

When markets fail – the need for collective action in tackling climate change

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[Home](#) › [Media](#) › [Speeches](#) › 28 September 2020

Speech by Isabel Schnabel, Member of the Executive Board of the ECB, at the European Sustainable Finance Summit, Frankfurt am Main, 28 September 2020

Frankfurt am Main, 28 September 2020

There has been a growing debate about the role that monetary policy should play in addressing the risks of climate change. The coronavirus (COVID-19) pandemic has intensified this debate in several ways.^[1]

It has laid bare how large global shocks can affect price stability and hence the conduct of monetary policy. The pandemic has also testified to the vulnerability of financial markets to tail events – a risk that many observers see in the prevailing pricing, or mispricing, of climate risks.

In my remarks this afternoon, I will argue that, despite growing efforts, policies to mitigate the adverse and partly irreversible effects of climate change are not moving fast enough to limit the physical and financial risks that global warming poses to our society.

I will argue that collective action, by governments, firms, investors, households and central banks, including the European Central Bank (ECB), is required to accelerate the transition towards a carbon-neutral economy and correct prevailing market failures.

Physical and transition risks threaten economic growth

Climate change poses an exceptional risk to our society. There has been an alarming rise in global temperatures, which have been far higher in the past decade than their 100-year average (see slide 2). Studies show that the world as a whole, including Europe, is expected to face higher temperatures, with significant and rising risks of droughts, floods and fires.^[2]

Just how severely our lives and economies will be affected by climate change in the future depends on our determination today to take decisive global policy action.

Some argue that these efforts already come far too late. Emissions are highly persistent and remain in the atmosphere for a considerable period of time. In other words, irrevocable temperature increases have already been locked in and there is a significant lag in discerning the benefits of mitigation measures (see slide 3).^[3]

The physical damages of climate change are already clearly visible. The economic costs of climate change are growing steadily: the share of weather-related catastrophe losses accounted for over 80% of insured catastrophe losses in 2018 and the share of climate-related disasters has been on a sharp upward trend since the 1980s (see slide 4).

Physical risks are compounded by rising **transition risks**. As we migrate towards a carbon-neutral economy, we are likely to see wide-ranging economic dislocations across both sectors and regions.

All in all, there have been few instances in the past where society and policymakers have faced such a clear and significant threat to lives, jobs and prosperity. There is now broad agreement that, if left unaddressed, climate change will reduce global GDP by a substantial margin, with poorer nations being hardest hit.^[4]

According to the International Monetary Fund (IMF), a persistent increase in the average global temperature by 0.04°C per year, in the absence of mitigation policies, is estimated to reduce world real GDP per capita by more than 7% by 2100.^[5]

Despite these abundant and rising risks, the world economy seems largely unprepared. Last year, carbon dioxide (CO₂) emissions continued to increase globally, mostly on account of emerging market economies, although they fell in the European Union (EU). The fall in emissions this year due to the pandemic is likely to have only offered a temporary respite in the absence of more forceful policy action.

Climate risks are also still firmly embedded in our economic structures. In the euro area, even today nearly 40% of jobs are in carbon-intensive sectors, compared with 32% in the United States (see left chart on slide 5). In some euro area economies, this share is even larger.

Path dependency and a lack of business dynamism have so far prevented the euro area from building a growth model that is fit for the challenges of tomorrow (see right chart on slide 5).

Climate risks remain mispriced

There is also broad agreement that climate risks continue to be mispriced in financial markets.

Empirical evidence suggests that there are at least two forces at play: first, mispricing as a result of **informational market failures** that stem primarily from the absence of a clear, consistent and transparent globally agreed taxonomy accompanied by disclosure requirements; and, second, the failure of market participants to correctly and fully **price externalities** as well as **tail events** that fall outside the historical distribution of outcomes.

The first point is easy to see.

Europe has become a world leader in the issuance of green bonds. During the period 2013-2019, total net euro-denominated green bond issuance accounted for nearly half of global issuance (see left chart on slide 6). Data broken down by issuers also suggest that the green bond market in Europe is broadening continuously (see right chart on slide 6).

But environmental ratings for green bonds or other financial instruments – if available – are often inconsistent, incomparable and, at times, unreliable. In many cases, this reflects the absence of granular data or the large degree of discretion in the construction of such indicators. As a result, ratings often have a very low correlation, even though there appears to be a slight improvement over time (see slide 7).

In the absence of common and clear definitions, as well as disclosure requirements, such ratings carry the risk of “greenwashing”, providing little guidance to investors and setting insufficient incentives for companies to improve their ecological performance. Indeed, new research by the Bank for International Settlements (BIS) documents that green bonds have not necessarily translated into comparatively low or falling carbon emissions at firm level.^[6]

Nor have green bonds consistently led to lower yields. Many green corporate bonds still trade at a positive spread to conventional bonds, also because of lower liquidity (see slide 8).^[7]

Hence, it appears that markets still fail to internalise the costs that climate change imposes on society.

The second point is that although clearer rules and definitions are necessary, they are unlikely to be sufficient by themselves. In the absence of an, ideally global, price for CO₂ emissions, financial markets will continue to overestimate the returns of carbon-intensive assets and hence allocate capital sub-optimally.^[8]

Europe is spearheading global efforts to put a price on CO₂ emissions. The EU’s emissions trading system (ETS) is the world’s largest carbon market. But it remains incomplete, as it only covers economic sectors that together account for less than half of total carbon emissions in the EU. And current prices, although high by historical standards, remain far from the levels that would be consistent with limiting global warming to 2° Celsius or less (see left chart slide 9).^[9]

As a result, current carbon prices do not yet serve as a proper corrective device, including in financial markets. Empirical evidence, for example, shows that the difference in the cumulative excess returns of a representative green and carbon-intensive portfolio was rather small over most of the period 2006-2019 (see right chart slide 9).^[10]

Delayed actions to tackle climate change entail higher costs

The implication is that current market prices are unlikely to yield the needed transition towards a carbon-neutral economy at the pace required to stimulate investment and

innovation and safeguard a sustainable growth path with stable prices.

Issuance volumes, too, remain far from sufficient, despite recent growth (see left chart on slide 10). Last year, green bonds accounted for less than 5% of total issuance volumes. To become climate-neutral by 2050, the European Commission estimates that the EU needs up to €290 billion in additional yearly investments over the coming decades, compared with issuance of €100 billion last year.^[11]

The pandemic has exposed the simmering financial vulnerabilities that a too hesitant transition to a low-carbon economy may entail. Most major European car producers, for example, have seen their market capitalisation fall by around 10-50% since the start of the year. Tesla, by contrast, the largest electric vehicle manufacturer in the world, saw its market capitalisation increase by a factor of almost five.

Such sudden and drastic changes in relative stock prices signal that transition risks are not confined to specific sectors or countries. Indeed, within the same industry, there are often wide variations across the universe of firms (see right chart on slide 10). So, it is clear that climate change will create both winners and losers.

But the aggregate **risks of doing too little too late** are significant. Recent analysis by the Eurosystem demonstrates the significant macroeconomic costs of delaying action for too long (see slide 11).^[12]

The analysis shows that, if the global carbon price were to suddenly increase by USD 100 as part of an abrupt and belated tightening of policies that mitigate climate change, stock prices would be expected to drop sharply, while euro area GDP would decline by almost 2.5% below its baseline level within a two-year horizon.

As a result, the Common Equity Tier 1 (CET1) ratio of euro area banks could be expected to drop by 0.8 percentage points at the peak and, in the first year of the scenario, lending in real terms would contract by approximately 5% compared with the baseline scenario, with highly persistent effects.

By contrast, the transition costs of a sudden and unexpected breakthrough in energy storage technologies would be more moderate. A doubling of the share of renewable energy over a five-year period would be expected to temporarily depress economic growth owing to the resulting redistribution across sectors and the write-off of carbon-intensive assets. But new technologies would steadily support growth, valuations and lending.

In other words, there are clear benefits to frontloading mitigation policies, with timely action implying the need for a less abrupt adjustment in the future.

Collective action for a faster transition towards a carbon-neutral economy

What, then, needs to be done to make our economies and financial system more resilient to the risks posed by climate change?

In short, I would argue that it requires collective and concerted action by all stakeholders, first and foremost by legislators and national governments.

There is broad agreement among economists that environmental externalities should be corrected primarily by increasing the price on greenhouse gas emissions. A **global carbon price** is the most powerful way to correct market failures and to set in motion a process whereby firms and households reduce their energy use and make a permanent shift to cleaner energy sources.

A higher carbon price, however, needs to be complemented by large-scale investment in green technologies to ensure, for example, that consumers have sustainable alternatives in transportation.

The **Next Generation EU recovery fund** should be the cornerstone of these efforts in the European Union: the commitment by leaders to earmark one-third of the funds for climate projects is expected to fuel and scale up the search for new green breakthrough technologies.

A functioning capital market is needed to fund green investments.^[13]

Euro area firms still lack access to capital markets as deep and liquid as those of their international peers. The US stock market remains by far the largest in the world. Today, it accounts for nearly 60% of global stock market capitalisation, compared with less than 6% for Germany and France combined.^[14]

The funding mix matters. Empirical evidence suggests that stock markets are more effective than banks in financing the greening of our economy, given the high capital intensity, high risks and long-term horizon of most projects.^[15]

Other research suggests that deeper equity markets are more effective in bringing economies closer to the technological frontier.^[16]

Europe therefore urgently needs to make faster progress towards creating a true **capital markets union**, with a strong focus on equity markets and green financial instruments.

An ambitious climate strategy needs to guide and steer implementation. The proposal by the President of the European Commission, Ursula von der Leyen, to cut the EU's greenhouse gas emissions by at least 55%, rather than 40%, by 2030 is an important step in this direction.

Such targets matter. Indeed, we should resist calls to delay or amend the implementation of carbon policies in an apparent attempt to strengthen the recovery from the current crisis.

Although controversial, there is ample evidence in favour of the so-called **Porter hypothesis** – the view that the stringency of domestic environmental regulation can be an important driver of environmental innovation.^[17]

This might be particularly important in the euro area, which is currently lagging behind in the quest for new technologies in a number of areas, such as the transport, battery or solar energy sectors.

New ECB analysis confirms that, for the case of the EU, stricter environmental regulation does not appear to slow down economic recoveries (see left chart slide 12). By penalising the use of carbon in production, it facilitates the reallocation of resources into green sectors and turns them into engines of growth (see right chart slide 12). Countries with weak environmental standards leave this growth potential untapped.

The Eurosystem, for its part, cannot be a bystander in the transition towards a carbon-neutral economy. I see three dimensions of support.

First, as **prudential supervisor**, we have an obligation to protect the safety and soundness of the banking sector.^[18]

This includes making sure that banks properly assess the risks from carbon-intensive exposures, which could raise the relative attractiveness of lending to climate-friendly projects.

We are building a robust analytical framework to improve the modelling of climate risks, which should also inform and support investors in pricing assets more accurately.

These efforts include an ECB stress testing framework suitable for addressing the unique challenges posed by climate risks. We will also leverage joint work with the **Network for Greening the Financial System**, working together with counterparts around the world, on devising new models that quantify the economic and financial impacts of a number of transition scenarios at the sectoral level, spanning decades into the future.^[19]

Second, as **large-scale investor**, we have an obligation to appropriately reflect climate risks on our balance sheet. As part of this process, we are constantly examining whether our non-monetary policy portfolios are invested responsibly.

And, third, as independent guardian of the single currency, we are investigating if and how our **monetary policy operations and portfolios** could be adjusted to reflect the fact that climate change, if not addressed swiftly, may affect the economy in ways that pose potentially material risks to price stability in the medium to long term.

For example, we could consider linking the eligibility of securities as **collateral** in our refinancing operations to the disclosure regime of the issuing firms. Then the Eurosystem would only accept collateral if it is able to fully assess climate-related risks. In addition, we could consider adjusting the haircuts to the risks we identify. Clearly, there are strong and mutually reinforcing synergies between the actions on the prudential and central banking sides.

We could also consider reassessing the **benchmark allocation** of our private asset purchase programmes. In the presence of market failures, market neutrality may not be the appropriate benchmark for a central bank when the market by itself is not achieving efficient outcomes.^[20]

An important first step in contributing to correcting prevailing market failures is to improve disclosure requirements and reduce informational inefficiencies. The ECB is actively engaged in this endeavour.

But should such measures not prove sufficient, or should they progress too slowly, we could consider other options, such as, for example, excluding certain bonds – based on clear and transparent rules – that are used to finance projects that conflict with the decarbonisation objectives of the EU.

In doing so, we could avoid a scenario in which our monetary policy contributes to locking in investments in sectors and technologies that are more acutely exposed to the disruptive effects of the transition to a carbon-neutral economy.

A meaningful policy in that direction would rely, however, on a greater supply of sustainable bonds.^[21]

Small incentives, such as making particular sustainability-linked bonds eligible for central bank operations, as we have done recently, may provide additional incentives for such markets to grow.

The Governing Council will discuss these and other options during our **monetary policy strategy review**, which we have just relaunched after a pause following the onset of the pandemic. These reflections will also include an assessment of the risks that a lack of action on the part of the ECB could imply for our price stability mandate.

Conclusion

Let me conclude.

Prevailing and deep-seated market failures continue to prevent the transition towards a carbon-neutral economy at the pace that is required to ward off the exceptional, and partly irreversible, risks that climate change poses to society. In many cases, climate change is still seen as a reputational risk rather than a financial or existential risk.

Central banks cannot ignore these risks. Nor should their actions reinforce market failures that threaten to slow down the decarbonisation objectives of the global community.

The extent to which central banks should and can support the chorus of actions and commitments to limit the damages of global warming will also depend on whether, and how, climate risks – including physical and transition risks – may affect medium-term

inflation dynamics as well as central banks' ability to protect price stability against large and persistent climate shocks in the vicinity of the lower bound.

In this context, further work is needed to assess whether climate risks will ultimately require a stability-orientated central bank to react pre-emptively and help accelerate, within its mandate, the transition toward a carbon-neutral economy.

Thank you.

[1]See also Schnabel, I. (2020), "Never waste a crisis: COVID-19, climate change and monetary policy", speech at a virtual roundtable on "Sustainable Crisis Responses in Europe", organised by the INSPIRE research network, 17 July.

[2]See, for example, Guerreiro et al. (2018), "Future heat-waves, droughts and floods in 571 European cities", Carbon Brief, 21 February.

[3]See Samset et al. (2020), "Delayed emergence of a global temperature response after emission mitigation", *Nature Communications*, Vol. 11, No 3261.

[4]See, for example, Organisation for Economic Co-operation and Development (2015), *OECD Economic Outlook*, Issue 2, Chapter 2, "Cool Policy: Climate Change Mitigation Supporting Growth".

[5]See Kahn et al. (2019), "Long-Term Macroeconomic Effects of Climate Change: A Cross-Country Analysis", *IMF Working Paper*, No 19/215.

[6]See Ehlers et al. (2020), "Green bonds and carbon emissions: exploring the case for a rating system at the firm level", *BIS Quarterly Review*, September.

[7]See Schnabel (2020, *ibid.*); and Kapraun, J. and Scheins, C. (2019), "(In)-Credibly Green: Which Bonds Trade at a Green Bond Premium?", Proceedings of Paris December 2019 Finance Meeting EUROFIDAI – ESSEC.

[8]See, for example, Hong et al. (2019), "Climate risks and market efficiency," *Journal of Econometrics*, Vol. 208(1), pp. 265-281.

[9]The IMF, for example, estimates that a price of USD 75 would be required to limit global warming to 2°C or less; see Gaspar et al. (2019), "Fiscal Policies to Curb Climate Change", IMF blog, 10 October.

[10]Alessi L., Ossola E. and Panzica R., The Greenium matters: greenhouse gas emissions, environmental disclosures, and stock prices, European Commission – Joint Research Centre, Working Papers in Economics and Finance, 2020.

[11]See European Commission (2018), "A Clean Planet for all – a European strategic long-term vision for a prosperous, modern, competitive and climate neutral economy", COM (2018) 773.

[12]See ECB and ESRB (2020), "Positively green: Measuring climate change risks to financial stability", June.

[13]See also Lagarde, C. (2020), "Climate change and the financial sector", speech at the launch of the COP26 Private Finance Agenda, London, 27 February.

[14]These figures refer to the investable free float.

[15]See De Haas, R. and Popov, A. (2019), "Finance and carbon emissions", *Working*

Paper Series, No 2318, ECB, Frankfurt am Main; and ECB (2020), “Financial integration and structure in the euro area”, Frankfurt am Main, March.

[16]See Hsu et al. (2014), “Financial development and innovation: Cross-country evidence”, *Journal of Financial Economics*, Vol. 112(1), pp. 116-135.

[17]See Porter, M. E. (1991), “America’s Green Strategy”, *Scientific American*, No 264(4), p. 168; Porter, M. and van der Linde, C. (1995), “Toward a New Conception of the Environment-Competitiveness Relationship”, *Journal of Economic Perspectives*, Vol. 9 (4), pp. 97-118; Rubashkina et al. (2015), “Environmental regulation and competitiveness: Empirical evidence on the Porter Hypothesis from European manufacturing sectors”, *Energy Policy*, Vol. 83, pp. 288-300; and van Leeuwen, G. and Mohnen, P. (2017), “Revisiting the Porter hypothesis: an empirical analysis of Green innovation for the Netherlands”, *Economics of Innovation and New Technology*, Vol. 26:1-2, pp. 63-77.

[18]See also Enria, A. (2020), “ECB Banking Supervision’s approach to climate risks”, keynote speech at the European Central Bank Climate and Environmental Risks Webinar, 17 June.

[19]See Allen et al., “Climate-related scenarios for financial stability assessment: An application to France”, *Banque de France Working Paper*, forthcoming.

[20]There have also been proposals for the ECB to introduce green TLTROs, providing banks with cheaper funding that lend in accordance with the European Commission’s taxonomy. See van ‘t Klooster, J. and van Tilburg, R. (2020), “Targeting a sustainable recovery with Green TLTROs”, Positive Money Europe, September.

[21]The share of green bonds in the corporate universe increased from 4% in 2018 to 5% today, or around €60 billion, out of which the Eurosystem holds about 20%. In the sovereign bond space, green bonds account for around 1% of the universe, or around €100 billion, of which the Eurosystem holds somewhat more than 20%.

28 September 2020



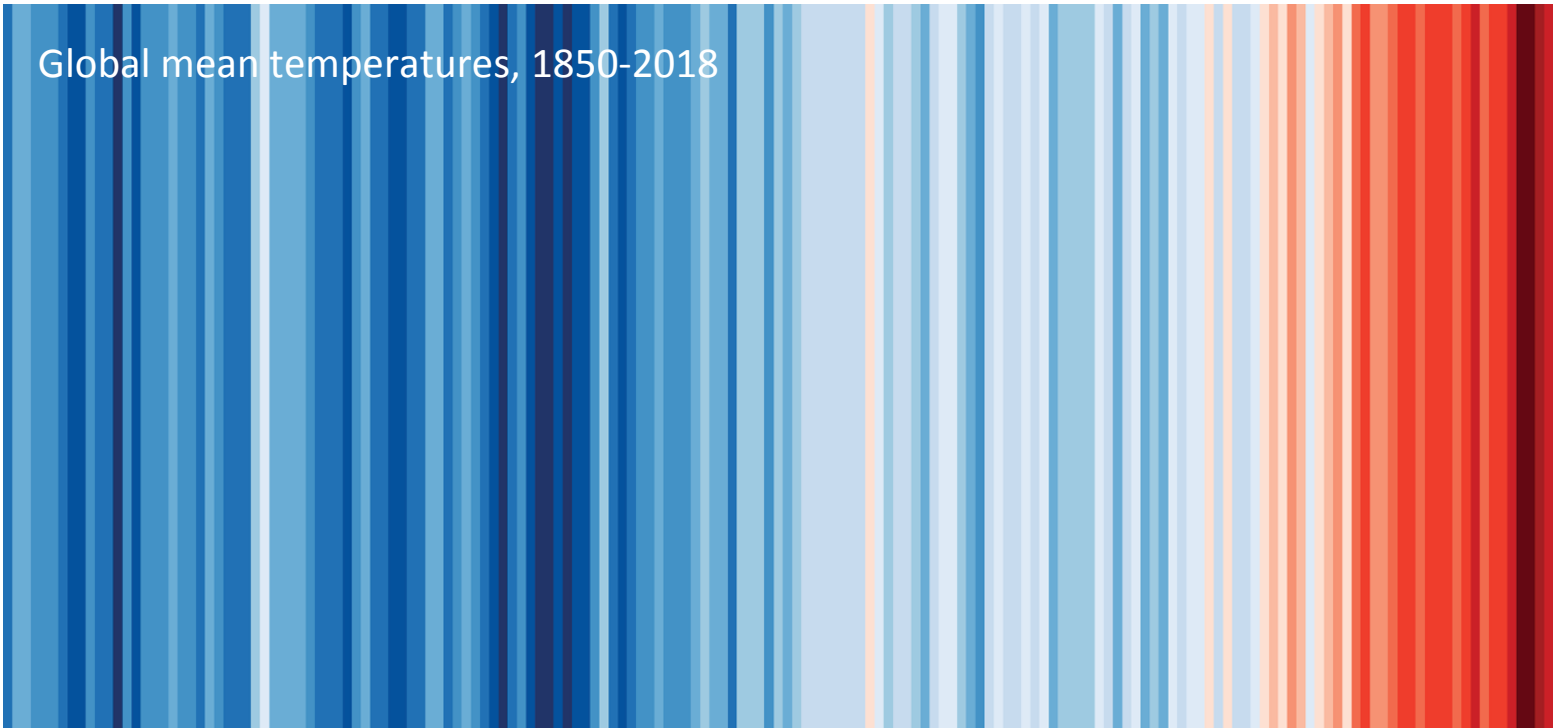
EUROPEAN CENTRAL BANK
EUROSYSTEM

When markets fail – the need for collective action in tackling climate change

European Sustainable Finance
Summit, 28 September 2020

Isabel Schnabel
Member of the ECB Executive Board

Global mean temperatures, 1850-2018

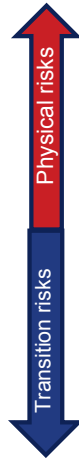
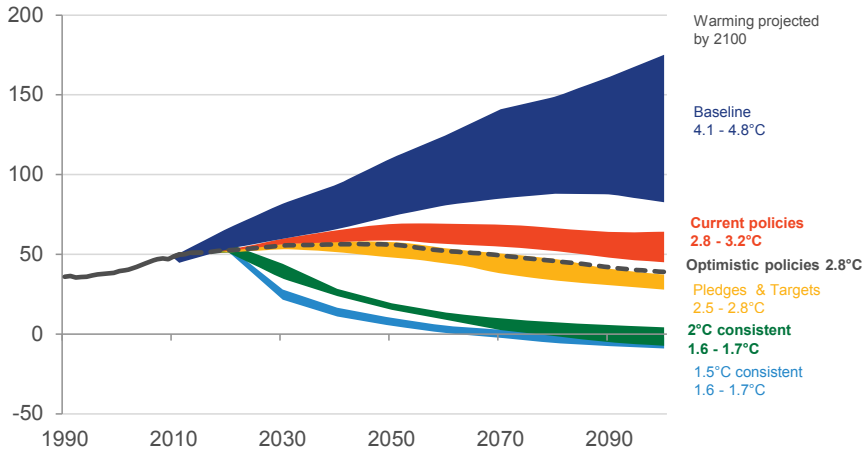


Source: Institute for environmental analytics, showyourstripes.info

Note: Annual global average temperatures from 1850-2018 using data from UK Met Office. Average temperature set as the boundary between blue and red colours, and the colour scale varies from +/- 2.6 standard deviations of the annual average temperatures between 1901-2000.

Climate change posing physical and transition risks, depending on policy action

Climate risk scenarios: projections of carbon emissions and global warming
(emissions of CO2 in gigatonnes per year)



Note:

Baseline: In the absence of policies, global warming is expected to reach 4.1°C – 4.8°C above pre-industrial levels by the end of the century. The emissions that drive this warming are often called baseline scenarios.

Current policies in place around the world are projected to reduce baseline emissions and result in about 3°C warming above pre-industrial levels.

The “**optimistic policies**” scenario factors in additional as well as planned, but not yet implemented, policies and a continuation of recent developments.

The “**2°C**” consistent benchmark pathways are drawn from the “lower-2°C” and “high-overshoot 1.5°C” pathways in the new set of IAM pathways assessed in IPCC in its latest report.

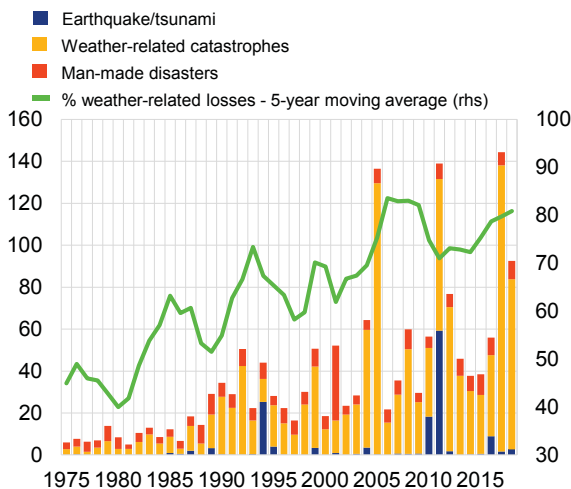
The central “**1.5°C compatible**” benchmark is defined as the median of pathways that limit global warming to 1.7°C, or below.

Source: Climate Action Tracker, Warming Projections Global Update. December 2019 projections.

Rising importance of physical risks of climate change

Global insured catastrophe losses

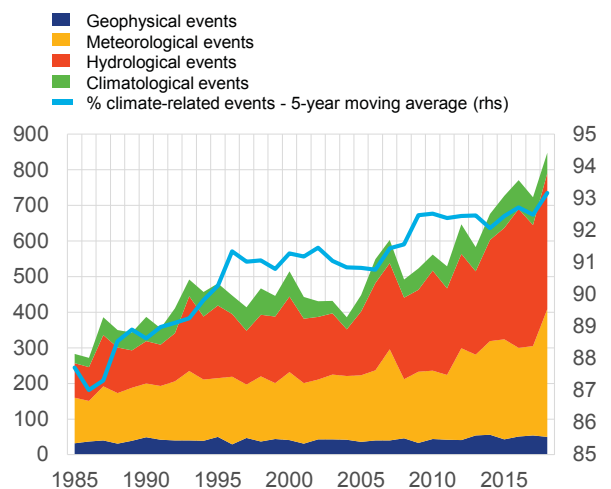
(left-hand scale: USD billions in 2018; right-hand scale: percentages)



Sources: Swiss Re institute, Munich Re NatCatService and ECB calculations.

Number of relevant natural loss events globally

(left-hand scale: number of events; right-hand scale: percentages)

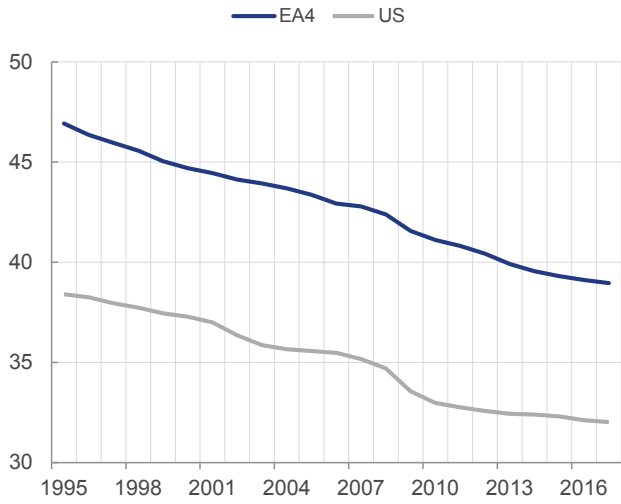


Sources: Swiss Re Institute, Munich Re NatCatService and ECB calculations.

Notes: Climatological events: drought and wildfire. Geophysical events: earthquake, tsunami, volcanic activity. Hydrological events: floods. Meteorological events: all types of storms.

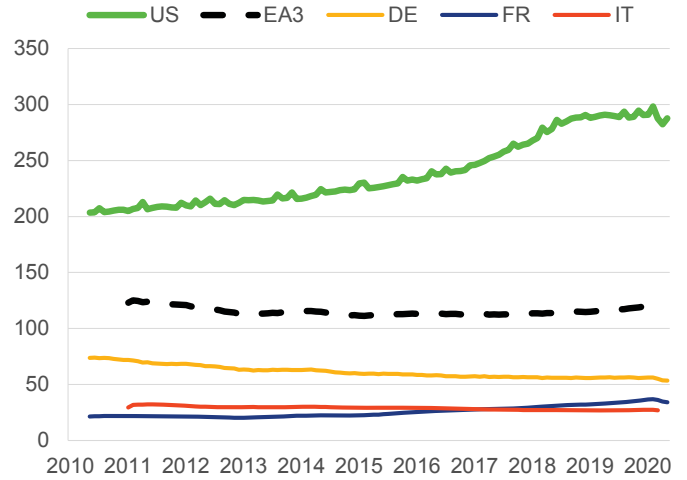
Europe lagging behind in transition to carbon-neutral economy

Employment in carbon-intensive sectors relative to all activities (% of total employees)



Source: Haver and Eurostat. Note: Carbon-intensive sectors are defined on the basis of EU28 average greenhouse gas emissions during the period 2008-2018 (kg per euro of GVA). The top 50% of sectors, in terms of emissions per GVA (31 NACE 2 sectors in total), are defined as "more carbon-intensive". Latest observation: 2017.

New business creations (thousands)

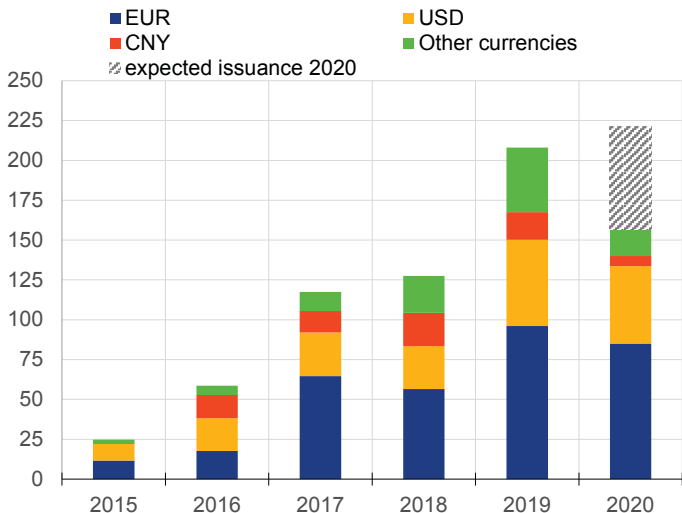


Sources: INSEE (FR), Destatis (DE), Banca d'Italia (IT), Census Bureau (US). Notes: Number of new businesses outside of agriculture (DE, FR, IT) and number of business applications outside of agriculture (US), 12-M rolling average. FR excludes sole proprietorships.

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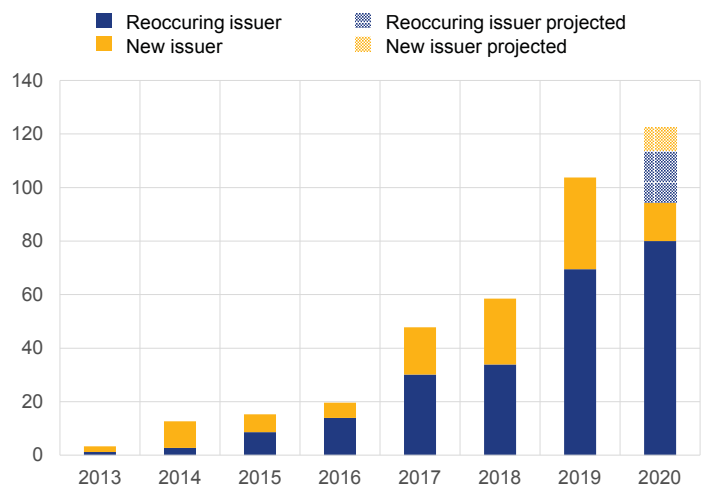
Green bond issuance growing dynamically, especially in euro

Green bond net issuance by currency of denomination (EUR billions)



Sources: Bloomberg, HSBC Research, ECB calculations. Last observation: 24 September 2020. Note: Due to different sources, EUR issuance may diverge from issuance amount on right-hand chart.

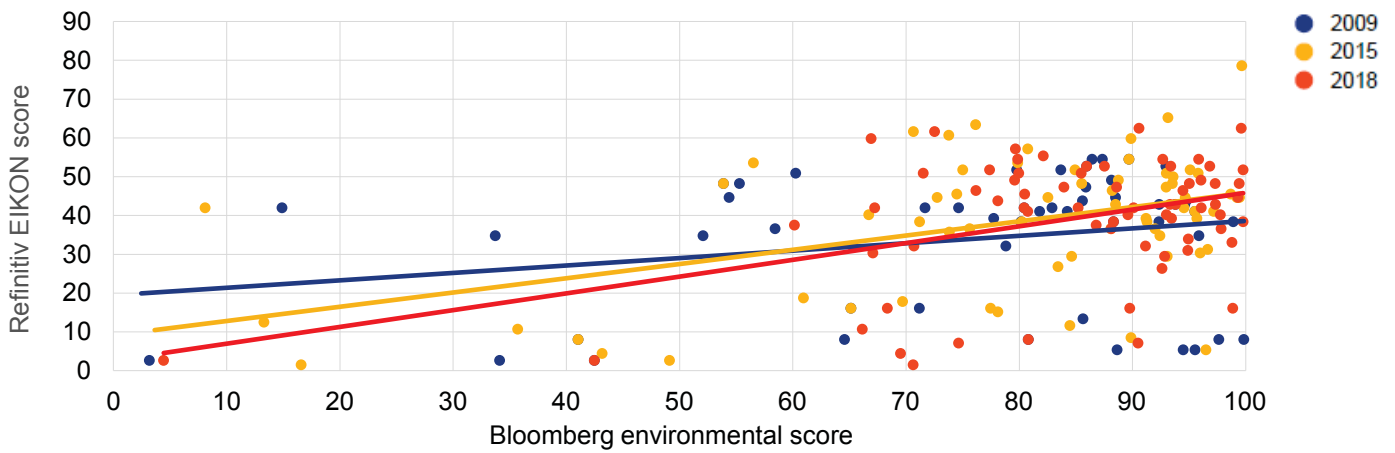
European issuance of green bonds (EUR billions)



Source: Dealogic. Note: Last observation 24 September, projection for Q4 is based on September 2020 figures.

Low but rising correlation of environmental ratings due to lack of common standards

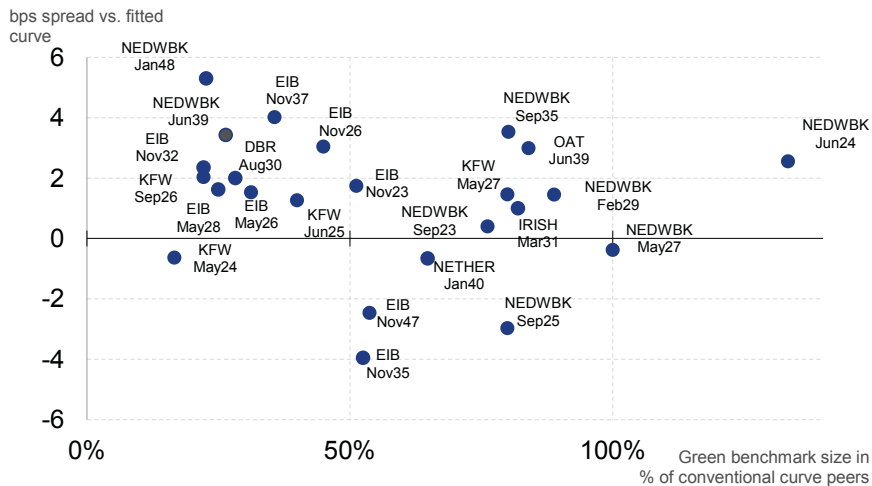
Financial market pricing of climate risk: correlations of bank environmental scores by Bloomberg and Refinitiv



Source: ECB Financial Stability Review, November 2019 based on Bloomberg, Refinitiv Eikon, S&P Global Market Intelligence and Dealogic.
 Notes: The Bloomberg and Refinitiv environmental scores give values between 0 and 100, whereby a higher value indicates a better performance in terms of environmental variables. The full unbalanced sample consists of 49 banks and 23 insurers in the EU and the United States.

Green bonds not leading to consistently lower yields

Green benchmark outstanding volume in % of size of two direct curve peers (x-axis) vs. yield premium/discount in bps (y-axis)



Source: Commerzbank Research

Carbon prices not yet serving as proper correcting device

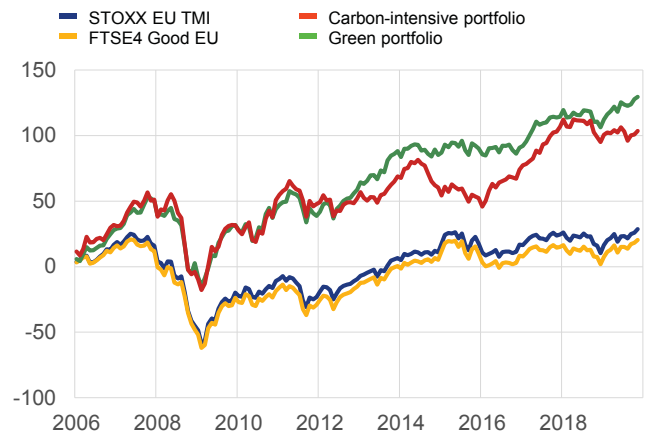
EU ETS price

(in US dollar per ton CO2 emissions)



Source: Bloomberg
Last observation: 28 September 2020.

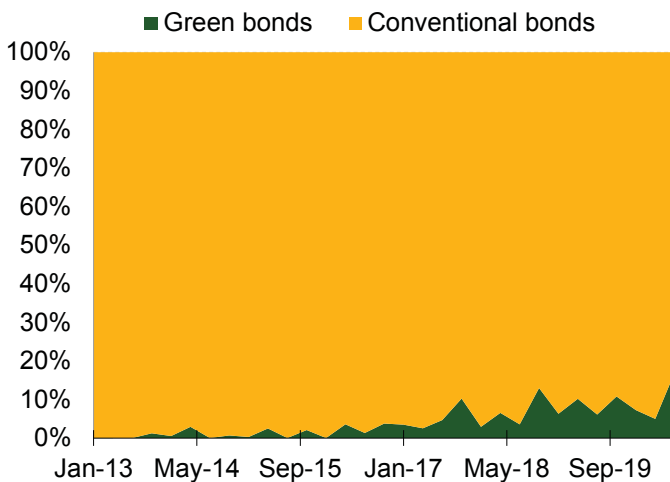
Monthly cumulative returns of selected stock indices and portfolios (percent)



Source: Bloomberg, Datastream and European Commission – Joint Research Centre calculations based on Alessi, Ossola and Panzica (2020), "The Greenium matters: greenhouse gas emissions, environmental disclosures, and stock prices".

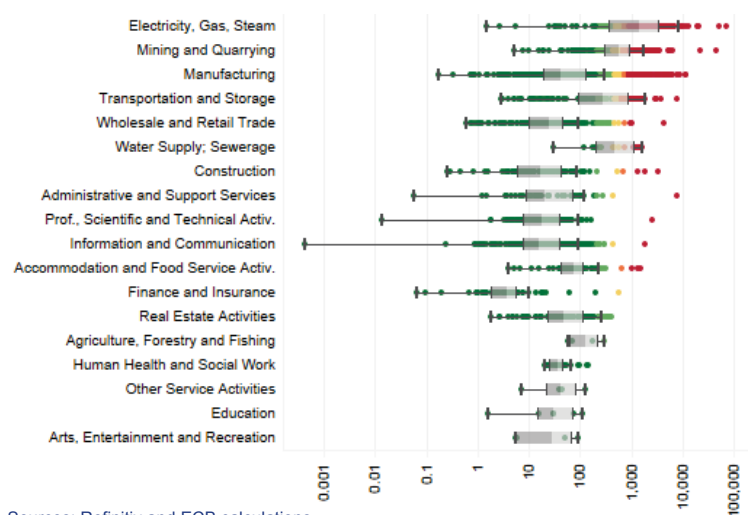
Green bond universe still small, transition risks affecting broad parts of the economy

Share of IG green bonds in global gross issuance (in %, based on EUR data)



Source: Dealogic. Note: Quarterly data.
Last observation: 24 September 2020.

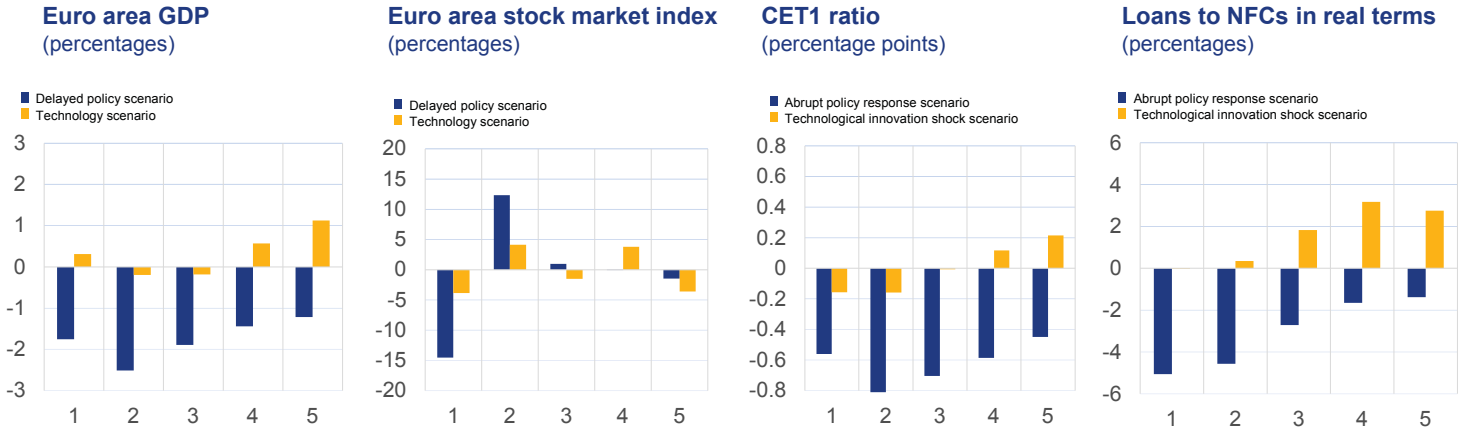
Firm-level emission intensities within economic sectors (2017; emission intensity in tonnes of CO2/EUR millions of sales)



Sources: Refinitiv and ECB calculations.

Delayed policy action exacerbating transition costs

Effects of an abrupt policy response and green technology breakthrough scenarios (x-axis: years)



Source: DNB and ECB calculations based on NiGEM outputs, SHS-G data and 2017 stress test templates.

Note: The delayed policy scenario assumes that an abrupt policy change aimed at mitigating climate change translates into a sudden and sharp increase in the carbon price by USD 100 per tonne at the global level. The second scenario, which considers an asymmetric technology shock, looks at what could happen in the event of a positive breakthrough in energy storage technology which would allow the share of renewable energy to double over a five-year period.

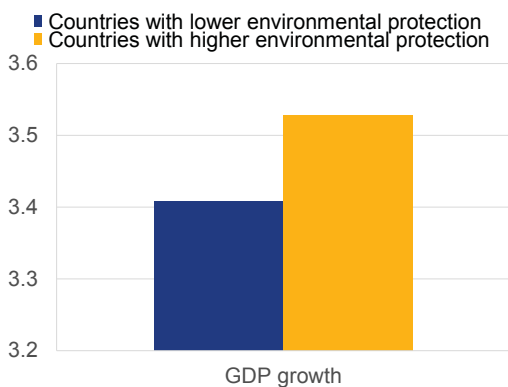
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Faster recovery of “greener” economies

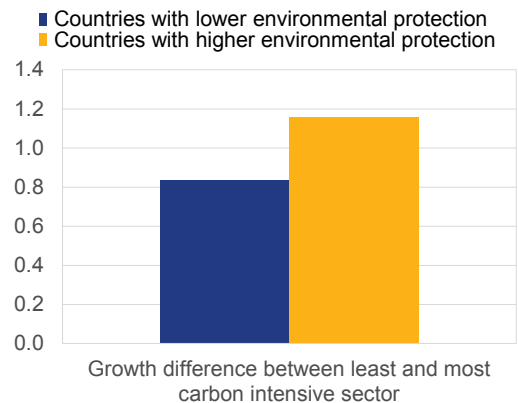
Environmental protection and GDP growth during recoveries

(percentage points, relative to recession episodes)



Environmental protection and sectoral growth during recoveries

(percentage points, relative to recession episodes)



Sources: ECB calculations, World Bank, OECD.

Notes: Growth is measured in percentage points relative to a recession episode. "Sectoral growth" is the growth difference between least and most carbon-intensive sector during recovery. "Recovery" is defined as the two year period after a recession. Environmental protection is measured by an index of environmental protection stringency (EPS), for the countries with below-median and the countries with above-median EPS. "Low" = 1.54 EPS, "High" = 2.14 EPS.

12

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