

Measuring climate-related financial risks using scenario analysis

The Bank of England's latest views | June 2024



As part of its April 2024 Quarterly Bulletin, the Bank of England (BoE) published an article on 'extending' macro-climate scenarios to carry out more granular asset-level analysis and references examples across sovereign bonds, corporate bonds and residential mortgages.

Quantifying the risks of climate change is an ongoing challenge for financial services (FS) firms and a consistent and expanding area of focus for regulators:



The Basel Committee for Banking Supervision (BCBS) noted at the end of 2023 that banks were lagging on the quantification of climate-related risks – for more see KPMG in the UK's article here.



The International Association of Insurance Supervisors (IAIS) launched a consultation in 2023 on climate risk scenario analysis and is expected to publish final comments expected at the end of the year.



The PRA and ECB are already supervising firms against their expectations on climate modelling – the PRA is due to refresh Supervisory Statement 3/19 in 2024 and the EBA has recently closed its consultation on new Draft Guidelines for the management of ESG risks, including minimum standards and a methodology for identifying, managing and monitoring ESG risks.

Using scenario analysis to measure climate-related financial risk.

While some backward-looking metrics, such as carbon intensity and financed emissions, can help firms to measure climate-related risks, they come with numerous limitations. They do not consider actions that a specific issuer is planning to take to mitigate their climate exposures and are difficult to translate into decision-useful information that can be incorporated into risk management frameworks. Scenario analysis can help to address this by modelling the impact that a top-down climate scenario has on the value of a financial asset. However, standard risk modelling approaches do not capture the unprecedented nature and uncertainty of climate-related risks, hence the need for further guidance from the BoE.

The BoE article focuses on the FS-specific NGFS climate scenarios and how to measure the asset-level impacts of climate-related financial risks. Firms can use toolkits such as:

- **Special granularity and resolution** e.g. what is the proximity of the asset to the source of physical risk;
- **Related variables** e.g. including variables that are not usually provided in climate scenarios, such as sovereign debt / GDP ratios;
- **Temporal misalignments** e.g. using varying time horizons in analysis given the broad range of maturities, from months to years, for financial assets; and
- **Intra-sectoral variabilities** e.g. developing toolkits to apportion sectoral impacts at asset level.

Applying macro scenario analysis

Sovereign bonds



The BoE observes that sovereign bond yields are influenced by expected policy rates, where bond prices can fall if they are less attractive than short-term investments with higher interest rates in money markets, and sovereign credit risk premia (additional premia on bond yields where a sovereign issuer is at risk of defaulting due to governance, fiscal positions etc). The crystallisation of physical and transition climate risk could have impacts on inflation as well as government spending and revenues, subsequently affecting the yields on sovereign bonds.

Macro climate scenarios often only provide a short-term and a 10-year interest rate projection. However, as investment portfolios include sovereign bonds with intermediate or much longer maturities, it is important to extrapolate the macro projection to measure financial risks across the whole yield curve.

Important factors to consider when doing this are:

- **Changes in the 'risk-free' component of interest rates:** firms should estimate how yields change on bonds with maturities other than short-term and 10 years. The BoE provides an example assuming that the yield of a 30-year (or other maturity) bond today is simply determined by the pathway of short-term interest rates in a given scenario over the next 30 years (or other maturity); and
- **Changes in the 'credit risk' component of interest rates:** firms wishing to measure how debt/GDP ratios or sovereign credit ratings change over climate scenarios primarily need to overcome the 'related variables' challenge i.e. what are the other considerations that are not usually provided in climate scenarios. Factors to consider in developing debt/GDP projections include changes in tax revenues, carbon tax revenues, fuel taxation, green investment, debt interest and acute physical spending (i.e. government expenditure on supporting households to respond to or mitigate against the physical risks of climate change).

Corporate bonds



The physical and transition climate risks to which a corporate issuer is exposed can be transmitted via their corporate bonds. Transmission variables include regional carbon prices, country-level GDP and global temperature rises.

Macro scenarios do not provide sufficient granularity to assess impacts at individual firm level. The BoE bulletin notes that asset-level analysis should ideally incorporate:

- **The impact of carbon pricing** on the specific issuer, with consideration of the corporate's future decarbonisation plans;
- **The impact of other transition risks and opportunities** on the specific issuer, e.g. regulatory costs, reductions in income, any financial benefits;
- **The impact of physical risks** on the specific issuer, e.g. location of operations, supply chains and consumer markets; and
- **Economy-wide interdependencies.**

Residential mortgages



Residential mortgages form the largest asset class for most retail banks but, with typical maturities of 25 years or longer, climate-related risks may not crystallise for several decades.

When extending macro scenarios to asset-level analysis the BoE advises firms to consider:

- **Transition risks:** a key challenge is not knowing how energy consumption is distributed across different households and how different households might respond to rising energy prices by improving energy efficiency. Combining energy prices from macro scenarios with the energy consumption data from EPC ratings can provide an estimate of each borrower's total energy cost.
- **Physical risks:** the key challenge is not knowing how climate change impacts the frequency and severity of floods in the UK. The BoE analysis uses data from a catastrophe modelling firm to estimate this – and thus indicates the potential damage to specific properties.

How KPMG can help



Modelling and analytics

- Benchmarking and gap analysis of existing capabilities
- Climate data identification, sourcing and integration
- Incorporating climate risk into stress testing, provisioning and credit decisioning models
- Analytical assessment of strategy and climate-credit policies
- Integration of scenario analysis results into strategy setting, risk appetite and credit decisioning
- Climate-adjusted financial statement and asset valuation modelling
- Monitoring, reporting and disclosing climate risk exposures



Scenario analysis

- Climate risk driver identification and materiality assessment
- Climate scenarios tailored to the needs of your institution and stakeholders
- Adaptable and transparent economic expansion using the [KPMG Climate IQ](#) framework
- Climate risk quantification training



Model validation

- Model validation of climate risk and ESG models
- Model enhancement identification and planning
- Internal audit support
- Review of model risk management and oversight structure

Contact us

KPMG in the UK has a dedicated Risk and Regulatory Advisory practice with extensive climate risk expertise, including climate-related modelling.

We can support financial institutions in addressing the business and regulatory challenges of climate-related risk, applying our experience, our understanding of industry bodies and evolving regulatory expectations, and our combined expertise across different markets and risk types.

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