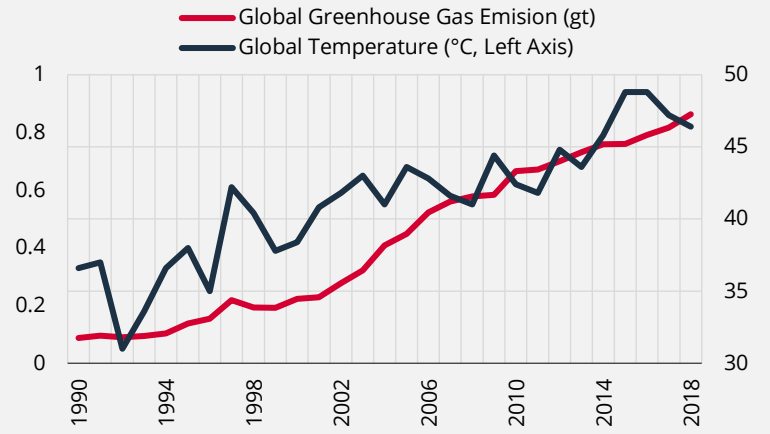
Box 1.2

Monetary Policy and Central Banking during Global Climate Change

Improvements in technology and rapid industrialization caused higher emissions of greenhouse gases such as carbon dioxide and methane, which led to global warming and global climate changes. Global greenhouse gas emissions have increased over years, and the global temperature has increased in parallel (Chart 1). Global climate change not only shapes the overall economy through its impacts on economic activity, inflation and labor productivity, but it also affects the financial system by creating financial risks. The fact that these issues are factors affecting price stability and financial stability necessitated that the developments regarding global climate change should also be monitored by central banks. In fact, global climate changes are frequently analyzed in recent studies by major central banks and international financial institutions. In its latest decision announcement, the CBRT also stated that it decided to support sustainable finance practices as a long-term policy, without changing the main objectives of the monetary policy, in order to limit climate and other environmental risks.

Chart 1: Global Greenhouse Gas Emission and Global Temperature*



Source: https://www.climatewatchdata.org/, https://www.ncdc.noaa.gov/
*Global greenhouse gas emission is denoted in gigaton carbon dioxide equivalent (GtCO2e) while global temperature is the deviation of yearly surface temperature from the 20th century average.

The idea that global climate change developments should be included in the monetary policy strategy was first expressed by the Bank of England in 2015. In this context, global climate change was defined as the "tragedy of the horizon" and it was underlined that central banks should take action today in order to eliminate the problems that may arise in the financial system due to climate change and to ensure the efficient functioning of the markets (Carney, 2015).

Currently, global climate changes are thought to affect financial stability mainly through three channels: physical risks, transition risks and liability risks.[1] Physical risks refer to negative effects of the increased default risk and credit risk on financial sector balance sheets arising from compensation for physical damage caused by natural events due to climate change. As a matter of fact, a recent study indicates that due to physical risks, the credit risk may rise from around 10% for banks operating in the Eurozone to 30% in 2050 (Alogoskoufis et al., 2021).

[1] Physical risks and transition risks posed by global climate change on the financial system are discussed extensively in Box II.1.1 of the Financial Stability Report May 2021 issue (CBRT, 2021).

Transition risks refer to the risks to financial stability that arise from the reallocation of resources and the possibility that some sectors will become inoperable or face serious costs during adaptation to policy (Paris Agreement) or technology changes regarding global climate change. On the other hand, transition risks are viewed as limited compared to physical risks (de Guindos, 2021). In this context, a similar finding in a study conducted by the International Monetary Fund (IMF) predicts that the short-term cost of the transition to a carbon-neutral economy can be more than compensated in the long term (IMF, 2020).

Finally, liability risk refers to the risk arising from the claims of compensation for losses by persons or businesses exposed to physical risk or transition risk. Managing these risks caused by global climate change falls within the scope of central banks' mandate and regulatory institutions in line with their objective of safeguarding financial stability. However, the magnitude of these risks and the difficulties in their pricing may affect financial stability and also the related policies. In addition, these risks to the financial system may also appear on the balance sheets of central banks through open market operations (OMO). This is because the bonds and bills subject to OMO may carry climate risk, which may cause the central bank balance sheets to be exposed to this risk as well (Schnabel, 2021).

On the other hand, global climate change not only poses risks to the financial system, but it also creates a new potential in terms of meeting the financing needed to manage these risks. Financial instruments developed to fund environmental projects are called "green bonds". According to literature and policy debates, the inclusion of green bonds in central banks' balance sheets may help to lessen the risks discussed above.

Global climate change hits price stability through negative shocks that affect economic activity and increase prices (de Galhau, 2021). In addition, the transition effects created by global climate change may cause inflationary pressure and slowdown in economic activity through cost increases such as carbon tax. Moreover, weather events driven by global climate change negatively affect the agricultural sector, causing an increase in food prices. What is more, it is predicted that global climate change may reduce labor productivity in the long run (Somanathan et al., 2015).

In 2017, the Network for Greening the Financial System (NGFS) was established under the leadership of the Bank of France, to consider the effects of global climate change on price stability and financial stability in implementing monetary policy. NGFS focused its work on five main themes: (i) microprudential/audit, (ii) macrofinancial, (iii) scaling up green finance, (iv) bridging data gaps, and (v) research.

In this context, the following themes can be listed as the main areas of research by the NGFS: (i) examining the extent to which a financial risk differential exists between green bonds and other assets, (ii) reviewing and assessing existing methodologies to measure climate-related and environmental financial risks at a micro level, (iii) keeping track of supervisory developments and update the mapping of supervisory practices to integrate climate-related and environmental risks into microprudential supervision, (iv) developing climate scenarios for central banks and supervisors; (v) providing guidance to central banks and supervisors on integrating climate risk analysis into macroeconomic and financial stability surveillance, (vi) sizing the macrofinancial impact of climate-related risks, (vii) promoting the adoption of sustainable and responsible principles in central banks' investment approaches, (viii) understanding and fostering the market transparency of green finance, (ix) providing a joint central banks' view on the various challenges climate change raises for the conduct of monetary policy, and (x) encouraging the adoption of climate-related financial disclosure by central banks.

Meanwhile, the Bank of France, which pioneered the establishment of the NGFS, states that central banks' mandate should be amended to take into account the negative effects of global climate changes on price stability. The Bank of France also argues that central banks should include green bonds in their balance sheets, considering that the financial risks caused by global climate changes will also be visible in the balance sheets of central banks and thus influence monetary policy.

The inclusion of green bonds in the balance sheets of the central banks, which is called the "greening of monetary policy", has been implemented by the European Central Bank (ECB) within the Corporate Sector Purchase Program since 2016. In addition, green bonds are purchased through the Public Sector Purchase Program. Lastly, the ECB submitted an action plan on July 8, 2021 to incorporate climate change considerations into its monetary policy strategy. Accordingly, the ECB announced that it will expand its analytical capacity in macroeconomic modelling, statistics and monetary policy with regard to climate change; will include climate change considerations in monetary policy operations in the areas of disclosure, risk assessment, collateral framework and corporate sector asset purchases; and will implement the action plan in line with European Union (EU) policies.

Another initiative regarding the greening of monetary policy and the inclusion of global climate change issues within the monetary policy strategy took place in the United Kingdom. In a statement made by the HM Treasury in March 2021, it was stated that the Bank of England MPC's remit was updated "*to reflect the government's economic strategy for achieving strong, sustainable and balanced growth that is also environmentally sustainable and consistent with the transition to a net zero economy".* Accordingly, the Bank of England announced in May 2021 that it would start purchasing green bonds in order to support its goal of reducing carbon emissions to zero by 2050.

Another step in taking global climate changes into account in monetary policy was taken by the Bank of Japan. Being actively involved in international platforms regarding global climate change, the Bank of Japan announced its climate change strategy on July 16, 2021. In this context, a new fund-provisioning measure was introduced so that financial institutions that disclose a certain level of information on their efforts to address climate change can receive funds from the Bank of Japan against their investment or loans made as part of such efforts. In addition, it was announced that financial institutions will be supported in identifying and managing their climate-related financial risks to maintain financial stability and ensure the smooth functioning of financial intermediation. It was also stated that necessary actions will be taken to collect climate-related data and improve analytical tools to better analyze the effects of climate change on economic activity, prices and the financial system.

The US Federal Reserve (Fed) also established two different committees in 2021 to examine the effects of global climate change on financial institutions and the financial system. The first of these, the Supervision Climate Committee examines the effects of global climate change from a microprudential perspective, while the other committee, the Financial Stability Climate Committee investigates these effects from a macroprudential point of view.

Lastly, various other central banks have taken action in global climate change and green finance issues. In addition, there are initiatives led by international organizations to monitor the financial risks caused by global climate changes and to include climate-related issues in monetary policy design. The Bank for International Settlements (BIS) also makes a significant contribution to green finance through its technical reports and research publications, as well as its collaborations with various international organizations such as NGFS and the Sustainable Insurance Forum (SIF). In addition, the BIS issued green bonds in US dollars and euros in 2019 and 2021 for use by central banks. It also pioneered research in green finance through new technologies such as artificial intelligence and blockchain in its innovation center.

In sum, there are many international organizations acting to solve the problems posed by global climate change. Research publications and initiatives on the reflections of developments stemming from global climate change on central banking have also increased.

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