Wicked Knowledge Co-Creation: An Imperative for Climate Finance Solutions

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An Imperative

Climate finance may be the "wickedest" of wicked problems before society today.

It was hard to miss the wave of news of 2021's Intergovernmental Panel on Climate Change (IPCC) Sixth Comprehensive Assessment Report, an integral lead-up to the UN's Conference of Parties in Glasgow (COP26). The Report includes hundreds of authors and over 3,000 pages, all representing the scientific consensus that affirms much of what we already knew about the state of the globe's climate. If anything, this 2021 report removes any elements of uncertainty that might wrongly have served to reassure some powerful political interests and the public about things being not as bad as we thought.

This IPCC Report focuses on the *physical science* basis, or the most up-to-date physical understanding of the climate system and climate change, combining evidence from paleoclimate, observations, process understanding, and global and regional climate simulations. But the one scheduled for late 2022 or early 2023 - its aptly named "Synthesis Report" - relates to climate adaptation and mitigation and the assessed *economic* costs and policy measures. To corporate officers, investors, asset owners, market regulators, and business and management scholars, this is where all the chips lie. Led by the UN's Framework Convention for Climate Change, it is this Report that takes stock of countries and their progress towards the Paris Agreement goal of keeping global warming to well below 2ºC, while pursuing efforts to limit it to 1.5ºC. Of course, most policy makers and regulators are not waiting to start thinking about these things, as they proceed with the mandatory climate change risk disclosures foisted upon us by investor demands. October 2021 saw the release of the U.S. Financial Stability Oversight Council Report on Climate-Related Financial Risk in response to President Biden's Executive Order and, coming out of Glasgow's COP26, the International Financial Reporting Standards (IFRS) Board announced the launch of its new International Sustainability Standards Board to develop in the public interest a comprehensive global baseline of high-quality sustainability disclosure standards to meet investors' information needs.

Financial markets need to assess the risks and opportunities facing individual companies which arise from environmental, social, and governance (ESG) issues, as these affect enterprise value. This is driving significant demand for high-quality information. Investors and other providers of capital simply want reliable global sustainability disclosure standards that meet their information needs. Surely, voluntary reporting frameworks and guidance have prompted innovation and action on ESG ratings, but fragmentation has also increased the cost and complexity for investors, companies, and regulators.

These investors and regulators are calling on us in the scholarly community to build upon market-led initiatives, to use the latest research methods and big data in financial science to bring structure and understanding to how climate change-related risks affect valuations.

But what are the best ways to mobilize the research talent out there toward the timely questions demanding our attention? The answer I will put forward here is "knowledge co-creation." Indeed, **I will call it "wicked" knowledge co-creation to acknowledge the acuteness of the climate finance problem for society**. Humbly, I acknowledge another important influence for this article's title and for many of the ideas that lie within – namely, the June 28-29, 2021 Responsible Research Roundtable, organized by the Responsible Research in Business & Management (RRBM) Network. RRBM is dedicated to inspiring, encouraging, and supporting credible and useful research in the business and management disciplines. (My title shamelessly steals from the title of that roundtable, which virtually brought together 84 academics and practicing executives from 15 countries to explore collaboration and co-creation of knowledge to tackle "wicked problems" of the world. I write as a proud member of RRBM's working board.)

Within this article is the story of how I, as a former Executive Editor of the Review of Financial Studies, a top-tier, peer-reviewed journal in financial economics, became involved in a serendipitous knowledge co-creation event, one which I found valuable and productive. It is a positive story about the launching of what I like to call – perhaps too boldly - the first body of knowledge about climate finance. And it is a behind-the-scenes story that brings out some important dimensions about the process of knowledge co-creation that I did not fully appreciate at the time. There are elements of this initiative that I might have pursued in a different way, had I had the benefit of this new-found knowledge. I offer it as a cautionary tale to others who are eager to take on similar initiatives.

A critical definition of "knowledge co-creation"

A formal definition of knowledge co-creation comes from a valuable recent article in ecological economics:

> "Creative human activity embedded in and influenced by evolutionary processes in many dimensions, across varying scales, and over different time dimensions." (Herrmann-Pillath 2020)[2]

I find this to be formal, sterile, and so abstract as to become unusable. Coming from a subdiscipline in ecological economics called social learning, I think Herrmann-Pillath is trying to hint at complex interactions between knowledge and decision making that link many aspects -- social, cultural, and political influences, among economic players, like households, corporations, governments, policy makers, and bringing along researchers with multi-disciplinary instincts.

Given the diffuse general definition, a policy-linked angle could be more useable:

> "Creation of long-lasting outcomes that aim to address societal needs by fundamentally changing relationships, positions, and rules between involved stakeholders through an open process of participation, exchange, and collaborations *with the relevant stakeholders.*" (Voorberg et al. 2015)[3]

The architect of knowledge co-creation, a line of reasoning on social learning from the field of ecological economics, is Elinor Ostrom, 2009 Nobel Laureate in Economics. Professor Ostrom

[2] See C. Herrmann-Pillath, The art of co-creation: an intervention in the philosophy of ecological economics, *Ecological Economics* (2020), p. 169.

[3] See W.H. Voorberg, M. Bekkers, L.G. Tummers, A systematic review of co-creation and co-production: embarking on the social innovation journey, *Public Management Review*, Volume 17 (2015), pp. 1333-1357.

referred to the process as "co-production" in a seminal 1996 work showing the importance of cooperation and mutual monitoring of agreed-upon rules among competing individuals as the way of solving ourselves out of the problem of the tragedy of the commons. In the *World Development* article, entitled "Crossing the Great Divide: Coproduction, Synergy, and Development," she delineates coproduction issues related to economic development.[4] In this work, two clinical studies are presented, one from Brazil and one from Nigeria—where public officials play a major role, with examples of encouraged co-production (public officials exhorted citizens input for an urban infrastructure project) and discouraged co-production (public officials inhibit citizen direct involvement in primary education).

An essential element of the foundational architecture of knowledge co-creation appears to be a multi-stakeholder dimension. What compels me then to add the adjective *wicked* to this policy-oriented idea about research collaboration? The word *wicked* emphasizes that is what we should all be talking about and working on. Addressing the challenges of climate change is the world's most acute societal need and requires no less than *wicked* knowledge co-creation.

Back in April of 2015, however, I received an unexpected email that launched a wicked knowledge co-creation event even before I even knew what that was.

An unexpected call for knowledge co-creation

I served as Editor and then Executive Editor of the Review of Financial Studies for eight years, 2011-2018. During that time, I was lucky to have a rare overview of the breadth of research in our field of financial economics. In 2015, I received an email from the desks of two organizations – the Accounting for Sustainability Project (A4S) and the Cambridge Institute for Sustainability Leadership (CISL). Both are sponsored charities of His Royal Highness The Prince of Wales' Charitable Foundation. The email was an invitation to come to London on a given date in May 2015 for a gathering of the senior staff of the two charities and other fellow editors of top-tier journals in financial economics and accounting. The invitation was gracious and specific: "In light of the significant role RFS plays in finance and education, leading research across all the major fields of financial research and being one of the most widely respected and cited journals on finance…, we would value your contributions to the discussion." Why would they invite a journal editor to London to discuss and brainstorm what they called "Finance for the Future: Thinking about the 21st Century Challenge?"

It did not take long to learn why. As conveners of CFOs and CIOs from around the world, A4S and CISL had been interacting with them actively. And, they had come to realize what we now know well in retrospect: corporations and large asset owners and managers were faced with imperatives to foster capital investment in mitigation and adaptation to climate change, but the financial science did not exist. Of course, our hosts knew that. They had done their homework before they called on me and other journal editors to show up. When we arrived, they had anticipated our defensive arguments that we were not publishing such research because it did not exist, that researchers need data and additional funding support. It became clear that the point of

[4] See Elinor Ostrom, Crossing the great divide: coproduction, synergy and development, World Development, Volume 24 (1996), pp. 1073-1087.

the exercise was to exhort us, the perceived gatekeepers of knowledge in the disciplines of finance and accounting, to take some action.

An inconvenient void

At the time, a Web of Science search for the words "climate change" in any article published in any of the top finance and accounting journals would return a null set. By contrast, the same search substituting the top five economics journals returned a total of 45 publications with cumulative citations to the body of work in the thousands. Not surprisingly, two of the highest cited works were by 2018 Nobel Laureate in Economics William Nordhaus.[5] The economics discipline more broadly was clearly much more aware of the challenges and issues before it. Scholars in the fields of management, organizations, and corporate strategy were also well ahead of those in finance and accounting in pursuing questions related to climate change. For CIOs and CFOs, however, the general economics questions on dynamic, general-equilibrium integrated assessment models are not as salient to their decision making with respect to investing and managing the risks posed by climate change.

You cannot call for papers that do not exist, and we did not see any completed working papers in 2016.

The challenge put before us in London was to do something. I could see that we should do something, but to do something, we had to understand why there was a research void on climate change research in finance. If we accepted the premise that climate change risks could matter for markets, and if we further *agreed* that finance and the discipline of finance was lagging in research, what must be precluding us from engaging in this inquiry? Was it because we did not have adequate data? No known commercially available data sources? Was it too costly to invest in proprietary data acquisition? Did scholars feel that deans and associate deans were not investing in support from school research budgets to help build databases to take on these big problems? Was there uncertainty about whether there was an appetite for the topic? Maybe there were no capable reviewers to help judge the work?

Could it be that researchers -- young and seasoned ones alike -- perceived the risks of taking on research into these big issues as just too great? Since everyone was aware of this problem, scholars needed a pathway through to the research; our logical reasoning, and that of the team that I drew in to work on this at the RFS, was that we needed to shift the risks away from whatever might be keeping eager scholars in the discipline from pursuing their research. However, being a top-tier, elite journal, the RFS of course prescribed that the review process be rigorous and scientific. So, the essential charge became to innovatively shift the burden of risk from scholars while affirming the rigor of the scientific review process. How would one create incentives for scholars to engage in research they had not yet done?

[5] Consider R. Mendelson, W. Nordhaus, and D. Shaw's 1994 paper, "The impact of global warming on agriculture – A Ricardian analysis," and W. Nordhaus and Z. Yang's 1996 study, "A regional dynamic general-0equilibriummodel of alternative climate-change strategies," both published in the *American Economic Review*.

Our answer was registered reports

This was a clever and innovative concept invented by Professors Chris Chambers and Sergio Della Sala, Editors of *Cortex*, an Elsevier journal on cognitive neuroscience. They invented the concept of the registered report in 2013, envisioning and devising a platform for open research in all disciplines, with the goal of fostering the transparency and reproducibility of science.[6]

Chambers simply established a process whereby editors would accept proposals for what would become published papers. Protocols were reviewed before their experiments were conducted or results known; rather than completed papers, proposals were to be judged by the integrity of the design and proposed execution, and those which were deemed rigorous enough would receive a commitment to the study's publication in our journal. The idea was that this would ameliorate the so-called "publishing bias" against negative or non-results, and limit incentives to strive for positive, "publishable" results.

My editorial collaborators and I conflated this idea of a registered report with the problem we were trying to address in the area of research on climate finance. We thought that this alternate approach could serve not only as a disciplined editorial review process on which scholars must rely but also one to encourage scholars sitting on the fence about whether to engage in climate finance research or not. We would shift the peer review process two stages earlier, to the integrity of the study's design of the study and not its result.

A wicked knowledge co-creation event unfolds

How did we do this? Several critical steps needed to be taken to put the effort into motion. First, we gathered the editorial review team of the *Review of Financial Studies* to brainstorm the registered report protocol. They deserve much credit for understanding what we were trying to do and seeing the true intrinsic value in this effort. Nothing could have moved forward without the support of the executive team and the board of directors of the Society for Financial Studies.

A second critical step was to involve experts in the study of climate change from economics who had a good understanding of the questions that lie before financial economists. Professors Harrison Hong and Jose Scheinkman of Columbia University answered my call and agreed to join forces as guest editors. Together, Professors Hong, Scheinkman, and I assembled a blue-ribbon scientific committee to make sure the editorial process was rigorous. We also needed multiple stakeholders for funding, coordination, and convening support: Columbia's Economics Department generously agreed to host one of the workshops that we planned for the initiative; Norges Bank helped to underwrite the two conferences; A4S offered convening support among industry collaborators.

Once we built it, like the "field of dreams" of the 1989 baseball movie, we had to hope that the scholars would respond. A rigid protocol was set with finite time limits for submissions and, if successful, invited follow-on revisions. We issued our Call for Proposals on January 31, 2017,

[6] For additional information on how the journal, *Cortex*, took a step forward in reforming the culture of scientific publication, please see the March 11, 2015 editorial by Professor Chris Chambers, "Cortex's Registered Reports: How *Cortex*'s Registered Reports initiative is making reform a reality."

with a tight deadline of July 30, 2017. For the proposals received, we conducted a first pass with editors, and a second pass with the program committee. Successful proposal research teams had to attend a proposal workshop at Columbia University in November 2017. In January 2018, we conferred in-principle acceptances for publication. The message was that we would publish the paper if executed as proposed. If the authors changed course, they would need to be transparent about why and how. They were encouraged to complete the studies in time for an October 2018 conference event in London hosted by Imperial College Business School, A4S and Norges Bank. We editors bet that there were going to be climate finance papers on the sidelines that might miss the original call but would come forward when they saw a top journal creating this kind of space. So, we conducted a second call for newly completed working papers to join the original set of in-principle acceptance papers for the London conference. Following that event, we solicited a third and final round of anonymous reviewer reports to finalize the papers. Most papers were accepted online during 2019, but in March 2020 our special Climate Finance issue of the *Review of Financial Studies* was officially published.

Who answered the call?

We received 106 proposals from all over the world. Only 46% came from research teams based in the US. This affirmed that the appetite for research on these big societal problems like climate change is truly global in scope. Another gratifying aspect of this exercise was that 63% of the proposals involved co-authors among assistant professors and graduate students. Those sitting on the margins waiting to attack climate finance research were, as we suspected, disproportionately younger people who needed a path. Indeed, shifting the risk burden might have been just the trick to get this over the hump.

The special issue included nine research papers plus an editorial. Two studies focused on sea-level rise, three on investor attitudes to climate change (including a survey of institutional investors, mutual fund managers, retail investors). One article developed a theory modeling pricing uncertainty and climate change. Another study built a hedging strategy linked to climate change news. Finally, there were two studies on corporate financial policy associated with climate shocks and earnings news and with pollution externalities and corporate governance.

These papers are impactful, at least to date. The ten articles, including the editorial, have accumulated 237 citations (23.7 per article, more than double that of the other 375 articles published in 2020 in top three journals in Finance) as of the writing of this article. Six of them are among the 25 most highly cited that year. The article entitled "Pricing Uncertainty Induced by Climate Change," by Professors Barnett, Brock, and Hansen won the Review's much-coveted Michael Brennan Best Paper Prize in 2021.[7] Each of the major conferences for finance scholars are now featuring multiple climate finance sessions. As of the end of 2021, there were more than 900 working papers registered on this topic with the Social Science Research Network. Much more is yet to come.

But how do we really measure long-term success?

[7] Please see the full list of best-paper prize winners at the Review of Financial Studies homepage.

It is important to pause and reflect on what constitutes success. Admittedly, my collaborators and I had no idea of what knowledge co-creation was before we embarked on this enterprise. We knew the effort was worthy, we knew we were purposefully being responsive to the calls from CIOs and CFOs, and we knew it was important to involve others, such as Norges Bank, A4S, and at least three university partners.

But what really is success in knowledge co-creation? Fortunately, in a recent study in the journal, *Environmental Challenges*, a companion journal of *Journal of Environmental Management*, a team of scholars in Coggan, Carwardine, Fielke, and Whitten (2021) unpack the concept of co-creation for environmental policy design, implementation, and evaluation. They purposefully lay out a series of impact guidelines for knowledge co-creation, what they call criteria for "good" knowledge co-creation.[8] The five criteria focus on actors, process, rules, resources, and reflection. It is useful to juxtapose our own efforts against these criteria.

- *Actors.* A successful event is one that has the broadest inclusion of diverse knowledge holders possible without trading off salience and credibility of outcomes. Were those affected by the decisions, those with power to influence the outcome, and those with information relevant to the issue or solution included or, at least, represented? I believe our two *Review of Financial Studies* events – the proposal workshop and final conference – included a good representation of scholars and stakeholders. We made sure that Norges Bank and A4S were present at the workshops and conferences. They only were partially involved in the design of the call for proposals. Broader industry representation would have been even better.

- *Process.* Were the objectives clear and was the process set up to support achieving these objectives? Was the broader context of the issue discussed and understood? Was the context of the participants considered within knowledge co-creation activities? The editorial protocol that we laid out was solid. As the editors, we were conscious of the burden of responsibility to the *Review*'s readers, to the Society for Financial Studies to whom we made an affirmative commitment to ensure a robust editorial process. We also were careful to involve the sponsors in the feedback mechanism that we designed. But it is a tricky balance to meet the goals of the industry representatives and yet retain the academic freedom for faculty to pursue the questions as following their best judgement.

- *Rules.* Was the researcher's role made clear? Was there a clear intermediary? Was there a clear reward for involvement? Were expected outcomes communicated? We spent a lot of time designing the editorial protocol, with a proposal workshop and final conference. The responsibilities of the editors and authors were clear. There were some interesting challenges in terms of engaging anonymous reviewers who were unsure how to review a proposal rather than a completed working paper. Being new to the process of registered reports, we, as editors, could have scoped out guidelines for reviewers beyond the list of questions and prompts we shared with them. The rewards to the authors were clear – a

[8] See Table 2 in A. Coggan, J. Carwardine, S. Fielke, and S. Whitten, "Co-creating knowledge in environmental policy development: An analysis of knowledge co-creation in the review of the significant residual impact guidelines for environmental offsets in Queensland, Australia," *Environmental Challenges*, Volume 4 (August 2021), 100138.

publication in a special issue of a highly selective journal in Finance with the potential to influence many who would undoubtedly follow with climate finance research.

- *Resources.* Was there a neutral meeting place? Were boundary limits provided? Did participants have enough time to process all information? Our university partners – Imperial College Business School and Columbia University's Economics Department – provided safe, neutral locations for discussion. However, our authors, referees, and even the editors would have benefitted from more time to engage during the conferences, to get the work done between rounds of reviews, and over the timeline that we outlined for the whole project.

- *Reflection.* Were participants given the opportunity to reflect on the direction of the discourse and on the composition of the group? Was any kind of reflection included? Our authors did get a chance to incorporate comments from the plenary at the workshop and conference. We, as editors, carefully collected the feedback of the group to share with the authors in our decision letters in each round of revisions. We would have valued more time for small group discussion and reflection at the conference.

Much yet to do

I serve on the board of Responsible Research in Business Management (RRBM), a network of scholars around the world devoted to inspiring credible and useful research across the business and management disciplines. RRBM's Responsible Research Roundtable in 2021 was dedicated to knowledge co-creation in business research for societal progress.[9] There were about 200 academic researchers and business leaders from 70 institutions in 15 countries virtually assembled with a shared belief in the imperative to transform business school research to serve society more directly to create a better world. They brainstormed how, what, and why these multi-stakeholder models are useful for advancing knowledge on society's gnarly problems.

There is a movement across all business disciplines, including business economics, advocating change. The challenge of advancing more "wicked" co-creation requires a recognition of the selflessness necessary to see and acknowledge the importance of an opportunity not just within a scholar's own school or college, but beyond, working with other organizations and stakeholders.

I would like to offer a few final reflections.

First, all scholars in business and management can play a role in fostering wicked knowledge co-creation. We can all see the benefits of academic and societal stakeholder collaboration in generating useful knowledge for the betterment of businesses, of multilateral organizations, of policymaking. Deans, associate deans, department chairs, center, and institute directors, all must see a role for themselves.

Second, we must acknowledge that senior, tenured scholars have earned the right to pursue their own research goals and objectives. However, one responsibility of tenure in our university system, is to take on the bigger risks in research. Society is calling on them to do just this.

[9] A useful summary and some videos of RRBM's Responsible Research Roundtable is available.

Third, more junior scholars face a test of their risk tolerances. Those who have a higher tolerance for risk may take on research in management that addresses the "wicked" questions of poverty and inequality, the future of work, and business and sustainability. No one would criticize them, however, for taking on safer choices. These are calculable gambles in research.

Finally, for our generous funding sponsors, there must be an understanding that they are better off by collaborating with the academy. They need to keep in mind the constraints of the academy, the unique challenges of peer-reviewed journal publications, time lags, the rigor and intensity of the peer review process. Sponsors might ideally seek out the junior faculty member for project collaborations, but more senior faculty and deans want to be protective of them. There may be great benefit for a sponsor to push its funding efforts to the places where there is a natural opening to help get these research projects off the ground. They can be the most valuable forcing function for wicked knowledge co-creation.

A closing proposal for young scholars

Young scholars in accounting and finance are always looking for the newest, most important things and what is relevant for society. I think about this research report – stemming from another knowledge co-creation event – co-authored by the Paulson Institute, the Nature Conservancy, and Cornell's Atkinson Center for Sustainability. The report focuses on what they called the Global Biodiversity Financing Gap, where they estimated that there is a shortfall of approximately $600 to $800 billion each year over the next ten years that we would need to sustainably manage our biodiversity, maintaining the integrity of the earth's ecosystem, compared to what is currently being invested to do so. This is a massive amount of private capital that needs to be mobilized if their estimates are true. The new Task Force on Nature-related Financial Disclosures (TNFD) is working on developing a risk management and disclosure framework for corporations and financial institutions on evolving nature-related risks.

Unfortunately, if you did a survey of the top journals in accounting and finance, you would find no research on the topic of financing related to the biosphere and loss to the biodiversity on our planet. I cannot overemphasize how important this issue is to so many, not just companies that are trying to be attuned to the natural environment more so than ever before, but to society at large. **It is a compelling moral imperative for us to be addressing this issue.** If I were a young scholar and I wanted to take a risk on a research topic that could be transformational, I would choose biodiversity finance. In fact, I have issued a formal call to action to my fellow financial economists.

If you are on the margin and thinking this is an area where you want to get involved as a scholar, if you want to take a chance and push research in this area, let me offer to you an unequivocal, "Yes, come. You are welcome." This is what we need. This is what the world needs. Society needs for us to be focusing our attention on this.