Egil Matsen: Climate change, climate risks and Norges Bank

Speech by Mr Egil Matsen, Deputy Governor of Norges Bank (Central Bank of Norway), at Norges Bank, Oslo, 8 November 2019.

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Accompanying charts of the speech.

Introduction

This autumn, news reports have included a hurricane in the Bahamas, a typhoon in Japan and large-scale wildfires in California. Many lives have been lost, and the economic losses have been substantial.

While we should be cautious in attributing single weather events to global warming, climate research points towards an increase in extreme weather events and natural disasters in the years ahead. What we have seen so far may be a forewarning of what is to come.

Chart: The temperature is rising

Global warming is one of the greatest challenges of our time. The global average temperature has increased by about 1 degree Celsius above pre-industrial levels. It is widely accepted that climate change is largely human-induced. Greenhouse gas emissions must be drastically reduced if the temperature goals of the Paris Agreement are to be reached.

Putting the necessary measures in place has proved to be demanding. From an economist's standpoint, a carbon tax would be the most effective way to reduce greenhouse gas emissions – the polluter must pay. However, carbon taxes and other measures are often met with opposition. Costs are imposed locally, while the gains from lower emissions are enjoyed by all. The temptation is to be a free-rider. In addition, the consequences of current emissions will largely be borne by future generations. Is this perhaps why there is less incentive to implement measures today?

To mitigate greenhouse gas emissions, the most important measure is the work conducted in the political arena, together with the development of more environment-relatedly friendly technologies. At the same time, the authorities, private individuals and companies must address a new type of economic risk, climate risk. Climate risk includes physical climate risk and transition risk.

Physical climate risk is associated with uncertainty about the economic consequences of higher temperatures and more extreme weather. There is a not insignificant probability of an outcome that is far more severe than the Paris Agreement is aiming for. Even if such an outcome does not materialise, and even if mitigation measures are able to limit the extent of the damage, the economic consequences could be considerable. Poor countries in the Global South will likely be hardest hit.

Chart: Insurance payouts after natural disasters

Norway is in a less vulnerable position, but we see that the weather is changing too. River and coastal flooding has increased and the damage caused is more severe, as reflected in insurance claims payouts. Over the past ten years, annual insurance payouts for climate-related flood and storm damage have been on average about five times higher than in the 1980s.

Transition risk is associated with the economic consequences of the transition to a low-carbon economy. Climate policy measures, changes in public attitudes and the emergence of more

environment-relatedly friendly technology will have an impact on both production methods and consumption patterns. This will create both opportunities and challenges for the business sector. Not all companies will make the transition to a low-carbon economy. Others will benefit from the restructuring involved, and new companies and industries may emerge.

It is uncertain which climate policy measures will be introduced ahead, particularly internationally. If little is done in the short term, economic decisions today must take into account that climate policy may be abruptly tightened later. Postponing climate mitigation measures will also increase the risk of severe and irreversible climate change in the future.

Responsibility for achieving the Paris Agreement's goals lies with the political authorities. However, we already know that climate change and adjustments to a low-carbon economy will affect large parts of the economy. Norges Bank is responsible for maintaining price stability and the stability of the financial system. In its conduct of monetary policy, the Bank also promotes high and stable employment and output. The Bank is also tasked with managing the Government Pension Fund Global (GPFG) and is thereby a major investor in global capital markets.

A feature common to these tasks is the identification and management of uncertainty and risk. Climate-related economic and financial risks have important implications for all of Norges Bank's operations. Climate change and climate risk must also be taken into account by central banks.

In order to work on these issues, central banks and financial supervisory authorities have formed the Central Banks and Supervisors Network for Greening the Financial System (NGFS). Norway is represented by Norges Bank and Finanstilsynet (Financial Supervisory Authority of Norway). The aims of the network include building knowledge and sharing best practices on climate risk management within the financial system.

Climate change, the macroeconomy and monetary policy

Natural disasters and extreme weather have an adverse impact on the production of goods and services. The agricultural sector is particularly vulnerable. But extreme weather events have also disrupted infrastructure and production chains. In the years ahead, climate change will lead to an increase in the frequency and intensity of weather events that have a negative impact on output.

In Norway, monetary policy is the first line of defence against economic shocks. When Norges Bank sets the policy rate, most weight is usually given to the outlook for the Norwegian economy over the next few years. Thus, there could be implications for monetary policy if extreme weather events occur that affect inflation and output prospects within this horizon.

Economists refer to events that unexpectedly reduce output as negative supply shocks. Such shocks typically push up the price of the affected goods. There are many examples worldwide of spikes in food prices following extreme weather events or long periods of drought. Electricity prices vary considerably in Norway depending on the amount of precipitation. For example, the combination of a cold winter and a dry summer contributed to a 26 percent rise in electricity prices, as measured by the consumer price index, in 2018.

Negative supply shocks thus lead to lower output but higher inflation. This poses a dilemma for monetary policy. Should the policy rate be raised to curb inflation? Or should it be lowered to stimulate the economy?

Chart: Quarterly growth Norway, autumn 2018

With our flexible inflation targeting regime, we will not usually change the policy rate if a supply shock is transient. One example is the decline in agricultural production in Norway in 2018 as a result of an unusually hot and dry summer. Production fell by 40 percent in the third quarter. Even though Norway's agricultural sector is small, the fall in production led to a decline in economic

growth between the second and third quarter. We assessed the decline as transient, and the policy rate was not changed. However, if such an event leads to a persistent rise in inflation in the next round, this may affect the policy rate.

So far, more unstable weather has only had short-term effects on output, employment and inflation in Norway and other advanced economies. Wide fluctuations have been observed in food and energy prices in particular[1], but there have up to now been few instances of physical climate change influencing macroeconomic developments in these countries.

Chart: Prices for European CO2 emission allowances

Climate policy measures, such as higher carbon taxes, will also affect price and demand developments. Prices for European CO2 emission allowances have increased by close to 500 percent over the past two years. This has pulled up coal and gas prices in Europe and has also contributed to higher electricity prices in Norway.

Even though the impact of climate change on aggregated economic variables will not necessarily be substantial in the next few years, the situation for individual businesses might be different. Norwegian firms will have to be prepared for the introduction of new climate mitigation measures and new, more environmentally friendly technology. Public attitudes and consumer demand patterns are also changing.

Many of Norges Bank's Regional Network contacts report that they are being affected by the increased focus on climate and sustainability.[2] Statutory emission limits and customer demands are steering investment and production methods in a greener direction. A number of retail trade contacts reported that sales are declining because customers are increasingly focused on sustainability. The trend towards lower meat consumption has, on the other hand, given a boost to aquaculture and fish farming.

Chart: Carbon pricing in Norway

A number of industries are likely to have to comply with a stricter climate policy, particularly industries with low or zero carbon prices today. Stricter climate policy requirements may also speed up the introduction of new technologies. Some firms will have to undergo major changes, while others may gain competitive advantages. Electricity production in Norway is largely environmentally friendly and could be more so. The transition to a low-carbon economy may therefore provide opportunities for the Norwegian business sector.

On the other hand, our large oil and gas sector may expose the Norwegian economy to transition risk. This was an issue that then Governor of Norges Bank Hermod Skånland addressed as early as in 1989: "Many accounts could be given of how they [international climate agreements] will affect prices and quantities in our production of oil and gas," said Skånland, and he went on: "but we cannot pretend that they will not be influenced by a climate policy we are pursuing ourselves. At the very least, they will increase uncertainty, and in sum, I believe, in a negative direction".[3]

Today, 30 years later, much of Norway's oil wealth has been converted into financial wealth. Petroleum revenues have been transferred to the Government Pension Fund Global (GPFG) since 1996. Petroleum revenue spending over the central government budget has been in line with the so-called fiscal rule since 2001.

Chart: From oil in the ground to financial wealth

The dark blue bars in this chart are the present value of government petroleum revenues at different dates, while the light blue bars show the value of the GPFG.

The Norwegian government has used this model to convert North Sea oil and gas wealth into a

fund with an investment portfolio diversified across equities, bonds and real estate around the world. The overall risk, including climate risk, has been reduced.

The Norwegian economy is also exposed to abrupt changes in operating parameters for oil and gas production through spillovers from offshore activities to the wider economy. We have long known that Norway's offshore petroleum activities would be gradually reduced. If global climate policy proves to be stricter than currently expected, the decline in offshore activity may occur sooner and more rapidly than previously assumed. This will have consequences for Norway's industry structure.

Even though it is likely that the biggest changes in oil-related industries lie some years ahead, climate risk may also have an effect on the oil sector in the short term. There are perhaps signs of this effect in recent years' oil stock prices.

Chart: Valuation of oil stocks

The price-to-book (P/B) ratio is lower for international oil companies than the average P/B ratio in the stock market, and this gap has widened in recent years. There may be several reasons for this, but we know that investors' climate risk awareness has increased in the same period.

Measures to influence industry structure are not within Norges Bank's remit. However, if the decline in the oil-related sector were to occur abruptly, the spillovers to the wider economy could be considerable. Monetary policy is adjusted to changes in output, employment and inflation and can therefore support overall activity and employment in a period of restructuring. The responsibility for the restructuring itself lies elsewhere, not least with the business sector.

The Norwegian banking sector and climate risks

Norges Bank promotes stability in the Norwegian financial system. We have recently published our annual financial stability report. The report includes an analysis of adaptation to climate risk in the financial system.

Economic losses resulting from changes in the regulation of greenhouse gas emissions, new climate-friendly technology or new consumption patterns must primarily be borne by the individual firm and its owners. In the event of very substantial losses, the firm's lenders will also be affected. In Norway, these lenders are largely banks. Climate risks, and transition risk in particular, may thus be a source of credit risk for banks.

Norwegian banks' exposures reflect the Norwegian economy and industry structure. I have already touched upon the substantial importance of the oil and gas industry to Norway's economy. Lending to this industry is a possible source of transition risk for banks.

Chart: Oil-related exposures, DNB

Although Norwegian banks have reduced their exposure to the oil industry in recent years, this industry remains important for banks. However, banks' losses may not be substantial unless a structural decline in oil-related industries results in substantial spillovers to the wider economy. This applies not least if there is a sharp fall in prices in the commercial and residential property markets, where banks' lending exposures are highest.

Banks can make a number of adjustments to reduce their own climate risk, primarily by correctly pricing the risk associated with their own exposures. Risk premiums on projects that do not meet green standards should reflect the higher risk associated with these projects. Similarly, discounts should not be given for so-called green projects unless there are financial reasons for doing so. A green investment does not necessarily involve lower financial risk.

In order to identify and adapt to their own climate risk, banks depend on relevant disclosure by

the companies in their lending portfolios. Accurately pricing risk is difficult without information about the level of the borrower's exposure.

For banks, transition risk is also a source of financing risk. There is growing interest in climate risk among financial investors, including those providing credit to banks. The perception that some banks are particularly exposed to transition risk may have implications for banks' funding costs and access to funding.

Thus, just as banks should identify climate risk in their own lending portfolios, they must be prepared for their own investors to demand improved disclosure of climate-related financial risk. The recommendations of the Task Force on Climate-related Financial Disclosures (TCFD) are in the process of becoming normative.

Banks play a vital role in the intermediation of credit to households and businesses. Problems in the banking sector can quickly have negative consequences for the wider economy. Large credit losses or difficulties obtaining funding can have ripple effects in the form of lower lending to households and businesses. Transition risk may therefore contribute to systemic risk.

Central banks and financial supervisory authorities can, within their mandates, promote financial stability by ensuring that financial institutions include climate risks in their risk assessments. Climate risks must be addressed in the same manner as other risks facing the financial sector. To the extent climate risks lead to higher credit risk, funding risk and systemic risk, climate risks should be included in the assessment of whether banks are sufficiently capitalised and have adequate long-term funding.

Climate risks and the Government Pension Fund Global

Norges Bank manages the GPFG under a mandate from the Ministry of Finance. The capital is invested with the objective of achieving the highest possible return within the limits of acceptable risk. The GPFG's mandate requires responsible investment activities to be integrated into investment management.

The aim of being a responsible investor is in part to support the long-term financial performance of the GPFG's investments. In addition, we seek to mitigate the financial risks associated with environment-related and social conditions in investee companies.

Chart: Invested in more than 9 000 companies in 73 countries

Seventy percent of the GPFG is invested in equities. With ownership shares in more than 9 000 companies in 73 countries, we take part in global growth and value creation. Many of the companies in the GPFG's portfolio could be impacted by physical climate change and the consequences of regulatory and technological countermeasures. Climate change could thus influence the GPFG's long-term return. Against this background, Norges Bank defined company behaviour towards the authorities regarding environmental and climate issues as a focus area for active ownership as early as in 2006.

In recent years, interest in responsible investment, and not least climate risk management, has increased among investors. Investor activity can be divided into two main categories: working with the companies in the investment portfolio or changing the composition of the portfolio.

The GPFG does both. We draw up expectations for portfolio companies, engage them in dialogue and exercise our voting rights. The composition of our investment portfolio also differs somewhat from the broad market index. The Bank's responsible investment work is concentrated on three pillars.

The first pillar, which we like to refer to as "setting standards", consists of our support for

common international standards and the published expectations drawn up for all the companies in the portfolio. The Bank's expectations with regard to companies' climate change-related work were first published in 2009.

If we and other investors are to understand our own exposure to climate risk, we will need adequate company reporting. To quote Bank of England Governor Mark Carney: "In order to watch we must be able to see".[4] To ensure consistency across markets, disclosures should comply with a common international standard. This would also contribute to raising the bar for all companies. I have already mentioned the TCFD recommendations. The GPFG supports this work.

The second pillar of the GPFG's responsible investment management is exercising ownership. We exercise our voting rights at companies' annual general meetings, and we engage in dialogue with a large number of portfolio companies. Recurrent topics in our dialogue with banks include financing palm oil producers and following up TCFD recommendations. Topics related to climate change have also been an important part of the dialogue with companies that buy and sell meat in Brazil.

The third pillar is related to the composition of the GPFG's investment portfolio. Our management mandate requires parts of the fund to be invested in environment-related mandates. The environment-related mandates were first introduced in 2011. The purpose of the investments does not differ from that of the rest of the GPFG. The environment-related mandates are required to contribute to diversification and to improving the return on the GPFG.

Chart: Environment-related mandates

The Ministry of Finance is in the process of adjusting the guidelines for these mandates. Investments are to be focused on climate-friendly energy, improving energy efficiency, carbon capture and storage, water technology and the management of waste and pollution. The upper limit for the environment-related mandates will be increased from NOK 60 billion to NOK 120 billion, as the mandates will be expanded in 2020 to include unlisted renewable energy infrastructure investments.

Primarily, these will be investments in wind and solar power production. In the Bank's strategy for the management of the GPFG in the period to 2022, our target is an allocation of around one percent of the GPFG towards the end of the three-year period. At the GPFG's current value, this is equivalent to NOK 100 billion.

Renewable energy infrastructure investments will reduce equity and bond investments by an equivalent amount. Therefore, the risk-adjusted return on the infrastructure investments should be at least as high as the return on the securities that we could otherwise have had.

Our managers have assessed the risk associated with governance and sustainability in some companies as so high that we have divested. Most often, these have been companies with business models that are not sustainable in the long term. This group also includes companies that emit particularly large amounts of greenhouse gases or engage in activities that contribute to deforestation.

In addition to such risk-based divestments, we sometimes exclude companies on the basis of ethical guidelines. These guidelines are set by the Ministry of Finance and serve as the basis for the Council on Ethics' advice and our decisions on exclusions. Ethical exclusions are not based on financial risk considerations, but on whether a company's operations or behaviour is in violation of fundamental ethical norms.

Two of the criteria for exclusion are related to greenhouse gas emissions. One of the criteria applies to mining companies or power producers with substantial emissions from coal, in either

absolute terms or as a relative share of their operations. In all, 82 companies have been excluded from the GPFG's investment universe based on the coal criterion. The second criterion states that companies that through their acts or omissions are responsible for unacceptable greenhouse gas emissions can be excluded.

This conduct-based climate criterion has yet to result in any exclusions. One of the issues that has proved demanding is whether a basic norm for ethically acceptable emissions can be defined. Another issue has been whether it is unethical to emit considerably more than the industry average if the emissions are part of an emission trading system. The Ministry of Finance provided important clarification of the application of the climate criterion in this year's annual white paper on the GPFG. The clarification provides a solid basis for moving forward on the criterion.

Conclusion

The impact of climate change is already substantial. In 2018, extreme weather events affected about 60 million people.[5] At the same time, the number of fatalities after severe storms and flooding has decreased in recent years. This is partly due to better disaster risk management.

Chart: Lower Manhattan, 30 October 2012

The picture shows a Lower Manhattan in darkness after Hurricane Sandy made landfall in October 2012. One building obviously had a backup power system when the power supply failed – the headquarters of the investment bank Goldman Sachs.

Let us take this as a reminder that contingency solutions must also be put in place for the economy, and not just to deal with power cuts. Extreme weather, policy measures and technological innovations have financial consequences for households, businesses and investors. This can have implications for the macroeconomy and for financial markets. As a central bank, we must adapt to the economic effects of climate change.

In Norges Bank, climate risk has long been on the agenda in the management of the GPFG. For the rest of the Bank, this field of work is a more recent addition. There is still a great deal we do not know about the economic and financial consequences of climate change. That is why we are working with other central banks to build up expertise in this field. Our aim is to play a role in strengthening the resilience of the Norwegian economy to the challenges posed by climate change and climate risk.

Thank you for your attention.

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1 Parker, M. (2018): "The Impact of Disasters on Inflation". *Economics of Disasters and Climate Change,* Volume 2, Issue 1, April, pp. 21–48.

2 *Regional Network* 3/2019. Norges Bank.

3 Skånland, H. (1989): "Refleksjoner ved utgangen av 1980-årene" [Reflections at the end of the 1980s]. Speech on 23 August 1989. Norges Bank.

4 Carney, M. (2019): "Remarks given during the UN Secretary General's Climate Action Summit 2019". Speech on 23 September 2019. Bank of England.

5 United Nations Office for Disaster Risk Reduction and Centre for Research on the Epidemiology of Disasters (CRED) (2019): "2018: Extreme weather events affected 60 million people". Press release, 24 January 2019.