

ARTICLE – Climate-related risks are a source of financial risk

Climate change is one of the major challenges of our time, and it requires a global transition to a less fossil-based economy. Both the effects of global warming and the transition itself create climate-related risks. For the participants in the financial system – banks, insurance companies and other financial and non-financial corporations – climate-related risks can create financial risk. If these are not managed, they can entail risks for the financial system, which can in turn have consequences for financial stability. It is therefore part of the Riksbank's mandate to promote resilience to climate-related risks in the financial system. This article aims to describe climate-related risks and how they can give rise to financial risk and therefore why they are relevant to financial stability. Better disclosure by both financial and non-financial corporations is one of the actions required in order to be able to measure, price and manage climate-related risks.

The transition to a less fossil-based economy involves structural changes and requires political decisions

To change and to achieve the objectives of the Paris Agreement⁷⁹, significant investment and far-reaching technical innovation are required. Certain sectors and companies will benefit, including those that apply new technology that enables this transition. The sectors and companies that do not change will lose out, including sectors that are dependent on coal, oil and steel with a high carbon footprint. In addition, the large amounts of capital and the new financial products that will finance the transition to a less fossil-based economy will be a substantial challenge for the financial sector. The transition will require structural changes both in the real economy and in the financial system. To manage this transition, political decisions will be required.⁸⁰

Direct effects of climate change give rise to financial costs and risks – physical risk

It is already possible to see direct effects of climate change. Damages caused by, for example, drought, flooding, hurricanes, heatwaves, rises in sea level and changes to ecosystems reduces the values of various assets. This is called physical risk. If the assets are insured against such damage, unexpected costs for insurance companies may result. Major climate events may force insurance companies to sell off their financial assets on a large scale, resulting in price pressures on these assets and, in the worst case, leading to bankruptcy.⁸¹ If, on the

other hand, the assets are uninsured, individual companies and households will be those adversely affected. This may, for example, be due to insurance companies refusing to insure certain assets, such as new buildings in areas that are sensitive to rises in sea levels. Individual companies and households may also be affected by insurance companies increasing their insurance premiums so that it becomes more expensive to insure certain assets.⁸²

Climate change can also have a negative impact on collateral accepted by banks. The credit given by banks to households and companies often has real property as collateral. Natural disasters can destroy this property and thereby severely reduce the value of the collateral. For loans where the borrower's debt-servicing ability deteriorates and they are unable to repay the loan in full, it is important that the value of the collateral can cover the bank's claim. If the value of the collateral deteriorates, a credit loss may arise. This increase in credit risk has, in turn, a negative effect on the banking system.

Physical risk can also involve dramatic variation in the prices of financial assets and can thereby give rise to market risk. If these materialise, it may lead to participants in the financial system making losses. It may also reduce capital and impair liquidity among banks and central counterparties.

⁷⁹ In November 2016, the global climate agreement reached in Paris entered into force. One of its objectives is to keep the global temperature increase well below 2 degrees Celsius and then limit it even further to 1.5 degrees Celsius.

⁸⁰ Climate pollutants are a so-called externality in which the causative party, for example a consumer or a company, generates a cost for another party without paying for this cost. Solving the problem requires political decisions, which means that governments and fiscal policy have the main responsibility for reducing emissions.

⁸¹ See PG&E: the first Climate-change bankruptcy, probably not the last, 18 January 2019. *Wall Street Journal*.

⁸² For example, the Insurance Council of Australia has agreed that property in coastal areas is likely to become more expensive and more difficult to insure according to even the most conservative sea level rise forecasts. Another example is insurance companies in Sweden that have plans to stop insuring shoreline buildings in Skåne, for which municipalities have granted planning permission despite the County Administrative Board advising against it.

Financial risk related to the transition to a less fossil-based economy – transition risk

The actual transition to a less fossil-based economy is associated with financial risk. It may, for example, be a question of political decisions such as higher carbon taxes, road tolls or higher prices of emission rights, which are intended to gradually help reduce fossil fuel use. Such political decisions change the conditions for certain specific markets. They may also have consequences for pricing on the financial markets, such as the equity market, credit market or commodity market. The consequences can be financial risk as a result of the price fluctuations that arise when uncertainty over the future value of assets increases.

It may also be a question of political decisions, according to which certain resources such as coal, gas and oil shall no longer be extracted but left in the ground. If the use of certain assets is completely prohibited due to their potential to generate far too much toxic pollution during their extraction and use, they will become so-called *stranded assets* and completely lose their value.

Companies that own or have substantial exposure to such assets may be hit hard when the value of the assets falls sharply. If these companies have loans, this may have negative consequences for their lenders, such as banks and other investors.

Physical risk and transition risk are not independent of each other. A slow transition to a less fossil-based economy may reduce the negative consequences of the transition (transition risk) in the short term, but at the same time may intensify the physical risk in that the risk of damage will increase. If the physical risk increases, it may, on the other hand, lead to more substantial and faster changes to climate policy, which may increase transition risk in the short term.

To manage physical and transition risk, participants in the financial system need to look forward rather than backwards to a greater extent. Historical data cannot be used to predict the future. For example, historical price movements in financial assets do not capture the potential effects of climate change on future price movements. As regards models for managing risk and assessing risk resilience, such as stress tests, these need to be adapted to also include future transition scenarios.⁸³

An example of physical risk and transition risk from the electricity derivatives market

In September 2018, the German electricity price rose sharply when the prices of emission rights in Germany increased (transition risk that arose as an effect of political decisions to change over to a less fossil-based economy). At the same time, Nordic electricity prices fell sharply as a result of heavy rain in the Nordic region after a hot and dry summer (physical risk). The difference between Nordic and German electricity prices was 17 times greater than on a normal trading day. This rapid development led to the default of one of the participants in the central counterparty Nasdaq Clearing, that had large positions on the electricity derivatives market. As a result, the other participants had to share the loss.⁸⁴

Derivative instruments create a market for trading and redistributing risk. The market can either be used to try to reduce risk, known as hedging, or to speculate on risk. In the example above, the participant traded derivative instruments to speculate.

A global problem demands international cooperation

The effects of global warming and the transition to a less fossil-based economy are a global challenge that requires international cooperation, not least in the area of fiscal policy.⁸⁵ The financial system also has an important role in the transition to a more sustainable financial system, which is why there are several initiatives at the international level aimed at promoting a sustainable financial system.

NGFS – a network for central banks and supervisory authorities

The *Network for Greening the Financial System*, NGFS, has been in existence since 2017 for central banks and supervisory authorities. At the time of writing, the network has 48 members and 10 observers. The Riksbank and FI participate in this network.

In its first report, the NGFS established that climate-related risks are a source of financial risk.⁸⁶ In the network's view, therefore, the task of central banks and supervisory authorities to promote financial stability shall also consider climate-related risks.

In April 2019, the NGFS published a number of recommendations aimed at supporting the financial system in its work to achieve the objectives of the Paris Agreement (see table 4).⁸⁷ The recommendations from the NGFS are non-binding and are addressed to central

⁸³ See, for instance, *Transition in thinking: The impact of climate change of the UK banking sector*, September 2018. Bank of England.

⁸⁴ See *Financial Stability Report 2018:2*. Sveriges Riksbank and *Financial Stability Report 2019:1*. Sveriges Riksbank.

⁸⁵ See Olovsson, C. Is climate change relevant for central banks? November 2018, *Economic Commentaries* No. 13. Sveriges Riksbank.

⁸⁶ See *NGFS First Progress Report*, October 2018. Network for Greening the Financial System.

⁸⁷ See *A call for action: Climate change as a source of financial risk*, April 2019. Network for Greening the Financial System.

Table 4. NGFS recommendations

	Recommendations	Aimed at
1	Integrating climate-related risks into financial stability monitoring and micro-supervision	Central banks and supervisory authorities
2	Integrating sustainability factors into own-portfolio management	Central banks
3	Bridging the data gaps	Concerned authorities
4	Building awareness and intellectual capacity and encouraging technical assistance and knowledge sharing	Central banks, financial supervisory authorities and financial institutions
5	Achieving robust and internationally consistent climate- and environment-related disclosure	Companies issuing public debt or equity, financial institutions, policy makers and supervisory authorities
6	Supporting the development of a taxonomy of economic activities	Policy makers

Source: NGFS, adapted by the Riksbank

banks, supervisory authorities, policy makers and financial companies. The Riksbank supports these recommendations.

The first recommendation concerns integrating climate-related risks into prudential supervision. Some central banks and supervisory authorities have come further in this work and started to perform stress tests of the financial system based on various climate-related scenarios.⁸⁸

The second recommendation is aimed at central banks, encouraging them to integrate sustainability factors into their own-portfolio management.⁸⁹ This should be done to the extent possible based on each central bank's mandate and objective.

A pre-condition for being able to perform analyses and assessments of climate-related risks is the availability of standardised data. The third recommendation therefore concerns bridging existing gaps in the access to such data. This may be a question of appropriate authorities collecting and sharing data that is relevant to the assessment of climate-related risks. In addition, this data, wherever possible, should be made available in a public data base.

Another key aspect when it comes to supporting the financial system in its work to achieve the objectives of the Paris Agreement is to create awareness of climate-related risks and share information in the field. The fourth recommendation calls on central banks, supervisory authorities and financial institutions to improve understanding – both internally and among relevant parties – for how climate-related factors can be translated into financial risks and opportunities.

In the fifth recommendation, NGFS urges all companies issuing public debt or equities as well as financial sector institutions to disclose climate-related information in line with the *Task Force on Climate-related Financial Disclosures*, TCFD (see the section below). Such disclosure enables the pricing of climate-related risks and opportunities. Put simply, investors are better able to value different companies based on how they manage their climate-related risks and opportunities.

The sixth recommendation is about creating a taxonomy, or uniform classification system, that clarifies both which economic activities contribute to the transition to a green and sustainable level of fossil-based emissions, and which activities are more exposed to climate-related risks.

TCFD – disclosure by companies of climate-related risks and opportunities

TCFD was created in 2015 by the *Financial Stability Board* with the task of increasing transparency regarding climate-related risks and opportunities. To this end, the TCFD has developed non-binding recommendations for companies. The idea is for them to disclose how climate change affects their operations and how they manage their climate-related risks and opportunities.⁹⁰ The recommendations aim to give investors, lenders, insurance companies and other stakeholders access to information on how the companies manage climate-related risks and opportunities. The main elements in the disclosure are illustrated in figure 1 below and cover corporate governance, strategy, risk management and established metrics and objectives linked to climate-related risks and opportunities.

As of September 2019, over 850 companies and organisations had backed the recommendations globally. Of these, 28 are Swedish. An increasing number of banks, insurance companies and investors are asking for this kind of information from companies. More companies can therefore be expected to implement the TCFD recommendations in their annual reports.

⁸⁸ See, for instance, An energy transition risk stress test for the financial system of the Netherlands, *Occasional studies*, volume 16-17, 2018. De Nederlandsche Bank.

⁸⁹ Within the financial sector, sustainability efforts are operationalised via so-called ESG valuation of companies based on their management of environmental issues and

social aspects and on how the companies are governed. ESG is an abbreviation of Environmental, Social and Governance.

⁹⁰ See *Recommendations of the Task Force on Climate-related Financial Disclosures*, Final report, June 2017. Financial Stability Board.

Figure 1. The main elements in TCFD disclosure



Source: TCFD, adapted by the Riksbank

The European Commission's action plan on financing sustainable growth

In 2018, the European Commission adopted an action plan on financing sustainable growth.^{91,92} The main objectives are to steer capital flows to sustainable investment to achieve sustainable growth and manage the financial risks stemming from climate change.

Table 5. New European legislation in the field of sustainable growth and financial risk

The Commission's draft legislation	Purpose
New category of benchmarks for investments in securities	Provide better information to investors about the carbon footprint of their investments
Disclosure requirements for institutional investors with regard to their integration of ESG factors into their risk processes	Greater access to, for example, climate-related information from financial companies
A classification system (taxonomy) of green investments	A first step to steer investments towards sustainable activities

Source: European Commission, adapted by the Riksbank

In 2018, the Commission presented three legislative proposals that will result in EU regulations in the area (see table 5). In addition, reports have been produced on, for example, an EU standard for green bonds.⁹³

In June 2019, the Commission published guidelines to improve corporate disclosure of climate-related information.⁹⁴ These guidelines give companies practical recommendations on how they can improve their disclosure of how their operations affect the climate, as well as how climate change affects their operations. The latter is in line with the TCFD recommendations. The Commission's guidelines go further than TCFD and require

the disclosure to include the companies' own climate impact. In addition, there are special guidelines for banks and insurance companies.

The Riksbank's mandate includes promoting resilience to climate-related risks in the financial system

Climate-related risks are a source of financial risk and therefore falls within the mandate of central banks and supervisory authorities that are tasked with promoting financial stability. The Riksbank actively participates in international work in the area of climate risks, for example in one of NGFS's work streams aimed at developing various scenarios.⁹⁵ These aim to help increase understanding for how risks can develop based on various measures taken to reduce fossil-based emissions and whether or not these measures are implemented in an orderly and predictable fashion.

At present, it is difficult to know how the Riksbank's work in the area of financial stability will need to be developed and what role the Riksbank can play. But some of the work involves trying to assess the extent to which the major banks in Sweden and the Swedish financial market infrastructures are exposed to these risks and how resilient they are. The Riksbank has now begun to examine how climate-related risks can be integrated as part of stability analysis and monitoring.

As regards integrating sustainability factors into the Riksbank's management of the foreign exchange reserves, the Riksbank has had a new financial risk and investment policy in place since 1 January 2019. This states, among other things, that consideration shall be given to sustainability in the choice of assets in the foreign exchange reserves, in addition to other requirements laid down in the Riksbank's mandate.⁹⁶ Climate change can also have implications for monetary policy as economic forecasts and economic policy may be affected.⁹⁷

Since 2015, FI has worked actively on sustainability issues, both in Sweden and internationally. It is now integrating sustainability issues into its regular supervisory work.⁹⁸

Measures required to progress in analytical and preventive work

The Riksbank considers improved and uniform disclosure of climate-related financial information to be the first

⁹¹ The concept of *sustainability* is broad and includes much more than adaptations to climate change. Agenda 2030 consists of 17 global goals for sustainable development adopted at the UN summit in 2015. One of the goals relates to climate change.

⁹² See *Action plan on financing sustainable growth*, 8 March 2018. European Commission

⁹³ See *TEG report on EU green bond standard*, 18 June 2019. EU Technical Expert Group on Sustainable Finance.

⁹⁴ See *Guidelines on reporting climate-related information*, June 2019. European Commission

⁹⁵ The Riksbank has wider international commitments than those listed here.

⁹⁶ The primary purpose of the gold and foreign exchange reserves is to enable the Riksbank to provide the financial system with liquidity in foreign currency and to intervene on the foreign exchange market for monetary and foreign exchange policy reasons. The second purpose is to help safeguard the Riksbank's financial independence, which means ensuring a healthy return on the gold and foreign exchange reserves over time in relation to the risk involved in holding them.

⁹⁷ See *Monetary policy and climate change*, speech by Benoît Coeuré on 18 November 2018. European Central Bank.

⁹⁸ See *Finansinspektionens letter of appropriation for 2018*, 18 December 2017. Swedish Ministry of Finance. See also *Climate and sustainability in focus at FI*, speech by Erik Thedéen, 10 September 2019. Finansinspektionen.

building block in the work to manage climate-related risk.⁹⁹ Banks, insurance companies and other financial corporations need to identify and assess the climate-related risks they are exposed to and incorporate these into their business models and existing risk management. The Riksbank therefore wants to call on Swedish financial corporations to disclose their climate-related risks and opportunities. One way of doing this is to disclose in line with the TCFD recommendations and to take into account the Commission's guidelines.

Better access to information is a pre-condition for banks, insurance companies and other participants in the financial sector to be able to effectively measure, price and manage their exposures to climate-related risks. This is also a pre-condition for investors to be able to allocate capital to more sustainable operations more effectively.

At international level, it has been discussed whether banks' capital requirements could be eased in order to create an incentive for more sustainable investments (so-called GSF, *Green Supporting Factor*). Even though the intention is good, the Riksbank considers this to be inappropriate. Capital requirements exist for a reason – to build resilience in the financial system. Eroding these requirements risks undermining financial stability. Incentives to increase sustainable investment should be created in other ways, for example by introducing a unified classification system that specifies which investments contribute to a less fossil-based economy.

⁹⁹ According to the IMF, policy makers have a role to play in promoting increased disclosure of and transparency in climate-related risks, see *Global Financial Stability*