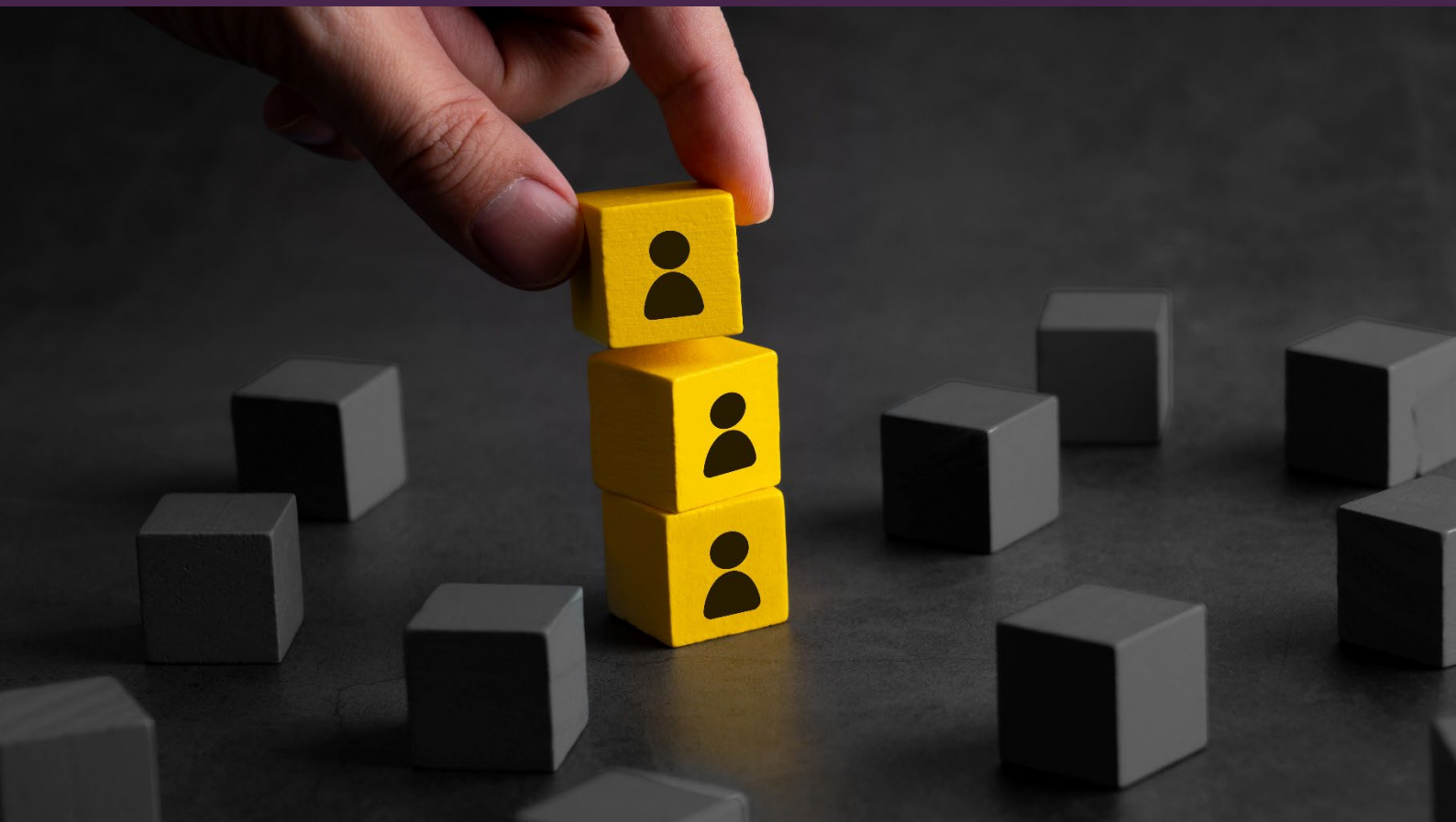# CBES to Assess Resilience of Financial Institutions to Climate Change

Introduction

The 2021 [Climate Biennial Exploratory Scenario (CBES)](#) was published by the Bank of England (BoE) during June 2021. The objective of the stress testing is to understand the resilience of UK-based Banks and Insurance agencies from physical and transition risks emanating from climate change. Apart from the broad mapping of exposure of participant banks to climate-related risks, the exercise will help to understand the challenges faced by financial institutions and carve out possible management approaches.

Salient features of CBES include the following:

- The CBES consists of three scenarios reflecting early actions, late actions, and no additional action to estimate the physical and transition risks.
- The physical and transition risks have been defined as risks associated with high global average temperatures and risks associated in the process to transition to lower greenhouse gases emission respectively.
- The participation in CBES has been limited to large UK-based banks and insurance firms. These firms together contribute to 70% of UK-based banks lending to UK-based businesses and households. The percentage is 65% and 60% in life insurance and general insurance segments.
- Participants would need to assess their positions with respect to 2020 end balance sheets assuming the position remains fixed (generally).
- For banks, the scope is only credit risk in the banking book, and for insurance firms the scope includes invested assets and insurance liabilities.

Some of the parameters are already accounted for in credit risk measurements like demand, price, and supply while assessing industry risk. Other parameters like carbon pricing and new vehicle registration are considered primarily in the companies where the linkages are direct like energy producing companies. Ratings and scorecards need to be recalibrated to reflect the risks from the various scenarios and to provide a linkage of rating migration with respect to risk parameters considered under transition risk. For instance, there could be a possible increase in the weights for business risk related to emission norms and costs thereof.

Transition Risks

Transition risks are estimated through measures such as carbon price, energy demand, end-user and producer prices of coal, gas and oil, new vehicle registration, number of vehicles plying on road, price of used car. The paths for these parameters have been defined for each of the early, late, and no additional action scenarios. Carbon price, for instance, increases from USD 30 in 2020 to USD 900 by 2050 in the UK under the early action scenario. The prices increase to USD 1060 in the late action plan and reduce to USD 21 under no action plan by 2050.

In early and late action plans, fossil fuels utilization drops to ten percent in the UK and to 30 percent globally. Under the no additional action scenario, fossil fuel utilization remains at 60% in UK. The prices of fossil fuel commodities start to decline due to a decrease in demand for fossil fuel-based energy. In the late action plan, the sharp rise in carbon prices leads to

businesses drastically changing their business models towards less carbon-intensive technologies thereby increasing transition risks. This can have a bearing on industrial production and inflationary pressures.

Some of the parameters are already accounted for in credit risk measurements like demand, price, and supply while assessing industry risk. Other parameters like carbon pricing and new vehicle registration are taken into account mostly in the companies where the linkages are direct like energy producing companies. Ratings and scorecards need to be recalibrated to reflect the risks from the various scenarios and to provide a linkage of rating migration with respect to risk parameters considered under transition risk. For instance, there could be a possible increase in the weights for business risk related to emission norms and costs thereof.

Physical Risks

Physical risks are much higher in the no addition action scenario as compared to the other two. The chronic risk of rising sea level, increased temperature, and precipitation are way higher. Acute risks in the form of increased frequency and severity of cyclones, wildfires, heatwaves increase substantially by 2050 under no action scenario. Temperature change, the percentage change in wind speed, precipitation rate, soil moisture, land area exposed to wildfires, crop failure, heatwaves, tropical cyclones, among other parameters, have been defined as the parameters to capture physical risks.

The UK is most likely to be impacted by increased average temperature, rise in sea level, reduced precipitation in winter months, and increased precipitation in winter months as per

the scenarios. Globally there is an increased level of precipitation in the no additional action scenario and can be measured using average maximum discharge in a river or catchment. Similarly, the frequency and severity of cyclones are expected to increase globally.

These risks can be captured through catastrophic modeling, integrated assessment models, computable general equilibrium, dynamic stochastic general equilibrium, and agent-based models. The use of geospatial mapping would provide better estimates of the incipient risk using micro-level risks faced by individual counterparties. The only limitation is that there is no globally accepted modeling framework in practice, affecting comparability and aggregation to some extent.

Macroeconomic Impacts

Paths have been provided for all years for most of the macroeconomic indicators, including GDP, inflation, interest rates, and unemployment rate. In the early action scenario, macroeconomic factors are moderate at an average. The demand-supply shock is mostly compensated by increased demand for energy-efficient alternate products and investments in producing these products. Interest rates increase gradually on the back of increased investment. In the late action scenario, there is a sharp decline in GDP and increased unemployment in the initial period of the 2030s. Similarly, credit spreads are expected to widen. Under the no additional action scenario, there are increased uncertainties as the physical environment turns adverse. Credit spreads are expected to widen in a large number of markets, interest rates rise gradually, housing prices steadily decline.

Macroeconomic impacts are already factored in as part of scenario analysis or stress testing mechanisms of banks and financial institutions. Since the path has been defined, there should not be a challenge to compute the shocks based on CBES paths. However, there will be differences in the impact across sectors which needs to be taken into consideration. For example, the impact will be much higher in fossil fuel, mining and manufacturing sectors which needs to me micro-factored in the credit exposures.

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Amit has 15 years of experience in risk management, regulatory advisory, and big data analytics in the banking and insurance sector. He has worked on numerous assignments including model development and validation in the areas of pricing and regulatory risk models.

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