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CREATING A SUSTAINABLE INFRASTRUCTURE FOR CLIMATE RISK ANALYTICS

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CREATING A SUSTAINABLE INFRASTRUCTURE FOR CLIMATE RISK ANALYTICS

PANEL EXPERTS

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R&C: **Could you provide an overview of some of the ways financial institutions (FIs) are currently reacting to climate risk?**

Siddiqi: There is a wide spectrum of reactions, ranging from being aware to proactive actions. Most banks are aware, at least at board level. After that, we see banks that are trying to understand ways in which climate risk might impact them as an institution, and how they need to react to issues such as setting risk appetites, governance, compliance, and policy and strategy, among other things. On the other side, there are also banks that are undertaking projects to identify exposures to climate risk and preparing to disclose them as required by some national regulators. At the leading edge, there are a few banks that have either completed a proof of concept or are using climate risk factors in their lending and investment decisions, for example via models that link climate factors to probabilities of default.

Plochan: How FIs react to climate risk depends on the region, political and regulatory climate, the size and profile of the bank and also on the attitude and opinion of senior leadership toward the topic. Some banks are looking to aggressively cut down their carbon footprint and become net zero on their financed loan and asset portfolios by 2050. On the other side of the spectrum, smaller banks consider climate risk to be an important topic, replacing plastic cups with paper cups at coffee machines.

R&C: **Given the uncertainty around future analytics on climate risk, do you believe FIs should invest now, or wait until key issues are more clearly defined?**

Siddiqi: This is a new type of risk for banks in some ways, but how they deal with it is no different to other initiatives. If you take something like the Basel or International Financial Reporting Standards (IFRS) rules, for example, there were some prescriptive components around calculations and reports, but complying with those required a lot of supporting infrastructure. The same will be true of climate risk. So, while we wait for clarity around disclosure and impacts on regulatory capital, banks can prepare to ensure smoother compliance. Specifically, we know they will need to prepare their data structures for larger and varied types of data, manage and extract samples for analytics, perform analytics such as modelling, stress testing and scenario analysis, validate and audit these processes, and disseminate reports internally and externally. In addition, we see integration with other parts of the operation, including finance. Banks should look into creating a flexible, efficient infrastructure now and evolve it as details become clearer. Lastly, by infrastructure, I do not just mean software and hardware – there are also areas

such as governance, organisational structure, compensation and HR, policy and strategy that will need to adapt.

Plochan: I would emphasise the following three elements as being key to effective climate risk analytics. First, focus on forward-looking and what-if perspectives. With climate risk we have to deal with much longer time horizons, with regulatory stress tests covering 30 years and carbon pathways going all the way to 2100. With longer time horizons, there is much more uncertainty and volatility to deal with compared to the other 'business as usual' (BAU) risk areas and processes. This impacts, for example, the number and duration of scenarios and simulations that we have to execute to understand the impact and sensitivities of risk drivers. It also increases our exposure to model risk. Second, focus on integration with other BAU risk areas and processes. As stated by the Network for Greening the Financial System (NGFS) in its call to action paper that started the climate movement in the financial sector – 'Climate change is a source of financial risk' – integration should be managed as an integral part of financial risk management activities, which includes underlying systems. What nobody wants to have is another island created in the organisation focusing only on climate risk , for example data scientists building their own climate risk models that are not in sync with existing credit loss (ECL) models. Finally, focus on strategy and portfolio

steering – addressing climate change is not just a risk and compliance topic, but rather a significant transformation of banking business models. In terms of the net zero portfolio strategies that banks around the world are committing to, the role of climate risk analytics will be crucial to identifying optimal portfolio decisions and strategies. Over the coming years, banks, in order to determine their optimal portfolio decarbonisation paths, will have to perform many portfolio simulations to determine the impact of various scenarios, portfolio mixes and decarbonisation strategies on their key performance indicators and their key risk indicators. Banks should already be thinking about these three perspectives, as they establish the foundations for their climate risk management function and systems.

R&C: What kinds of analytics should bank prepare to integrate into their systems?

Siddiqi: There are numerous types of analytics, but we should note that managing climate risk does not involve the creation of any new type. It is more about applying existing analytics to a new type of problem. At this point, we see some banks doing risk modelling for credit, market and operational risks. These involve building models to predict changes to, for example, probability of default, loss given default and other measures, due to climate change. However, scenario analysis and stress tests are

expected to be the primary means for analysing climate risk. As we have seen during the pandemic, scenario analysis is a good tool for leveraging data-driven forecasts and expert judgement. Some banks may even attempt a climate value-at-risk (VaR). We can also explore exposures and visualise climate sensitivities at asset level and aggregations. Climate risk analytics will consume and generate large volumes of data, so analytics and data visualisations to summarise risks and convey relative risks will be essential. We also recognise that each of these analytics areas consists of its own ecosystem of data structures, modelling, governance and so on. But it should be emphasised that climate risk analytics is a part of existing risk and finance processes, and must integrate into them.

R&C: Artificial intelligence (AI) and machine learning (ML) has been a hot topic lately, and banks have discovered many use cases where it can provide benefits. What role does AI/ML have to play in climate analytics?

Siddiqi: Artificial intelligence (AI) and machine learning (ML) have already changed the way we live and work. Climate data is massive and displays complex behaviour – two things that ML is designed to cope with much better than traditional techniques. I see it being used in models linking climate data to the different types of risks, and to predict things

like probability of default and loss given default. ML can also predict market risk, certainly in pricing instruments where there are complex relationships between climate factors and asset values. Natural language processing and text mining can be very useful in identifying exposures – some banks may have hundreds of thousands of counterparties. Finding exposure will be a complex task, but can be made easier it we can go through annual reports, publicly available data, newsfeeds, written reports and other such sources. Another area that is already being explored is the use of real-time streaming data for risk analytics. In credit, for example, news stories can be scanned and analysed to update credit ratings. We will likely see this real-time monitoring in climate risk as well, checking for physical risks and policy changes.

Plochan: We are already looking at how to leverage our AI capabilities to analyse climate risk disclosures, such as the TCFD's – published by thousands of firms around the world in order to determine their exposure and sensitivity to climate risks.

R&C: What lessons can FIs draw from their experience of the global coronavirus (COVID-19) pandemic, which may be applied to assist with climate risk?

Siddiqi: I saw coronavirus (COVID-19) as a mini dress rehearsal for climate risk. However, there are a few lessons to be learned. First, while most banks had similar ideas on how to respond, the ones that were successful were those that had invested in efficient, integrated infrastructure which allowed them to deploy those ideas quickly – for example changes to scorecards and models, policy rules, credit limit and collections strategies and even loyalty programmes. In the better banks, this took a few days; with others, making these changes took weeks. The same will be true when banks redevelop their models post-COVID-19. The lesson for climate risk is that investments in efficient infrastructure will now make life much easier when the time to comply comes. As compliance requirements become clearer, they will need to incorporate new data, forecasts, models, assumptions, reports and so on. Second, COVID-19 did not impact everyone equally. Initial analysis in banks for credit risk, for example, showed 'average' results – but deeper segmentation revealed industries and retail segments that showed very different impacts. This led to much better targeted strategies. Climate risk will also have such disparate impacts by geography and sector. Models, strategies and policies will be needed at segment, and perhaps microsegment, level to respond appropriately.

R&C: How can FIs quantify climate risk?

Siddiqi: This is one area where there are challenges. The impact of climate change takes decades – and what is being forecasted has not happened before. So using historical data is

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insufficient to get an accurate picture. For physical risk, FIs have been analysing past records of hurricanes, fires, floods and other such events and trying to correlate them to financial loss. This is quite similar to what insurance companies have been doing for much longer. Banks are also adding judgmental overlays on top of existing models for specific segments where historical data may not exist. Such analysis can be helpful for short-term exposures. For longer-term, it gets more complicated and typically we would do scenario analysis. While this can help with longer-term exposures, the very

long timelines also make it much more sensitive to assumptions and small changes. In particular, transition risks are subject to government policies which can sometimes be unpredictable. One possibility is a bottom-up approach, going asset by asset and aggregating losses to the portfolio level. Banks should attempt the most granular levels possible when defining climate scenarios and estimating sensitivities to climate factors. However, it is important to note the inherent uncertainty of all this, and to communicate to manage expectations, so that it is clear that there are a range of possible outcomes and not a single expected loss.

Plochan: I would start at the beginning with identifying and measuring exposures to climate risks. Given the lack of global regulatory alignment on which measures to use, currently the best approach may be to leverage the carbon accounting framework put together by the Partnership for Carbon Accounting Financials (PCAF). I like to call this a 'carbon weighted assets' calculation framework. Embedding this methodology is also fundamental for banks' net zero strategies. However, this captures mainly transition risk, so different methodologies will be needed for physical risk. But let us also recognise that a lot of banks still have a long way to go to

quantify their exposures to climate, and cannot even think about quantifying the risk itself.

R&C: Could you provide an insight into how significant climate risk is expected to be? What major impacts is it anticipated to have for FIs?

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SAS Institute Inc.

Siddiqi: Climate risk is already significant and losses from extreme weather events are already at record highs. Banks have been impacted by physical risk, and by all accounts it will get worse. Banks will face higher risks in all their operations. They may not be able to properly price things such as mortgages and commercial loans in areas subject to increased hurricanes and floods, or sectors linked to carbon industries. We are already seeing reduced agricultural yields in parts of the world from extreme

events like droughts and flooding. One estimate has the US Midwest losing around 25 percent of its corn and soybean yield by 2050. We are already seeing banks and insurance companies reducing their lending in some commercial sectors, and looking to decarbonise their books. There are also operational risks – one 2018 study estimated that by 2033 over 4000 miles of fibre optic cable, as well as data centres and other information infrastructure, would be underwater. This presents massive risks when we are so reliant on connectivity and information. Not surprisingly, every regulator and international body sees it as a financial stability issue that will have significant impact across all sectors.

R&C: Does climate change generate opportunities for FIs – or only downside risks?

Siddiqi: The Carbon Disclosure Project estimates over $2 trillion in new business from climate change. There are going to be several high-growth sectors, such as clean energy, electric vehicles, carbon capture technology, energy storage and the construction of more energy efficient infrastructure. We also know that thawing of permafrost and milder temperatures in many northern areas will result in higher agricultural yields. For FIs ,these represent opportunities to be part of the future. Being proactive and helping these industries and segments to grow by providing credit to them is a win-win.

Plochan: The opportunity is clear – to 'survive'. If banks do not transform their portfolios into green ones and, eventually, carbon-free ones, then they are very likely to get into serious trouble. Of course, as with any large transformation, early movers are also more likely to attract new types of customers, deals and sources of revenues that will no doubt emerge due to climate change.

R&C: What steps can FIs take to start preparing to address climate risk and its impact?

Siddiqi: I am a great believer in small steps. As individuals, our small steps can add up to make a significant impact. Encouraging employees to work from home, building more energy efficient buildings, investing in 'clean' industries and reducing their footprint in companies that cause environmental destruction are all possibilities. These will also help manage reputational risk for FIs. Banks that continue to lend to industries or companies considered 'dirty' may face negative attention and consumer boycotts, which can all impact profit and loss – and no amount of 'greenwashing' will help. On the technology side, take a look at your infrastructure and gauge how prepared you are to deal with new, and large, datasets, models, scenarios and requirements that will be part of climate risk analytics for some time. Start testing climate analytics on a selected number

of exposures and portfolios now so you get a running start when mandatory compliance kicks in.

Plochan: I am big fan of not 'reinventing the wheel'. There are lot of methodologies, technology and guidance out there that can be leveraged. Think of the carbon accounting framework example. You can easily spend a year building and debating your 'own' framework, but what is the real benefit of that? Climate change is too big to be figured out by each bank by itself. Let us use the expertise and help that is already out there. R&C