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**Comments in response to Principles for Climate-Related Financial Risk Management for Large Financial Institutions, Docket No. OP-1793**

To whom it may concern,

Climate-related risk – associated with both the uncertainty in the global climate’s warming response to CO<sub>2</sub> emissions and the world economy’s response to climate change – has an increasing role in how large financial institutions manage their assets as the world continues to warm. The draft *Principles for Climate-Related Financial Risk Management for Large Financial Institutions* (“*The Principles*”) puts forth a set of guidelines on how large financial firms should incorporate climate-related risk into their decision-making process and risk profiles. Herein we respond to the request for comment on *The Principles*, which if implemented represent a substantial step towards securing a lower carbon economy, and, indeed, a fully decarbonized economy that secures the well-being and economic flourishing of the United States of America.

Climate change and its impacts – through, for example, sea level rise, increased mortality, and labor disutility – present significant sources of risk for the United States financial system. These risks will only intensify as the global economy continues to emit CO<sub>2</sub>, leading to more warming and an exacerbation of climate-related risk. *The Principles* tackle this issue head-on, addressing the long overdue need for guidance on how large financial institutions can incorporate climate-related risk into their risk profiles. It is for this reason that we applaud the draft *Principles for Climate-Related Financial Risk Management for Large Financial Institutions*.

We do wish to emphasize some details that we believe would strengthen *The Principles*:

**1. Care must be taken when downscaling climate model projections.**

*The Principles* clearly state, “sound climate-related financial risk management depends on the availability of timely, accurate, consistent, complete, and relevant data.” We resoundingly agree with this sentiment. However, we advise the Federal Reserve to include guidance on how large-scale climate model projections are “downscaled” to smaller spatial scales and bias-corrected to remove systematic errors. Indeed, it has been shown that different “downscaling” procedures can induce significant uncertainty in local climate projections<sup>1</sup>. Moreover, the smaller the spatial scale in consideration, the more internal climate variability will influence risk<sup>2</sup>, and the less likely it is climate models can consistently replicate

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<sup>1</sup> See, for example, [Wooten A. et al., 2017](#) (DOI: 10.1175/JAMC-D-17-0087.1).

<sup>2</sup> See [Lehner, F. et al., 2020](#) (DOI: 10.5194/esd-11-491-2020) and [Schwarzwald, K. and Lenssen, N., 2022](#) (DOI: 10.1073/pnas.2208095119).

relevant drivers of risk<sup>3</sup>, heightening the need for accurate and careful use of climate models in climate-related risk projections by large financial institutions.

Our concern is that if a given institution carries out “downscaling” with a proprietary algorithm without sampling other “downscaling” methods – perhaps those methods done by other such institutions, or sampling other methodologies internally – that a potentially significant source of uncertainty will be missing from climate-related risk assessment. **We therefore support amending *The Principles* to suggest making “downscaling” algorithms open-source and for large financial institutions to publish their climate model inputs, so they can capture this important source of uncertainty, and hence, climate-related risk in a transparent and scientifically consistent manner.** At minimum, large financial institutions should be advised to sample a variety of downscaling methods and climate model inputs in assessing climate-related risk.

## **2. Integrate over all sources of risk in the climate-economic system.**

The very nature of climate-related risk is that various aspects of the climate-economic system are both inherently uncertain and strongly correlated. It is therefore prudent to treat climate change as a risk-management problem; indeed, taking this view seriously in a so-called “integrated assessment modeling” effort results in a high ‘optimal’ price of CO<sub>2</sub> and an ‘optimal’ policy that limits global warming below 1.5 °C (see footnote<sup>4</sup>). Crucial to this analysis is the unified integration of each source of risk in the climate-economy system in asset pricing-related decision making. **We recommend an amendment to *The Principles* that suggests large financial institutions take a unified approach to integrating over each component of risk in their risk calibrations.** Moreover, large financial institutions should take care to account for correlated risks. Indeed, if the sea is rising in New York City, it is surely rising in Miami. Similarly, fundamental physics suggests that the risk of, say, Dallas, becoming drier overall is correlated with the risk of it experiencing worse occasional flooding, as the summer of 2022 exemplified. **This correlation in climate-related risk both across space *and* across hazard sources should be included in the holistic assessment of climate-related risk suggested above.**

In summary, *The Principles* represent a necessary and ambitious step toward a lower carbon economy. We make two specific recommendations to improve *The Principles*: (1) requesting transparency on how large financial institutions “downscale” climate projections and (2) a unified approach to pricing uncertainty in the climate-economy system that integrates over possible risk sources *and* accounts for their correlation. It is our hope that these amendments will improve *The Principles*, and make them a more efficient, complete set of guidelines. We hope to see *The Principles* implemented soon.

Sincerely,

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<sup>3</sup> See, for example, [Nissan, H. et al., 2022](#) (DOI: 10.1002/wcc.579).

<sup>4</sup> See [Bauer, A. M. et al., 2023](#). (In preparation, preprint provided with authors’ permission.)

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