Climate change: central banks are taking action

François VILLEROY de GALHAU
Governor
Banque de France

The first central bank in History, the Riksbank, was founded in the 17th century to finance the Swedish government’s war costs. Today, central banks must wage another type of “war” alongside the signatory states of the 2015 Paris Agreement – the fight against climate change and its consequences.

The mandates given to central banks generally assign a price stability objective and now a financial stability objective. As climate-related risk is a source of financial risks, its management falls squarely within the financial stability objective. Recognition of this fact is central to the ambition of the Central Banks and Supervisors Network for Greening the Financial System (NGFS), which was launched by the Banque de France at the end of 2017. The NGFS is chaired by Frank Elderson, from De Nederlandsche Bank, and now has over forty members and observers from five continents. It works to improve the identification and measurement of the financial sector’s exposures to climate-related risks, to devise climate change stress tests for financial institutions, and to develop opportunities associated with financing the transition towards a low-carbon economy. The excellent articles presented in this 23rd edition of the Financial Stability Review throw light on many of these issues, and their authors have my heartfelt thanks.

The consequences of climate change for goods and services price dynamics and, more broadly, for economic growth have received less attention however, even though the changes underway, such as increasing temperatures and rising sea levels, raise fears and questions in this respect. It is therefore essential for central banks to also explore the implications of climate change for their price stability mandate and monetary policy. Consequently, the ideas developed in this article are rooted in two convictions. The first is strategic: central banks’ mandates compel them to take account of climate change. The second is operational: to do so, they have several tools at their disposal that can be activated.

11 A mission in keeping with their double mandate

Climate-related risk is unique in character. It is irreversible, in that no technology currently exists that can remedy it. It is also potentially systemic, in that its materialisation could transform the functioning of the whole economy. This is accentuated by the fact that a catastrophic climatic event can provoke another and that climate shocks can be non-linear, making the evolution of risk difficult to predict.

111 Climate risk and financial stability

The financial impact of climate-related risk takes two forms: the physical risks (which are the most immediate and visible) caused by the proliferation of extreme weather events such as floods, storms, wildfires and rising water levels, and the subsequent damages that insurance firms, for instance, will have to cover (the number of extreme temperature events has more than tripled since the 1980s, for example);\(^3\) and also the transition risks associated with public authority measures or private initiatives to support the move towards a low-carbon production model. France, for example, has announced that internal combustion engine vehicles will be phased out in the country by 2040, while cities such as Paris, Hamburg and Essen envisage banning diesel cars and vans entirely. These transition risks,

---
\(^1\) With seven other founding members: Banco de México, Bank of England, De Nederlandsche Bank, Deutsche Bundesbank, Monetary Authority of Singapore, the People’s Bank of China, and Finansinspektionen (the Swedish financial supervisory authority). The Banque de France provides the Secretariat to the Network.
\(^2\) The difficulty of correctly predicting phenomena that are infrequent but whose consequences can be extreme is a recurring problem in economics, sometimes referred to as the “Peso problem” – an expression attributed to Milton Friedman in reference to the foreign exchange rate of the Mexican peso, which was significantly devalued in 1976 after a long period of stability.
\(^3\) See Munich Re (2018).
which are more long term and less visible, result, for example, from financial market volatility and adverse macroeconomic outcomes caused by the transition and uncertainties with regard to its winners and losers.

The management of climate-related risk is therefore required under the financial stability mandate of central banks and financial sector supervisory authorities. The NGFS report entitled *A call for action – Climate change as a source of financial risk* that was published in April 2019 represents a first major contribution on this point at the international level. It puts forward a series of recommendations aimed at: (i) central banks and supervisors themselves, so that they improve their methods and practices in terms of the identification and measurement of the financial system’s exposures to climate-related risks and submit financial institutions to prospective stress tests; but also (ii) policymakers, as developing the opportunities associated with financing the transition to a low-carbon economy is equally important.

Since 2017, the Banque de France and the French Prudential Supervision and Resolution Authority (Autorité de contrôle prudentiel et de résolution – ACPR) have carried out regular assessments of climate change related risks in the financial sector, notably based on the new reporting requirements that came into effect for businesses and financial institutions in France. As part of this exercise, in April 2019 the ACPR published two analyses of how banks and insurers, respectively, incorporate climate-related risks into their risk management procedures. These studies were based on interviews and data provided by a sample of respondents representing, respectively, 86% of credit institutions’ total balance sheets and 80% of French insurers’ investments. They show that significant progress has been made in terms of governance of risks associated with climate change and in terms of transition-risk awareness among banks in particular. The twenty most carbon-intensive sectors represented 12.2% of net bank exposures to credit risk in 2017. The progress made in terms of understanding and integrating physical risk has been more modest, even though French banks and insurers seem relatively little-exposed.

12 Climate risk and price stability

Climate change has first of all a direct impact on two pricing items: (i) agricultural and food products, because more regular adverse weather conditions accentuate price volatility; and (ii) energy, because extraction and supply difficulties related to climatic events could lead to sharp price adjustments, as could measures to reduce reliance on fossil fuels. It can therefore intensify medium-term inflationary pressures through repercussions of food and energy prices on production costs.

Second, extreme weather conditions have a broader impact on infrastructure, buildings, the health of employees and productivity, and consequently production and price structures (through resource shortages, loss of activity, growing uncertainty, etc.). According to the Organisation for Economic Co-operation and Development (OECD), losses to global gross domestic product (GDP) could reach 10% in 2100 if no action is taken to reduce carbon emissions. Other studies assume that temperature increases have a permanent effect on production growth and thus estimate that the impact could be more severe: losses of up to 23%, for example, according to Burke et al. (2015).

5 See NGFS (2019).
6 See Article 173 of Law No. 2015-992 of 17 August 2015 on energy transition for green growth.
7 See ACPR (2019a).
8 See ACPR (2019b).
9 See OECD (2016).
of the environment” (see Article 3 of the Treaty on European Union).

However, monetary policy may find it difficult to manage climate shocks, insofar as they can be stagflationary supply shocks, which provoke both upward price pressures and a slowdown in activity. Furthermore, climate shocks are difficult to analyse and predict due to their magnitude, frequency and intensity, and can therefore blur the expectations of economic agents and complicate the central bank’s interpretation of economic conditions.\(^\text{10}\)

In reality, the first effects of climate change on economic growth dynamics are already apparent in a number of countries, with forest fires in California, for example, or, in Europe, the drought in the summer of 2018, which reduced the level of the Rhine river to a historical low and slowed growth in Germany due to the disruption caused to raw material and food transportation. Moreover, the costs of the transition towards a low-carbon economy are also already being felt. In the automotive industry, the ambitious carbon dioxide (CO\(_2\)) vehicle emission reduction targets set by the European Union for 2021 are already affecting automobile production and are expected to accelerate the decline in diesel vehicle sales.\(^\text{11}\) And in France itself, the so-called gilets jaunes protests largely began as a reaction to ecotaxes.

The times we live in require action; and the sooner the better, given that the majority of the benefits of corrective action may only be felt in the longer term.

\section*{2.1 Two priorities to be activated}

The debate of the day, particularly in the United States, is “Green QE” (“green quantitative easing”). It has, however, serious limitations, as we shall see: it is vital to aim far higher and be far more inclusive to mobilise monetary policy around two priorities.

\subsection*{2.1.1 Preparing for all the effects of climate-related risks}

The award of the Nobel Prize in Economic Sciences in 2018 to William Nordhaus, a pioneer in the development of models to integrate climate change and macroeconomics, shows how research into the interactions between climate change and economics has come on in leaps and bounds over the past two decades. But we are still somewhat in the dark on some issues, particularly those of direct interest to central banks. It is therefore essential that central banks contribute to the collective research effort, while prioritising two fields in particular.

The first concerns the assessment of the economic impact of physical risk. A substantial body of empirical literature, which for the most part focuses on the situation in the United States, already draws on a wealth of microeconomic databases to try to assess the effect of catastrophic climate events or heat waves on labour productivity, economic activity or business survival. This work should be continued, refined and updated for other countries. The findings of these ex post assessments can then be used to develop scenarios of physical risk by extrapolating trends provided, for example, in Intergovernmental Panel on Climate Change (IPCC) scenarios. They can also be used to help calibrate the damage functions embedded in macroeconomic models, which notably serve as a basis for discussions and reflections on monetary policy options.

The second consists in better understanding how monetary policy should best be conducted against a backdrop of economic policy measures (subsidies or taxes) aimed at reducing carbon emissions, and how and to what extent monetary policy may be constrained by insufficient control over climate change, which is a source of more...
regular and more severe negative shocks. To this end, the usual macroeconomic models of central banks, which have been developed to analyse short to medium-term trends, will have to be enhanced.

The NGFS already has plans for 2019 to publish a series of simplified long-term scenarios integrating climate-related risks and intended to facilitate understanding of the destabilising effects of climate change.

Another “new frontier” for the central bank stems from the fact that climate-change related risks materialise over a far longer time period than the traditional decision-making horizon of a central bank. This has been referred to as the “tragedy of the horizon”. An interesting analogy is the well-known debate on the interrelationship between monetary policy and financial stability. According to the separation principle, monetary policy should be centred on inflation risks while macroprudential policy should adhere to its role of monitoring and mitigating financial risks. Compliance with this principle relies on the existence of operational macro-prudential instruments. Should they appear inadequate, monetary policy will have to be brought to bear on the changes in the financial cycle, in accordance with the so-called “leaning against the wind” approach. By analogy, taking account of climate-related risk within the financial system first involves supervisory microprudential instruments, but it could push central banks to consider whether they should take preventive action to join efforts aimed at limiting global warming and thus adopt an approach of “leaning against climate change”.

2.2 Better assessing collateral

Do we need to amend the rules defining the scope of assets eligible as collateral for monetary policy lending to take account of climate-related risk, so as to grant favourable treatment to eligible green assets? We could consider eligibility criteria that reflect the specific risk associated with these assets, for example, or modifications to the haircut calculations applied to them. And if it is found that physical and transition risks have an impact on the profile of certain assets, central banks would have to draw the appropriate conclusions and integrate these financial risks into their collateral framework. This type of question could also be asked with regard to corporate bond purchase programmes (cf. the European Central Bank corporate sector purchase programme – CSPP), where these exist.

However, gaining a deeper understanding of these potential pathways requires the development of a robust methodology to accurately assess the impact of climate change on the credit risk of eligible assets. Above all, until now this credit risk reflects the profile of the corresponding issuing or debtor institutions (firms or governments), some of whose activities may be highly carbon intensive while others may be more carbon friendly. It will also be necessary to be able to carry out ex ante assessments of the impact of adapting eligibility rules in such a way on market structures and dynamics.

Furthermore, the widespread operational application of these pathways requires that several issues be resolved, particularly the identification of activities that contribute to the transition to a low-carbon, green economy (green assets) as opposed to activities that are most exposed to climate and environment-related risk (brown assets), and the determination of their respective risk profiles.

In this respect, developing a European taxonomy of sustainable economic activities, under the leadership of the European Commission, is an essential first step. The Banque de France, as Secretariat to the NGFS, is actively participating in the process. The taxonomy is intended to ensure the integrity of green financial instruments.
Climate change: central banks are taking action
François Villeroy de Galhau

– be they green bonds, loans or securitisation vehicles – and to reassure private investors, lenders and borrowers that they can invest in complete confidence, protected against practices of green washing. Economic players will then have to integrate this taxonomy in order to further the development of deep and liquid markets for green assets.

Meanwhile, these markets still lack depth and liquidity, which illustrates the fact that climate-related issues have still not been properly taken on board, particularly by non-financial corporations. It is therefore vital for the green bond market and the various markets for green financial instruments in general (lending to the economy, securitisations, covered bonds, etc.) to scale up in order to square with the massive investments required for the transition. According to the Intergovernmental Panel on Climate Change (IPCC), the additional annual average energy-related investments needed to limit warming to 1.5°C is estimated at USD 830 billion for the period from 2016 to 2050.

A variety of proposals have been made to allow monetary policy to play a more direct and sector-focused role in financing the transition to a low-carbon economy. For example, we could bring in “green” quantitative easing, by introducing a bias towards green assets in the purchase programme framework. Or we could launch long-term facilities designed to steer the credit supply towards activities that contribute to the transition (green TLTROs – targeted longer-term refinancing operations). But despite the apparent simplicity of these proposals, they are less appropriate and less effective than the two inclusive priorities mentioned previously.

The assumption underlying these targeted measures is that a central bank is better equipped to decide an efficient allocation of resources than democratic institutions – parliaments and governments –, and private agents. If this were the case, the same theory could also be applied to other objectives essential for the common good, such as combating unemployment or inequality, or inspiration could be taken from the subsidised loans (prêts bonifiés) of the past. But the idea that central banks have this type of information advantage is neither proven nor valid. Monetary policy targets a macroeconomic objective (inflation) and at the operational level it strives to be market neutral in order to ensure the smooth functioning of its transmission channels, meaning that it does not single out specific social or sectoral objectives. Moreover, the pool of green bonds that comply with Eurosystem criteria is relatively shallow: today, it accounts for less than 1% of the scope of assets eligible for the public sector purchase programme (PSPP) and around 4% of the scope eligible for the corporate sector purchase programme (CSPP). The Eurosystem already holds nearly EUR 19 billion; but more massive purchases by the Eurosystem in this narrow and emerging segment would push up the prices of these assets and thus lead to undesirable and damaging distortions.

3. Conclusion

Our conviction is clear: the financial stability and monetary policy mandates of central banks impose the obligation and also give them the tools to respond to the climate imperative. And in fact, they are actively contributing to this fight through the work of the NGFS. Their primary lever is their microprudential supervision of financial intermediaries, banks and insurance undertakings, while they also lead by example through their investment policies. The Banque de France, in March 2018, was the first to adopt a responsible investment charter for the management of its own funds and pension portfolios to ensure their allocation to socially and environmentally responsible investment funds, and De Nederlandsche Bank is a signatory of the
Principles for Responsible Investment supported by the United Nations.

But monetary policy is also involved in this collective mobilisation; not so much by directly targeting specific sectors – “Green QE” may be seductive but is too limited – but by thoroughly integrating climate change into the monetary policy framework. In terms of research, this requires a deeper understanding of all the economic effects; in operational terms, it involves integrating all the consequences into the assessment of collateral.

According to Albert Einstein, “The world as we have created it is a process of our thinking. It cannot be changed without changing our thinking.” This is indeed the challenge that central banks must overcome, as must we all. In the fight for the climate, not everything depends on central banks: appropriate public policies – including a carbon tax – and innovative business strategies are essential. But in the situation we now face, as in others, central banks are here to serve society and future generations. And this is reflected in our unprecedented collective action within the NGFS.
Climate change: central banks are taking action
François Villeroy de Galhau

References

AlixPartners (2018)
“Global automotive outlook”, press release, July.

Autorité de contrôle prudentiel et de résolution – ACPR (2019a)
French banking groups facing climate change risks, Analyses et Synthèses, No. 101 – 2019, April.

ACPR (2019b)
French insurers facing climate change risk, Analyses et Synthèses, No. 102 – 2019, April.

Burke (M.), Hsiang (S.) and Miguel (E.) (2015)

Carney (M.) (2015)
“Breaking the tragedy of the horizon – Climate change and financial stability – Speech by Mark Carney”, speech given at Lloyd’s of London, 29 September: https://www.bankofengland.co.uk

Cœuré (B.) (2018)
“Monetary policy and climate change”, speech at a conference on “Scaling up green finance: the role of central banks”, Berlin, 8 November: https://www.ecb.europa.eu

Intergovernmental Panel on Climate Change – IPCC (2018)
“Summary for policymakers”, in: Global Warming of 1.5°C – An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty, World Meteorological Organization and United Nations Environmental Programm.

Munich Re (2018)
A stormy year – Natural catastrophes 2017, TOPICS Geo.

NGFS – Central Banks and Supervisors Network for Greening the Financial System (2018)

NGFS (2019)
“A call for action – Climate change as a source of financial risk”, First Comprehensive Report, April: https://www.banque-france.fr and press release: “NGFS calls for action by central banks, supervisors and all relevant stakeholders for greening the financial system”.

The Economic Consequences of Climate Change: https://www.oecd-ilibrary.org