



**FINANSTILSYNET**

THE FINANCIAL SUPERVISORY  
AUTHORITY OF NORWAY

Report

# Climate risk in Norwegian banks

2021



**The transition to a low-emission society will require adjustments in the Norwegian economy, which may have a significant impact on banks' risk of losses and profitability. Just like other risk, climate risk must be taken into account in the individual bank's credit assessments and capital planning. Considerable work is in progress internationally to increase knowledge about the economic consequences of climate change and the transition to low-emission economies, including the preparation of exposure analyses, scenarios and stress tests. The European Commission has put forward proposals whereby banks and supervisory authorities will be required to carry out climate stress tests on a regular basis. Finanstilsynet will develop tools and analyses to follow up financial institutions' climate exposure and risk. The work carried out internationally in this area under the auspices of central banks and financial supervisory authorities forms the basis for Finanstilsynet's follow-up of financial institutions.**

**This report analyses the possible impacts for Norwegian banks in two different scenarios for the transition to a low-emission society: one scenario with an orderly transition (baseline scenario) and one scenario with a disorderly transition. The scenarios are based on climate scenarios prepared by the Network for Greening the Financial System (NGFS) and analyses from the Bank of England. Finanstilsynet's calculations indicate that the banks may suffer significant losses on corporate loans in a disorderly transition scenario. The total level of losses is nevertheless considered to be manageable for Norwegian banks.**

## **INTRODUCTION**

Climate change can have serious consequences for the environment and people's living conditions. This acknowledgment has led to extensive international commitments to reducing greenhouse gas emissions. National targets on emission reductions have been set, and climate policy measures will be implemented to achieve the targets. There is considerable uncertainty as to how climate change and measures to reduce emissions will affect the economy.

Finanstilsynet has previously analysed banks' and insurers' direct exposure to industries exposed to transition risk. Climate-sensitive industries include industries with large greenhouse gas emissions and industries that are affected by measures implemented by other industries when the price of emissions increases. The analyses were based on frameworks from Battiston<sup>1</sup> and PACTA<sup>2</sup> and showed that some banks and insurance companies have a significant exposure to climate-sensitive industries, but that their overall exposure is nevertheless moderate and thus poses a limited risk to financial stability.

In 2020, the IMF<sup>3</sup> analysed the impact of higher carbon prices for various Norwegian industries and how such an increase may affect Norwegian banks' lending. Norges Bank conducted a similar analysis in 2021.<sup>4</sup> These analyses show that banks overall have moderate credit exposures to industries with high emissions. However, higher carbon prices may have a pronounced impact on individual banks and parts of the banks' loan portfolios.

The transition to a low-emission society will entail transition costs. The scope of these costs will depend on several factors. A gradual and orderly transition will require lower transition costs than a sudden and disorderly climate change adaptation, which may also cause greater uncertainty in financial markets. In such a scenario, other parts of the economy than the most climate-sensitive undertakings will also be affected, and this may result in higher loan losses for banks and a fall in the value of insurers' securities holdings. There is uncertainty about how quickly new green technology can be developed, taken into use and contribute to lower emission intensity.

The preparation of climate scenarios is an important tool in analysing climate risk. The TCFD<sup>5</sup> recommends companies to stress test their business models against relevant climate policy scenarios. The European Commission has proposed that banks and supervisory authorities should carry out climate stress tests on a regular basis.<sup>6</sup>

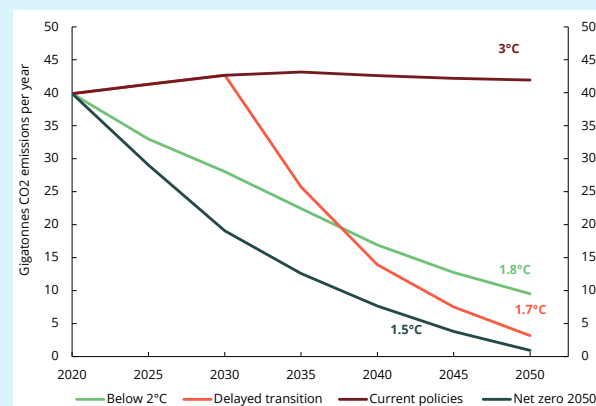
### Box 1 Climate scenarios from the NGFS

In June 2021, the NGFS\* published six different climate scenarios to provide a common starting point for analysing climate risk in stress tests. The climate scenarios have been developed using three so-called IAM models. In such models, modelling of physical climate variables, such as the concentration of greenhouse gases in the atmosphere and temperatures, is interconnected with economic variables and the design of climate policy. The models calculate, among other things, carbon prices that are consistent with a given climate target, for example the Paris Agreement goals.

The NGFS scenarios start in 2020 and run until 2100. The scenarios are designed to show a variety of possible outcomes, ranging from low to high risk associated with transition and physical climate change. The scenarios include different combinations of climate policy timing and intensity and the coordination of policies between countries and regions. The scenarios are also based on different assumptions about how quickly technological progress will occur, and the extent of carbon dioxide removal and storage.

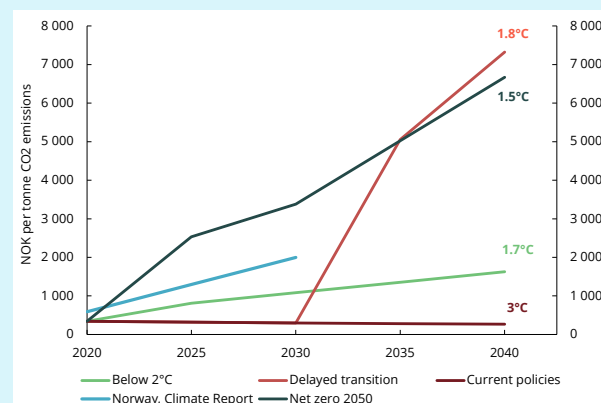
Charts A and B show four of the six scenarios from the NGFS. In one of the scenarios, current climate policies are retained throughout the period, see the line for 'Current policies' in charts A and B. In this scenario, global warming will be above 3°C, resulting in significant climate change and high economic costs throughout the period. Two other scenarios are based on the assumption that the transition to a low-emission society will start immediately and that greenhouse gas emissions will thus be reduced and global warming limited to below 2°C. In these scenarios, there are moderate costs associated with both the transition and climate change.

### A CO2 emissions in the NGFS scenarios



Source: NGFS

### B Co2 emission prices



Sources: NGFS and Report to the Storting 13 (2020–2021)

These scenarios are illustrated by 'Below 2°C' and 'Net zero 2050' in charts A and B. The last two scenarios illustrate the transition risk associated with the transition to a low-emission economy. In these scenarios, the transition will not start until 2030. At this time, much of the world's remaining carbon budget will be gone. The transition must therefore take place quickly in order for the global warming target below 2°C to be reached, see the line for 'Delayed transition' in chart B. A sudden and disorderly transition heightens the risk of misinvestment and a fall in the value of existing production equipment in the years after 2030.

The models used calculate cost-effective transition pathways. This means that for given assumptions about temperature targets, population growth, technological advancement and political aspects, the least costly pathway is estimated. This means, among other things, that necessary investments in renewable energy production can be realised. The models do not take the financial markets into consideration and thus do not capture the risk of misallocation of capital and the risk that a lack of financing opportunities could slow the transition to a low-emission society.

\* The Network for Greening the Financial System (NGFS) is a network of supervisory authorities and central banks. Norges Bank and Finanstilsynet are members. The climate scenarios are described in 'NGFS Climate Scenarios for Central Banks and Supervisors', NGFS, June 2021.

Some central banks and supervisory authorities have already used the climate scenarios from the NGFS in their stress tests of banks and insurers, and several are planning to carry out such analyses. The purpose is to gain increased insight into financial institutions' climate risks and consequences for the financial system, as well as to challenge the institutions' business strategies. Climate stress tests have so far not been applied for regulatory requirements.

In several of the published climate scenarios, such as the analyses from the Bank of England<sup>7</sup>, it is assumed that a sudden and disorderly transition will result in adjustments that amplify the negative economic impacts. Examples are increased uncertainty and higher risk premiums in financial markets and frictions in the labour market that delay the transition. This amplifies and prolongs the downturn and increases economic losses during the restructuring.

A small, open economy such as the Norwegian economy is heavily influenced by international developments. Among other things, a sharp fall in demand for petroleum will have significant ripple

effects for large parts of the Norwegian economy. A sudden and disorderly climate adaptation can therefore have serious negative consequences for the Norwegian economy and Norwegian financial institutions.

## FINANSTILSYNET'S CLIMATE SCENARIOS

The assessments in this report are based on two scenarios: one scenario with an orderly transition to a low-emission society (baseline scenario) and one scenario with a disorderly transition. The two scenarios describe possible pathways for the Norwegian economy during the transition to a low-emission society and do not represent Finanstilsynet's forecast of future developments. The projections are made by using the macroeconomic model NAM-FT<sup>8</sup>.

Finanstilsynet has not assessed or modelled the effect of various measures to reduce greenhouse gas emissions. Such an analysis would have required different modelling tools than those available to Finanstilsynet, and also falls outside Finanstilsynet's field of expertise.

In the baseline scenario, the transition to a low-emission society takes place in an orderly manner throughout the projection period. Decision makers both in Norway and internationally succeed in implementing necessary measures in a systematic and coordinated manner, thereby reaching the global warming goals in the Paris Agreement. It is assumed that the target to cut greenhouse gas emissions by 50 per cent from the 1990 level will be achieved for Norwegian mainland industries (both private enterprises and the public sector) and households by the end of 2030.<sup>9</sup> In the baseline scenario, total Norwegian greenhouse gas emissions (for mainland industries, households and the petroleum industry, but excluding international shipping) decline from 52 million tonnes CO<sub>2</sub> equivalent in 1990 to 33 million tonnes CO<sub>2</sub> equivalent in 2030 (chart 1).

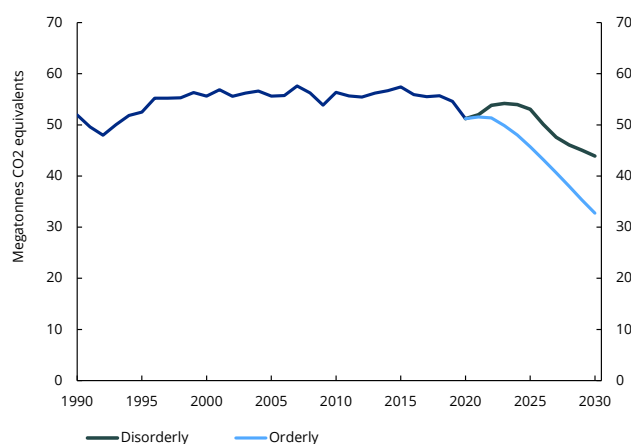
### Box 2 Norwegian climate targets

in February 2020, Norway submitted an enhanced climate target under the Paris Agreement. Norway thus committed to reducing greenhouse gas emissions by at least 50 per cent, and up to 55 per cent, in 2030 compared to 1990 levels. For emissions covered by the emissions trading system EU ETS, which covers most of the emissions from mainland industries, the petroleum sector, air traffic and some of the emissions from energy supply, the EU's overall emission reduction target is 43 per cent in 2030 compared to 2005 levels. The European Commission has proposed increasing the reduction target to 61 per cent in 2030 compared to 2005 levels. Norway has participated in the EU ETS on an equal footing with other European countries since 2008. There are no separate requirements for emission reductions in Norway or other countries within the ETS.

Source: Norwegian Environment Agency

The Norwegian emission reductions are assumed to be attributable to a rise in the price of greenhouse gas emissions in the non-ETS sector in keeping with the Climate Report (Report to the Storting 13 (2020–2021)) and higher allowance prices in the EU ETS. It is assumed that a gradual transition to low-emission technology contributes to emission reductions. Emission intensity, measured as CO<sub>2</sub> emissions in tonnes relative to GDP in NOK million, is reduced faster in this scenario than in the period from 1990 to 2020. There is a cost associated with a more rapid decline in emission intensity during the projection period. In the model calculations, this is reflected in somewhat lower consumption growth in the period from 2021 to 2030 than under a pathway where the reduction in emission intensity shows the same trend as in the period from 1990 to 2020. It is not clear how quickly new technology can be introduced, making it uncertain whether the target of a 50 per cent reduction in non-ETS emissions can be reached by 2030.

### 1 Norwegian greenhouse gas emissions (excluding international shipping)



Sources: Statistics Norway and Finanstilsynet

In the disorderly transition scenario, the start of the transition to a low-emission society is postponed both in Norway and internationally. The calculations are based on a technical assumption that the transition will start in 2025. The postponement entails a need to apply more drastic measures. The implementation of measures is also less coordinated and systematic than in the baseline scenario. This results in higher friction costs during the transition and greater uncertainty among investors and other players than in the baseline scenario. Up until 2025, emission intensity shows approximately the same development as in the period from 1990 to 2020. In the disorderly transition scenario, emissions initially increase before starting to decrease towards the end of the period. It is assumed that the emission cut targets will be achieved later than 2030 in the disorderly transition scenario.

NGFS' 'Below 2 degrees celsius scenario' and 'Delayed transition scenario' are used as a starting point when preparing the baseline scenario and the scenario with a disorderly transition to a low-emission society, respectively. However, when preparing the disorderly transition scenario, elements have been added that increase transition risk approximately to the same level as in the Bank of England's 'Late action' scenario, including higher risk premiums, steeper falls in oil prices and greater frictions in the labour market. Forecasts presented in Statistics Norway's 'Economic Survey 2021/3' and Norges Bank's 'Monetary Policy

**Table 1 Developments in important variables determined outside the model. Percentage growth in annual averages, unless otherwise stated**

		2020	Average 2021–2024	2025	2026	2027	Average 2028–2030
International CPI	Orderly	1.4	2.1	2.0	2.0	2.0	2.0
	Disorderly	1.4	2.1	3.3	4.1	4.1	3.1
Foreign money market rate (3-month, EURIBOR, per cent, level)	Orderly	-0.4	-0.4	0.0	0.3	0.5	0.9
	Disorderly	-0.4	-0.4	2.0	1.8	1.5	1.7
International demand for goods and services produced in Norway	Orderly	-7.3	7.1	4.6	4.6	4.5	4.3
	Disorderly	-7.3	7.1	-9.0	-2.0	2.0	3.0
Oil price (producer price, USD per barrel)	Orderly	41.8	65.2	62.0	62.0	62.0	62.0
	Disorderly	41.8	72.5	30.0	30.0	30.0	30.0
Public consumption	Orderly	1.7	1.9	2.0	2.0	2.0	2.0
	Disorderly	1.7	1.9	2.0	2.0	2.0	2.0
Public real investment	Orderly	-1.0	0.1	2.5	2.5	2.5	2.5
	Disorderly	-1.0	0.1	2.5	2.5	2.5	2.5
Norges Bank's key policy rate (per cent, level)	Orderly	0.4	1.0	1.7	1.7	1.7	1.7
	Disorderly	0.4	1.0	1.0	1.0	1.0	1.0

Sources: Statistics Norway and Finanstilsynet

Report 3/21' have been used as a basis for determining developments in some key economic variables in the period up to 2024.

The NGFS's scenarios cover the period up to 2100, while the Bank of England's scenarios runs until 2050. On account of technical aspects of the models, Finanstilsynet's projections have been made for the period from 2021 to 2030. The consequences of a transition to a low-emission society in Finanstilsynet's scenarios are therefore more concentrated in time than in the NGFS and Bank of England scenarios. The discussion of risk in the analysis is restricted to transitional risk.

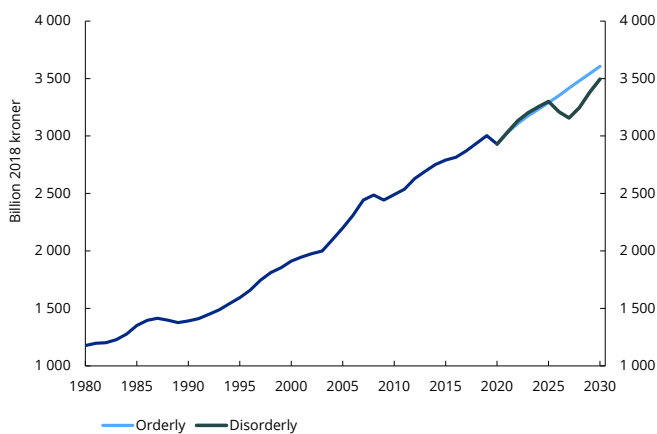
The fiscal policy stance is assumed to be the same in both scenarios. Public consumption and real investment are based on Statistics Norway's forecasts up to 2024. After this, growth rates are based on historical averages, see table 1. In both scenarios, Norges Bank's key policy rate is assumed to develop in line with the forecast presented in the Monetary Policy Report 3/21 up to 2024.

## ORDERLY TRANSITION SCENARIO (BASELINE SCENARIO)

As mentioned above, the baseline scenario is based on the NGFS' 'Below 2 degrees celsius scenario'. In the scenario, the transition to a low-emission society is assumed to take place in an orderly manner, and there are relatively low real economic costs associated with the transition. A further underlying assumption for the scenario is that there will be a faster reduction in emission intensity than in the period from 1990 to 2020.

In this scenario, there is an ongoing transition to less climate-polluting energy carriers in Norway and internationally throughout the period. It is assumed that demand for oil remains high during the first few years. Extraction and exports of Norwegian oil are initially assumed to rise roughly in keeping with Statistics Norway's forecast up to 2024, and then be reduced as projected in the Report to the Storting on long-term perspectives on the Norwegian economy 2021 (Perspective Report). The producer price of oil is expected to decline from close to USD 70 to USD 62 at the beginning of the projection period and remain at this level for the rest of the period, see table 1. However, the price of oil and other polluting forms of

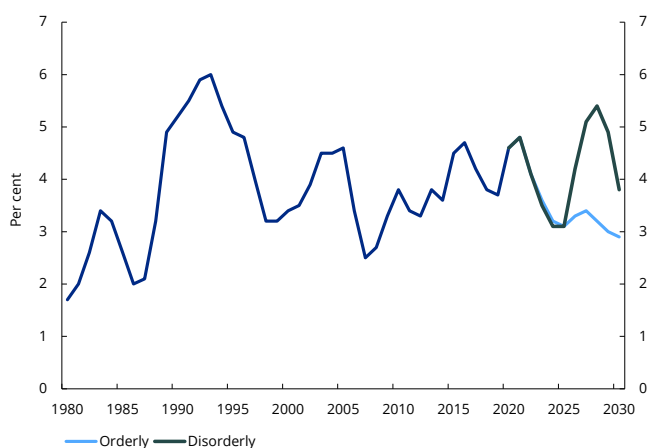
## 2 GDP for mainland Norway



energy that consumers must pay for are expected to increase in step with the planned rise in the price of greenhouse gas emissions. Developments in petroleum investments up to 2024 are based on Statistics Norway's estimates, but have been revised slightly downwards to reflect greater uncertainty about the industry's future level of profitability. From 2025, investments on the Norwegian shelf are assumed to gradually decline.

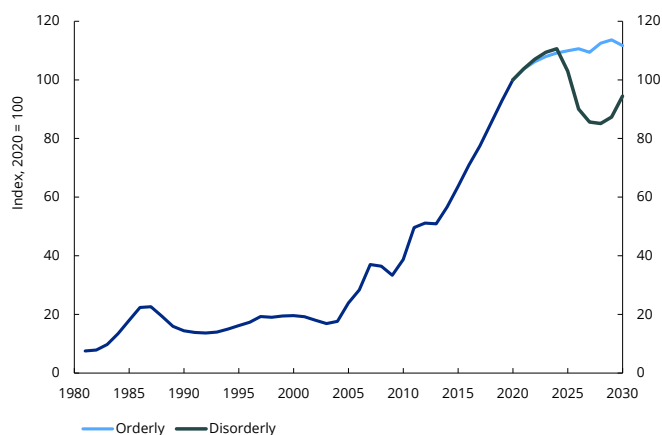
International demand for traditional goods and services produced in Norway is assumed to develop in line with the NGFS' scenario of an orderly transition to a low-emission society, with global warming below 2°C, see table 1. In the scenario, growth in Norwegian GDP is close to Statistics Norway's forecasts up to 2024, but slows somewhat towards the end of the projection period. GDP growth is positive throughout the period (chart 2). GDP for mainland Norway is higher than total GDP. This reflects the decline in production in the petroleum industry. Unemployment remains low throughout the projection period (chart 3).

## 3 Unemployment (LFS)



The increase in prices of energy and imported goods gives a certain rise in inflation. Norges Bank is assumed to raise its key policy rate gradually to 1.6 per cent in 2024 in keeping with the interest rate path set out in the Monetary Policy Report 3/21 and then leave the key policy rate at 1.7 per cent for the remainder of the period. International money market rates are expected to develop in line with estimates from the NGFS. In the scenario, three-month international money market rates gradually rise to 1.2 per cent in 2030. Developments in financial markets are stable both in Norway and internationally, and no shocks occur during the projection period. Norwegian banks' average lending rates therefore rise gradually and moderately throughout the period.

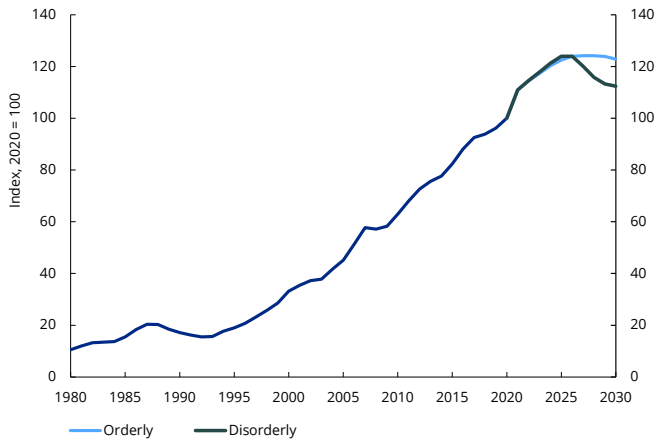
## 4 Commercial property prices



Sources: Dagens Næringsliv, OPAK, Entra and Finanstilsynet

Low interest rates and economic growth in mainland Norway contribute to an increase in Norwegian share prices and commercial property prices (chart 4). The upturn is particularly strong in the stock market. There is a 5.3 per cent increase in non-financial firms'

## 5 House prices

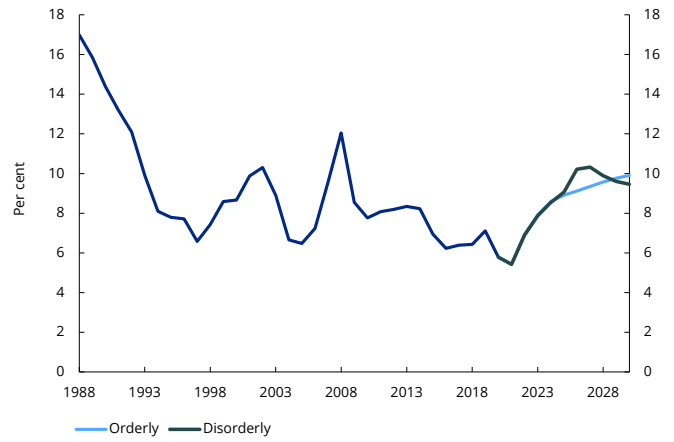


Sources: Statistics Norway and Finanstilsynet

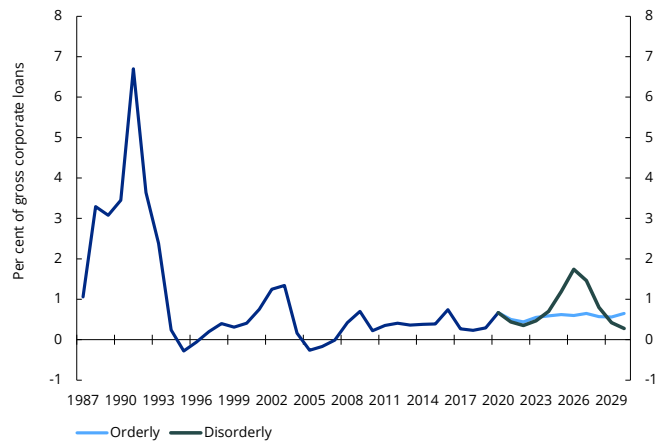
average debt (C2) per year from 2022 to 2030. The rising debt reflects an increase in real investment related to the green shift. On average, there is a nominal rise in households' disposable income of 4.1 per cent per year from 2022 to 2030. The nominal increase in household income is largely absorbed by inflation. Household consumption grows moderately throughout the period, and house prices level off in the second half of the period (chart 5). Household debt (C2) increases during the projection period, with the most pronounced rise in the first half of the period. There is a gradual increase in households' interest burden throughout the period due to a rise in both lending rates and household debt (chart 6). Households' debt burden is up 8 percentage points to 247 per cent in 2025, but declines to 244 per cent at the end of the period. Banks' losses on corporate loans and personal customer loans remain at a low level (charts 7 and 8).

## DISORDERLY TRANSITION SCENARIO

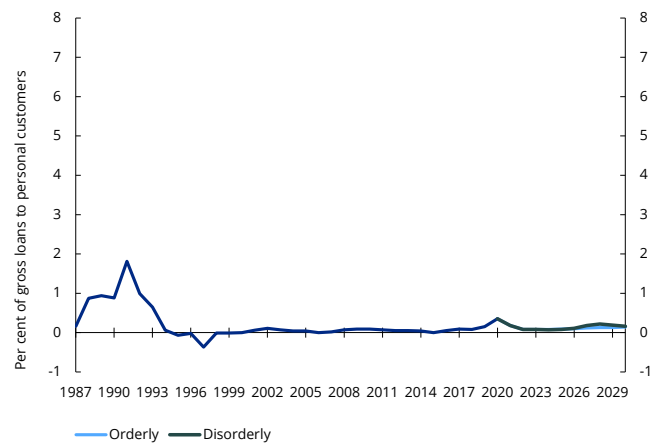
## 6 Households' interest burden



## 7 Banks' losses on corporate loans



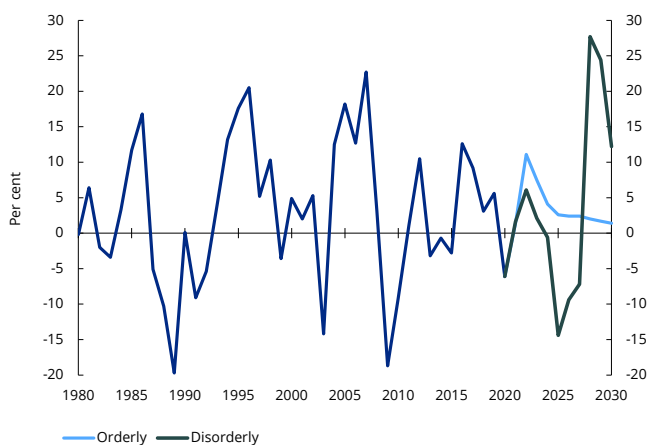
## 8 Banks' losses on loans to personal customers



Source: Finanstilsynet



## 9 Gross corporate investment (mainland), year-over-year growth



Sources: Statistics Norway and Finanstilsynet

for industries with large CO<sub>2</sub> emissions. Industries that are unable to adapt will thus experience weaker profitability. At the same time, technological progress leads to more efficient production of renewable energy, whereby the production costs of such energy declines. More affordable non-fossil energy and changing preferences in the population are assumed to amplify the shift in demand for non-fossil energy. User prices of all forms of energy rise in the scenario, with a particularly strong price increase on fossil-based energy.

The producer price of oil is expected to decline from close to USD 70 to USD 30 in 2025 and to remain at this level for the rest of the period, see table 1.<sup>10</sup> The fall in prices means that profitability in the petroleum industry is strongly curtailed and that petroleum investment on the Norwegian shelf is drastically reduced, especially after 2025. In the period from 2025 to 2030, Norwegian petroleum investment is expected to contract by 87 per cent. This will significantly reduce production capacity on the Norwegian shelf after the end of the projection period in 2030. Extraction and export of Norwegian oil remain approximately at the same level as in the baseline scenario up to 2030.

International money market rates rise after the start of the transition to a low-emission society, see table 1. As energy prices increase and the higher transition costs

are passed on to the consumers, inflation rises higher than in the baseline scenario from 2025. Just like in the Bank of England's 'Late action' scenario, central banks reduce their key policy rates somewhat to stimulate economic activity. Norges Bank is assumed to reduce its key policy rate from about 1.7 to 1.0 per cent in 2025 and to keep it at this level until the end of the period.

The economic impacts of the transition to a low-emission society will be greater in this scenario than in the orderly transition scenario. The degree of uncertainty and risk premiums in financial markets are expected to be particularly high in 2025 and 2026. The overall effect of lower key policy rates and higher risk premiums is that on average, the interest rates borrowers have to pay for loans in Norwegian banks will at no time be more than 0.5 percentage points higher in this scenario than in the baseline scenario.

Developments in GDP in key Norwegian export markets are assumed to approximately match those in the Bank of England's 'Late action' scenario, but are more compressed in time. International demand for traditional goods and services produced in Norway is assumed to contract by a total of 11 per cent in 2025 and 2026, see table 1. Significant uncertainty in 2025 and 2026 leads to a sharp decline in corporate investment in mainland Norway (chart 9). The declining trend in activity also results in sluggish growth in households' disposable income in 2026 and 2027. Private consumption is down 5.5 per cent from 2025 to 2028. Both total GDP and GDP for mainland Norway declines by 4.4 per cent from 2025 to 2027 (chart 2).

### Box 3 Comparison between the disorderly transition scenario and the Bank of England's 'Late action' scenario

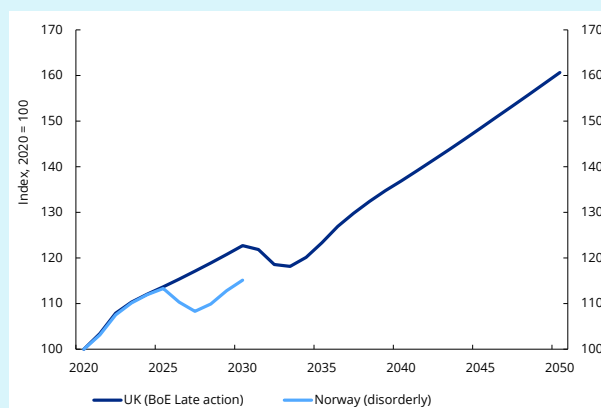
Finanstilsynet has calibrated the disorderly transition scenario so that the negative impulses that affect the domestic economy during the transition period roughly equal those in the Bank of England's 'Late action' scenario. A comparison of the severity of these two scenarios is compli-

**Table A Developments in key economic variables during the transition phase**

	UK Bank of England Late action scenario	Norway Finanstilsynet's disorderly transition scenario
<b>International factors:</b>		
Export market indicator*	- 10 per cent	- 11 per cent
Oil price (producer)	- 62 per cent	- 62 per cent
Implicit volatility of US shares, increase	11 percentage points	10 percentage points
<b>Domestic factors:</b>		
GDP	- 3.7 per cent	- 4.4 per cent
Share prices	- 15 per cent	- 37 per cent
Commercial property prices	- 28 per cent	- 23 per cent
House prices	- 19 per cent	- 9 per cent
Unemployment, increase	3.5 percentage points	2.3 percentage points
Unemployment, highest level in scenario relative to highest level in recent history	8.5 per cent in 2033 represents 72 per cent of the 1984 level	5.4 per cent in 2028 represents 90 per cent of the 1993 level

\* Estimated effect on international demand for goods and services produced in Norway, as measured by the NAM-FT export market indicator, subject to international GDP developments specified in the two scenarios. Sources: Bank of England, Refinitiv and Finanstilsynet

**C (Total) GDP in the Bank of England's 'Late action' scenario and Finanstilsynet's disorderly transition scenario**



Sources: Bank of England and Finanstilsynet

cated by the fact that they are of very different duration and that no specific variable or index provides an unambiguous measure of the severity of such scenarios. Table A compares developments in key macroeconomic variables from the highest to the lowest value (or vice versa) from the start of the transition to a low-emission society and for as long as the variable is declining (or rising), which is considered to represent the duration of the transition phase.

The changes in the export market indicator, the producer price of oil and the implicit volatility of US shares, which represent developments in international factors, are very similar in the two scenarios, see table A.

The international impulses have different effects on the Norwegian and the UK economies in the two scenarios. Despite the fact that there is a steeper decline in (total) GDP in Finanstilsynet's scenario for Norway (-4.4 per cent from 2025 to 2027) than in the Bank of England's scenario for the UK economy (-3.7 per cent from 2030 to 2033) (chart C), unemployment increases more in the UK (3.5 percentage points) than in the Norwegian scenario (2.3 percentage points). In Finanstilsynet's scenario, unemployment rises to 5.4 per cent, which is somewhat below the highest level during the 1993 downturn. There are structural differences between the Norwegian and the UK labour markets. For one thing, the proportion of public sector employees is higher in Norway than in the UK.

There is a smaller decline in commercial property prices and house prices in the scenario for the

Norwegian economy than in the scenario for the UK economy, while the fall in share prices is greater in Norway than in the UK. These differences partly reflect the significant importance of the oil industry for the Norwegian economy.

Rising interest rates, declining activity levels and higher risk premiums are factors contributing to the fall in the stock and real estate markets. Owing to the fact that the oil companies constitute a large proportion of the companies listed on Oslo Børs, the decline in Norwegian share prices will be particularly sharp. From 2024 to 2026, Norwegian share prices are down 37 per cent, while commercial property prices are reduced by 23 per cent from 2024 to 2028 (chart 4). House prices decline by 9 per cent from 2026 to 2030 (chart 5).

Towards the end of the projection period, frictions in the transition to a low-emission society are assumed to gradually subside, and the uncertainty in financial markets declines towards normal levels. Both Norwegian share prices and commercial property prices are rising, but do not reach pre-transition levels by the end of the projection period. It is assumed that a large number of green investments will be introduced, particularly in private mainland industries (chart 9). International demand for goods and services produced in Norway is expected to rise by 2-3 per cent per year from 2027 to the end of the projection period. A decline in inflation and higher growth in households' disposable income provide a boost to private consumption. Growth in GDP for mainland Norway picks up markedly towards the end of the projection period, while there is a continued decline in the petroleum industry. On account of developments in GDP, unemployment increases markedly in the second half of the projection period. Unemployment (LFS) increases from 3.2 per cent in 2025 to 5.4 per cent in 2028 and does not decline to 3.8 per cent until 2030 (chart 3).

Households' debt and interest burdens rise during much of the projection period and are somewhat reduced towards the end of the period. While the debt

burden in 2030 is 2 percentage points lower than in 2021, the interest burden increases by 4 percentage points, to 9.5 per cent, during the same period. This reflects the fact that banks' average lending rates are not reduced by more than 0.2 percentage points from 2027 to 2030.

Banks' loan losses rise considerably during the projection period. Losses are particularly high on corporate loans. From 2025 to 2030, banks' losses on loans to corporate customers represent 5.9 per cent of gross lending to the sector (chart 7). During the same period, the banks' losses on loans to personal customers come to 0.9 per cent of gross lending to the sector (chart 8). Banks' annual losses on loans decrease towards the end of the period. During the banking crisis from 1988 to 1992, the banks' accumulated losses were 20.2 per cent on corporate loans and 5.5 per cent on personal customer loans.

Higher loan losses will have a negative impact on banks' earnings. Estimates for a macro bank representing a weighted average of 19 of the largest Norwegian banking groups show that profit after tax will be more than halved in some years during the projection period. Nevertheless, the macro bank is projected to record net annual profits throughout the period. The fall in earnings thus has little direct impact on the banks' capital adequacy ratios, which nevertheless contract somewhat in consequence of the estimated strong lending growth up to 2026. Despite the increase in loan losses, slowing lending growth helps to raise capital adequacy ratios towards the end of the projection period. Such a development is considered to be manageable for Norwegian banks. Nevertheless, it must be emphasised that there is considerable uncertainty associated with both the macroeconomic scenario and banks' losses during a disorderly transition.

## NOTES

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<sup>1</sup> See A climate stress-test of the financial system, Battiston et al. (2017)

<sup>2</sup> See [Climate risk in insurance, exposure analyses and use of the PACTA framework](#), Finanstilsynet (2021) (in Norwegian only) and [PACTA's website](#).

<sup>3</sup> See [Climate-Related Stress Testing: Transition Risks in Norway](#), IMF Working Paper 20/232

<sup>4</sup> See [Climate risk and banks' loans to firms](#), Norges Bank Staff Memo 7/2021

<sup>5</sup> See [Task Force on Climate-related Financial Disclosures](#)

<sup>6</sup> See [the European Commission's proposed amendments to CRR2 and CRD5](#), aiming to strengthen the banking sector's resilience to ESG risks.

<sup>7</sup> See [Key elements of the 2021 Biennial Exploratory](#)

### [Scenario](#)

<sup>8</sup> NAM-FT is based on the Norwegian Aggregate Model (NAM) and was developed specifically with a view to stress testing of banks and analysis of financial stability. NAM was developed by Professors Gunnar Bårdsen and Ragnar Nymoen. Documentation of NAM can be found at [Normetrics](#). The model is also discussed in the Risk Outlook reports from 2014 to 2021.

<sup>9</sup> International shipping is not covered by the Paris Agreement and is excluded from this analysis.

<sup>10</sup> The price of natural gas is not included in the NAM-FT model. Just like the price of other fossil-based energy sources, however, a fall in prices is expected in the latter half of the projection period.



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