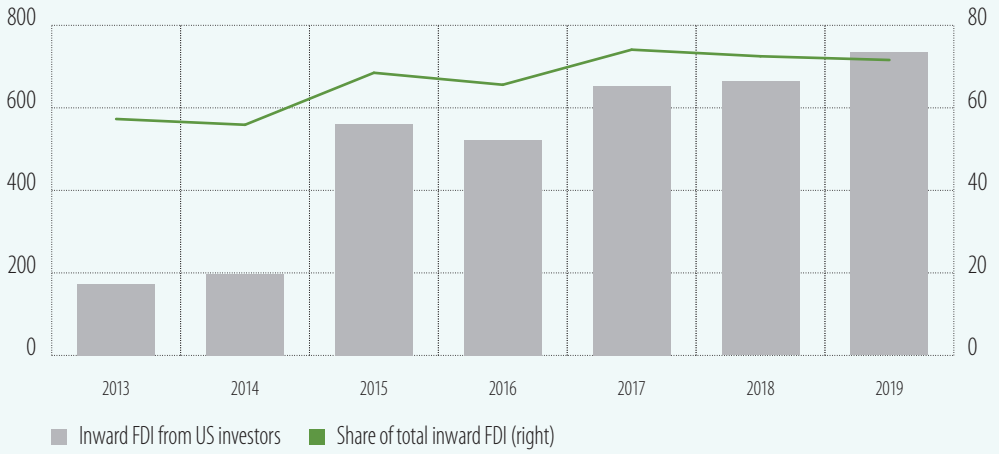
The surge in this activity in Ireland means that EU investment growth in year-on-year terms is inflated in 2019. Comparing the second quarter of 2019 the first quarter of 2020, average real investment growth is 5 percentage points higher when Ireland is included compared to when Ireland is excluded. Investment in Ireland in 2020 remained very large by historical standards but it did not replicate the extreme numbers seen in 2019. Irish investment also fell sharply during the pandemic, and this decline pulled down average EU investment growth from the second quarter of 2020 to the first quarter of 2021 by 4.8 percentage points, meaning the Irish data are causing significant fluctuations in EU investment data.

Would it be better to exclude Ireland from the EU investment data? The data for the EU26, excluding Ireland, would be less volatile: the key question is whether the activity in Ireland is part of EU investment activity. Foreign direct investment in Ireland is dominated by the United States, which finances over 70% of it (Figure C. 3). However, even if the United States is the ultimate owner of many of the intellectual property assets, the inclusion of these assets in European investment would still be warranted if they were predominantly deployed to support European production. The more common practice among IT companies, however, seems to be that the intellectual property assets are used to support global, non-US production, of which Europe is just a part.

Accordingly, the Irish investment data overstate the amount of investment activity that is truly linked to European production. This means that the EU27 data (including Ireland) will overstate European investment but the EU26 data (excluding Ireland) will understate it. Using the EU26 data may be the more conservative approach, given that it is hard to determine how much of the volatility in EU27 investment data is actually tied to European production.

**Figure C.3**

**Foreign-direct investment in Ireland** (left axis: EUR billion) **and investment coming from US firms** (right axis: % of total foreign direct investment)




*Source:* *Central Statistics Office of Ireland.*

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