

Tim Phillips [00:00:09]:

Welcome to the latest episode of VoxTalks Climate Finance, with me, Tim Phillips, and also hello to my co host, Alissa Kleinnijenhuis.

Alissa Kleinnijenhuis [00:00:18]:

Hi, Tim.

Tim Phillips [00:00:19]:

Seven syllables, one economist. Alissa this is great. We're in the same place today for the first time.

Alissa Kleinnijenhuis [00:00:24]:

Yeah, that's exciting.

Tim Phillips [00:00:28]:

Today we're going back in time to when we first started to research how finance can help solve the problems of climate change. Probably not as far back as you think it is. And we're going to find out what it took to kickstart interest in the topic and how we can learn from that and apply it to the related problems we see today. So, Alissa, who's our guest, who's going to help us do this?

Alissa Kleinnijenhuis [00:00:53]:

Today we have Andrew Karolyi join us. He is the Dean of the Cornell S.E. Johnson College of Business and a Professor of Finance and is a pioneer of Climate Finance.

Andrew Karolyi [00:01:04]:

Wonderful to participate on this podcast. I'm really pleased to be able to share my thoughts and have this wonderful conversation.

Tim Phillips [00:01:13]:

Andrew, the obvious question is, what interested you in this? How did you get into this?

Andrew Karolyi [00:01:17]:

I think that I was always interested in the general topic of climate change. I understood, I think, the big questions that many of my colleagues in the field of economics were tackling. I think what was dawning on me and those around me was the remarkable paucity of interest among my immediate cluster of financial economists in the topics. And it felt to me like we had something to say and there just didn't seem to be very much, certainly in the journals and at the time, I guess this light bulb moment was when I was serving as the Executive Editor of the Review of Financial Studies. I did that for eight years. Well, four plus four, Editor and then Executive Editor.

Alissa Kleinnijenhuis [00:02:03]:

You gave a keynote to the international workshop on Financial System Architecture and Stability in 2021, and you called climate finance the wickedest of wicked problems before society today. Why is climate finance such a wicked problem? Why is it the wickedest problem?

Andrew Karolyi [00:02:21]:

I was very proud to choose that title for that talk. It was a retrospective talk. The organizers, who were regulatory officials involved in regulatory bodies as well as peers in the scholarly community, I think what they wanted to do is sort of understand the dimensionality of the challenge from a research perspective that we undertook at the review of financial studies several years earlier, five, six years earlier. So that was the prompt. And I think the concept of wicked problems are those that are felt most acutely by society at large. And we have a number of them, from managing through geopolitical tensions to macroeconomic uncertainty with respect to inflation and disinflation. But certainly the overarching challenges of climate change is one that is truly global in scope, truly impactful of society at large. And so it was a call to continue to motivate our colleagues to continue to pursue these big questions.

Tim Phillips [00:03:22]:

In the intro, Andrew, I teased at perhaps the history of this is not quite as long as we think it is. So when did finance research first really seriously begin to engage with this wickedest problem?

Andrew Karolyi [00:03:35]:

That's a great question, Tim, and I loved your prompt at the top of the show. I think that there are many in our community who would say that they have been studying issues to do with sustainability and sustainable finance for years and years and years and decades. But what it seemed to me to be missing around this mid 2000's teens was the fact that our top journals, the most selective of the journals, were not featuring research in this area. And these elite general interest journals were the ones that seemed to be overlooking an opportunity here. The prompt was not organic. It came from the outside. It was an unexpected call in the form of an invitation to me as the Executive Editor of the Review of Financial Studies from, at the time, his Royal Highness, the Prince of Wales, and one of his charities. Actually two of his charities. One was the Cambridge Institute for Sustainability Leadership, and the other was this group, Accounting for Sustainability, A4S. I did not know much about these two organizations beforehand. Honestly, when I received the initial ping of an email, I questioned whether it was real. And I remember going back to my wife and showing her the email and her basically telling me, I think it's real. You might want to respond, which I did. Let's just say journal editors, the top journals, get a lot of unsolicited email from many different parts of the world. And sometimes it's not all real or certainly not all friendly. But this one I followed up on, and they invited a number of editors of journals in finance and accounting to London to first an undisclosed location where we were going to have the opportunity to meet with his Royal Highness, now his Majesty King Charles III. And in a small group setting, the day was filled with a lot of information and very useful brainstorming that ultimately led to this prompt. It was basically a challenge to us, saying, so you are the journal editors, you're the gatekeepers of knowledge. Why is it that we aren't publishing papers in the top journals? We acknowledge it's an important issue, right? And

we all said, well, we can't publish papers that don't exist. And almost instinctively, his Majesty responded on the ready, saying, well, I understand that. So what are you going to do about that?

Alissa Kleinnijenhuis [00:05:57]:

So what did you do about it?

Andrew Karolyi [00:05:59]:

I'm sure each of us in that room sheepishly looked down at our shoes and shuffled our feet and wondered, oh my gosh, what a great question. Right back to us. I went back home and thought pretty deeply about this. I was involved with something called the Open Science Framework. I was very interested in this new concept of registered reports. I was learning more and more about that from the open science movement. And I thought that is something that we could maybe manage as a way to induce scholars, perhaps young scholars, to actually come and write papers on this new topic of climate finance. So we held a competition. That's what we did. We held a competition for space in this extremely highly elite place in the RFS Special Issue. Unlike a typical special issue where you gather existing working papers, we knew there were none. So we had to create and stimulate a competition.

Alissa Kleinnijenhuis [00:06:58]:

So how did you do that?

Andrew Karolyi [00:06:59]:

The first thing was to convince those who are in the executive of the Society for Financial Studies, the oversight body for the journal, that this was a worthy initiative. And they were incredibly supportive all along the way, top to bottom. I think they saw the boldness of it. They understood the risks associated with doing something like that. It was an unusual editorial protocol that we devised for this. I also knew I needed help from people that probably knew something that I didn't. And so I went out and listed colleagues Harrison Hong and José Scheinkman, both at Columbia, who had actually worked in the climate economics area and certainly had their financial economics chops. And they were so gracious in agreeing to join me as co-editors on this exercise. We built a blue ribbon scientific advisory committee. And then we put out the call and hoped young scholars out there in the world would respond.

Alissa Kleinnijenhuis [00:07:52]:

I think it's brilliant that you judged the papers based on proposals of research and give them a conditional 'accept', if they executed the proposal as planned, they would get in, which was a really important, I think, way to lower the barrier to get people to do research in this area. I would argue that your special issue kick started the novel field of climate finance. And in full disclosure to our listeners, I'm actually teaching a climate finance course at Cornell. And I said to my students, you can make a difference that makes the difference. And I think what Andrew and his co-editors did was a difference, this special issue in the top finance journal, that made the difference. Today, every big finance conference, all have multiple sessions on climate finance, and the field is exploding.

Andrew Karolyi [00:08:43]:

It has blossomed. You're absolutely right, Alissa, and I'm really proud of that. We actually had a sense, I'm not going to make it like we were completely innocent and we didn't know whether anybody would show up. But we knew that there would be some response from the marketplace. We didn't know it was going to be as large as it was. And we knew that while we were only going to ultimately publish maybe eight to ten papers in that special issue, that there would be many other working papers that would come to the fore, that would then find their way into the RFS or to other journals. We kind of had a sense of this. Of course, the response was much more positive than we even imagined. And you're right about the registered report idea. The goal there was really to derisk for especially our younger scholars who didn't see the track record of success of top scholars publishing in this area. They needed to see a path forward. And the registered report was not only a tip of the hat to the open science principles, which was really important, right, not prejudging the outcomes of the results of a study relative to the hypotheses that were being formed, but it really was a mechanism by which we could derisk this is a new research venue for them. And that was the best part of the whole thing, was seeing such a large response from young scholars in our community to this. There was clearly pent up demand for pursuing this question. So that's a really gratifying part of it.

Alissa Kleinnijenhuis [00:10:06]:

And I actually would argue that while there are many senior scholars like yourself that are pioneers in this field, the mass of the research is the up and coming wave of young scholars that are, en masse, interested in this area. I would argue that the fact that you published a special issue in a top journal also ensured that climate finance was seen as central to mainstream finance. It could have been a fringe issue that people studied at the lesser good journals of the field. The beauties of what you did is that climate finance is seen as the hottest topic, I would argue, within finance. And we saw, for example, the AFA presidential address on climate finance by Laura Starks. We saw that Johannes Stroebel won the Fischer Black prize for his work on climate finance. So it's unlike economics, where the environmental economics is seen more as fringe. You managed to make it mainstream. So in this opening article of the special issue, you made a call for papers on research area agencies that you believed would be important. For example, you said that it would be valuable to do research on the uncertainty in the social cost of carbon, on hedging climate risks, on the efficiency of capital markets and climate change, on beliefs and climate change risks, on damage functions, short termism and corporate emissions, on divestment implications for financial stability, on climate change impact for municipal finance, and so on and so forth. Has the research that you've called for come to fruition? Has it been as successful as you hoped it to be? And are there any gaps that you think climate finance should still fill to be most useful for society?

Andrew Karolyi [00:11:45]:

So the answer is yes, that was a great start. And no, not yet. In terms of, have we fully realized the possibilities? I mean, there are big, big open questions. It's actually quite interesting. Not many people have asked me about this, but when Harrison and Jose and I were devising the

call for papers, we were literally sitting there brainstorming with a whiteboard as to what we should put in the call as the prompts. We thought, what are the low hanging fruit that need the immediate answers? We understood that we couldn't lay out the full, complete set of questions, and frankly, it wasn't really our job to do so, but enough of a prompt to draw the market of scholars out. And that list that you drew for us was actually what was ultimately published. Not all the proposal submissions, there were 106 of them. But the eight that we actually published were featured in the list that you talked about. And I'm really proud of that. And I think that the authors have done very, very well with them in terms of spurring on other things. But, my gosh, there are so many open questions that yet remain unanswered. And ultimately, why this is the wickedest of wicked problems. Going back to the first thing that you asked me. We too often in the academic community, don't fully realize how vital we are as co-participants in the advancement process. So research is a critical foundation for other actors, like regulatory officials, government officers, chief investment officers, chief financial officers that clearly lean very heavily on our guidance. For example, as to how optimally to integrate climate change related risks into valuation structures, and how our core valuation principles and models need to be retrofitted to incorporate these types of risks, if they should at all. And I think that there are so many open questions out there, but it's an important ingredient for the ultimate success, which is to mobilize action, mobilize likely trillions of dollars of private capital towards mitigation and adaptation for dealing with the big question of climate change. Too often, I think my colleagues in the academy feel like they are, I don't know, passive or sideline participants, and I'm here to tell them that they are not. And that the work that we do is a very honorable pursuit and a critical, vital component to mobilizing the kind of change that needs to happen.

Alissa Kleinnijenhuis [00:14:13]:

I think that it's really important that the climate finance field has focused on pricing climate risks, and that's definitely, as you say, a really important starting point if you think about what it takes to mitigate climate change. We really need to get climate finance to scale. So I think one area in which climate finance scholars can perhaps do more is on how to make that happen.

Tim Phillips [00:14:43]:

Andrew, we want to focus on one gap, and I know it's a gap you've mentioned. I know it's something that you're passionate about. Biodiversity. How long have biologists recognized that biodiversity is important?

Andrew Karolyi [00:14:56]:

I really appreciate the question, Tim. My interest in the biodiversity finance area was, in fact, stimulated by my colleagues, who asked me to participate in keynote addresses and would often say, well, you made the call on this whole climate finance thing, and obviously you've got a track record of one for one. So they said, okay, so make another call. What's the next big thing? That's a lot of pressure. And I was no longer the editor. I was moving into academic leadership here at Cornell. But I said, what the heck? I'll take it on. And this whole biodiversity crisis is another thing that was really capturing my interest. And I was doing a lot of background research in it, talking to some colleagues who are ecologists who have been working on this. So

the answer to your question, Tim, is back into the 1980s. It's a guy called E.O. Wilson who first coined the term biodiversity. He referred to it in a 1982 paper as the biological diversity crisis, and then he coined the term biodiversity, in this context, he's an ecologist, and I think this true pioneer of the field spawned all that we have seen to date.

Tim Phillips [00:16:11]:

Alissa, tell me, as an economist, for how long have economists been interested in biodiversity?

Alissa Kleinnijenhuis [00:16:17]:

The shocking thing is, I think for a long time, mankind has weaned itself out of believing that it's not actually embedded in nature. So we have now come to understand that our economy depends on at least three types of capital, physical capital, human capital, and natural capital. But actually, that has only started to be more recognized since the influential 2021 the economics of biodiversity Dasgupta review. And in that review, the central point, our economy is embedded in nature. If we destroy nature, we will not have an economy. And so, as Dasgupta explains, at the end of the second World War, the economic questions that needed urgent response could be studied most productively by excluding nature from economic models altogether. And, in fact, to introduce nature at that time, after the second World War or natural capital into economic models would have been an exercise of adding unnecessary luggage. Nature then started to enter macroeconomic models of growth and development in the 1970s, but it did so in quite an inessential form. The thought was essentially that humanity and human ingenuity could overcome nature's scarcity over time by things like technological progress and ultimately allow humanity to be free of nature's constraints. So the mainstream macroeconomics of growth and development, still up till today, does not have nature as an essential component of its equation. Now, Andrew, you warned that, unlike climate change and climate finance, the metrics that we need to use to measure biodiversity loss are more difficult to develop. Is solving the biodiversity crisis as an even more wicked problem than solving the climate crisis?

Andrew Karolyi [00:18:10]:

The short answer, I would say that it is equal, if not even more acute, and I'll get into why I think that. You're right in that 2021 keynote, I did drop the hint at the end about biodiversity. So that was a micro sampler of what ultimately became my keynote, the central point of the keynote address for the Western Finance Associations in 22 in Portland, where I featured it in front of a large audience of 600 or so people. I think many of the people were quite shocked to be hearing such out of the box, kind of. By the way, John Tobin, my colleague here at Cornell, who is an ecological economist and ecologist, he and I co wrote a paper that we published this year that was the basis for that speech. But why is it even greater? Well, I mean, we're talking about the erosion of the forest lands, of the grasslands. We're talking about terrestrial erosion and decay. We're talking about species loss. We're talking about invertebrate species loss that, over the past four or five decades have been diminishing in numbers. And even within species, the sort of genetic diversity among subgroups of these species or subspecies has been becoming more and more eliminated. And, of course, we're also talking about the inordinate pressure that humans in the Anthropocene are causing for the water systems. Those are the three big pillars

of that natural capital environment that you talked about and referenced in the Partha Dasgupta review, which I think is brilliant. I think the bigger aspect of this, the bigger, more acute challenge here, is that there is a multiplicity of risks that are hard to rationalize and integrate. And in this way, it is different than metric tons of carbon dioxide or equivalents that we've come to now socialize and understand as that metric of outcome with respect to climate that is clearly being linked through science to the global warming crisis, the erosion of the biosphere, the degradation of the biosphere is so much more complex in its multiplicity of risks, and that I think of as an even bigger research challenge. The good news is that you've got some brilliant minds in people like Jeff Heal and Dasgupta. By the way, those are people that I remember reading in my natural resource economics courses back in the 80s. Obviously, I had some early sort of tingling from this type of research before I moved fully into financial economics. So obviously I was interested in this stuff because I remember reading the early works by those scholars. Another pathbreaking scholar was a guy called Marty Weitzman, who in the 1990s published a couple of QJE papers that I think were really, I don't know if they were transformational, but they certainly weren't transformational enough, because not enough of our colleagues in economics were really picking this up. But he laid down some of the early theoretical work on min loss extinction optimization modeling and then tried to apply it in some settings of species loss. But that Dasgupta review is a really good anchor for you. And I think that's the bigger question, is how can we tackle this multiplicity of risks and over on top of, correlated with, but yet different from metric tons of carbon dioxide emits?

Alissa Kleinnijenhuis [00:21:35]:

The nature system is also a complex system, actually, like our climate system. So the risks are not necessarily linear. Up to some point, you might safely take away a forest, but if you cross some threshold in one tipping point, the whole system may change. And that further, I guess, complicates dealing with the preservation of biodiversity and the risk of loss that poses.

Andrew Karolyi [00:21:57]:

I like the way you're thinking. What's embedded in your message there. We financial economists, we actually have tools in our toolkit. Like those early models of international financial contagion we were developing in the 1990s in a completely different context. Right. The Asian financial crisis of the 90s, late 90s, where we built all these tools. Maybe we can retrofit those tools to answer some of these new challenges. We've got the ability to handle big data. We know how to think about multidimensional risks and risk modeling in terms of their consequences for the pricing of assets. We know how to model nonlinear threshold risks.

Alissa Kleinnijenhuis [00:22:34]:

Exactly.

Andrew Karolyi [00:22:35]:

We have the tools. We can do this. We can have a strong voice in this whole biodiversity finance movement.

Alissa Kleinnijenhuis [00:22:41]:

And we are also able to articulate these risks because we understand, for example, as financial contagion modelers, what it means to have amplification and feedback effects. And of course, that's exactly why climate change and the loss of biodiversity are so scary and why it's so urgent to tackle it.

Tim Phillips [00:22:57]:

Multiplicity of risks' hard to measure. Does this mean through all this time, that finance has been mispricing the biodiversity risk?

Andrew Karolyi [00:23:06]:

The responsible answer from the scientist has to be, don't know. I mean, that's the truth of the matter is, this is all new stuff. One of the big, low hanging fruit that needs to be answered here, Tim, is exactly understanding whether these biodiversity related risks, or, as Alissa referred to it more holistically, perhaps natural capital related risks are priced. And if not yet, then when? If not in this way, with familiar market or extramarket forms of risks that we're familiar. If not them, then in what other form? And is it revealed in terms of species loss? Is it revealed in terms of degradation of the water systems? I don't know, and I don't think anybody knows. And that's why I think the dogged pursuit of researchers is so clearly an imperative.

Alissa Kleinnijenhuis [00:24:00]:

You did manage to pull the feet twice. You published an influential call for papers in the RFS, which led to the booming field of climate finance. And in 2022, as you referred to earlier, you published a paper with John Tobin which was essentially a call for research, biodiversity finance. And as far as I know, you are the first one also to coin the term biodiversity finance. And this second call has been equally successful. And we've seen a lot of new papers emerge in the field of finance on the topic of biodiversity over literally the last one to one and a half years. Why did you issue that call? And what are the most important research advancements that you've seen in the field of finance on this topic? And what are the most important areas where you want to tell your fellow finance scholars in the academy: "please do more"?

Andrew Karolyi [00:24:51]:

I actually spent some time reading the foundational disciplines of biodiversity and certainly biographies of people like E.O. Wilson, trying to really get my mind around it. And, boy, there's piles more that I don't know relative to what I do know. And the same goes for the whole foundational economic paradigm and principles with respect to biodiversity loss. Those are certainly my guiding lights in the call that we did issue in that paper that we published. The issue of pricing risks is clearly one that we talked about. There's also this issue of mobilizing action and one that I'm seeing some early work by our colleagues. Caroline Flammer, I think you had an earlier VoxTalks Climate Finance, so we can do some cross selling here that actually looks at this. But in the keynote, I talked a lot about some really innovative deals coming down. So we don't call them green bonds. In the biodiversity sphere, we talk a lot about the specific types of dimensions of biodiversity loss as sort of an adjective for the types of bond deals that we're

talking about. But typically, like rhino bond issuances, as well as blue bond issuances dealing with erosion of the coral reefs in, for example, Central America. These are some deals that I thought were really innovative, really interesting. And part of the call was to say we need another new study like Caroline's original study on green bonds. How about let's do it for blue bonds and rhino bonds? And I don't know what kind of bonds related to biodiversity loss, and we need to build a database of these deals and understand what's interesting or unique about them and how they translate into prices. So I know Caroline was on in a previous podcast talking about her working paper in this space. I think that's wonderful. I think the next thing that I'm interested in is in mobilization of action, particularly on the private capital side of the ledger. Investment managers, asset owners, asset managers, and whether or not they are responding. Is there evidence that they are starting to pay attention to the issues and whether they are taking actions in a concerted way linked to the potential risks that are coming to the fore with respect to, for example, companies or municipalities that are exposed to water damage or damage to our water ecosystems, or erosion of our rainforests, for example. Those are the three big, I don't know, immediate research thrusts that I see as very promising.

Alissa Kleinnijenhuis [00:27:24]:

You suggest that there is a paradox of biodiversity finance. What is it?

Andrew Karolyi [00:27:30]:

That's a really good question. We coined that term. The logic is pretty clear. I mean, the backdrop is like climate finance. In the world of biodiversity finance, we're going to need to engage in a lot of creative thinking and innovative structuring. And I'm talking about those who are practitioners in the field. We can talk about, for example, a green energy project that needs to produce power, assuming it meets customer demands, will generate cash flows to pay back investors. The paradox of biodiversity finance is that while you are seeking to generate revenue from conserving a natural resource, we're actually doing that rather than trying to transform it, which is how natural resources are typically translated into cash flow streams. So it's just a little bit more complicated to try to think through what it means to transform or convert the preservation or conservation of an asset in the natural capital sphere into a cash flow stream. It's just a little bit harder than doing so in the climate change related world. A lot of that paradox is actually something that you can link back to some of the early work that shout out to Geoffrey Heal. He had a book on valuing sort of the ecosystems underlying natural capital back in the early 2000s. He was an early mover in this space. And the paradox is built from his own conceptualization.

Alissa Kleinnijenhuis [00:28:54]:

Even if you think about the field of economics and how they think about natural capital, they talk about the ecosystem services that natural capital provides. And then the natural thing that you could think of in the context, let's say, of a forest, is that you can cut down the forest and sell the tree trunks. But that's what you want, right? You want to actually preserve the forest because it functions as a carbon sink and it functions as a home for a huge amount of biodiversity. So is there already enough research within the field of finance on how we can use finance to pay for

the preservation of natural capital, specifically for the preservation of big forests, for example, the Amazon, so that it's not cut down?

Andrew Karolyi [00:29:35]:

It's a leading question, and you already know the answer, which is, no, we haven't got enough research on this. And that, I think, is one of the big questions to pursue is how actually can we think about, for example, utilizing as part of the ecosystem services of natural capital, the opportunity being carbon sinks, that forests are towards linking back to the climate crisis. Maybe, just maybe, this whole carbon offset market through the use of the biosphere may be the way in which we skate through these twin crises. And it just might be the solution that is staring at us that we don't even fully realize.

Alissa Kleinnijenhuis [00:30:17]:

Actually, with some climate scientists here at Imperial, we're looking at how close we are to climate tipping points, and it suggests that we are very close to it, especially if we are to further degrade plant vegetation on the earth. Right? So if we are able to somehow monetize preservation, that will do a lot, both for the climate crisis and for the preservation of biodiversity, and as such, tackled the wickedest twin crisis.

Andrew Karolyi [00:30:42]:

One thing that you've said, and this is something that we always thought was really important from the earliest get go when we started the climate finance stuff, and then the biodiversity finance stuff is go talk to the scientific experts. Yes, the ecologists, go talk to the climate scientists, because they have so much to offer here. This is literally where interdisciplinarity of mind comes to life.

Alissa Kleinnijenhuis [00:31:17]:

It was a great pleasure, Andrew, to have you as one of the pioneers of climate finance and the enabler of the field of climate finance and perhaps the field of biodiversity, join us today. Thank you, Andrew.

Andrew Karolyi [00:31:32]:

Thank you, Alissa and Tim. It's so fun to talk about these things, and I encourage my colleagues out there who are listening to feel motivation. This is important work. Please, please jump in, contribute.

Tim Phillips [00:31:47]:

Yeah. Thank you very much. If people are not feeling motivation after this, then I doubt whether they ever will. Thank you very much, Andrew.

Andrew Karolyi [00:31:53]:

Have a good one.

Tim Phillips [00:31:57]:

A few references from what we've been talking about. First of all, from 2020, the Climate Finance Special Review of Financial Studies. That was volume 33, number 3. And there's an article in there by Harrison Hong, Andrew Karolyi and José Scheinkman called Climate Finance. In 2023, the paper by Andrew and John Tobin called Biodiversity Finance: A call for research into financing nature. And that was published in Financial Management. And if you want to look up that keynote speech to the 2021 International Workshop on Financial System Architecture and Stability, it's called Wicked Knowledge Cocreation: An Imperative for Climate Finance Solutions. It was published in Accountability in a Sustainable World Quarterly issue 1 in November 2022.

Tim Phillips [00:32:56]:

Join us next time. We'll be talking to Fred Samama of SP Global. He's someone who's published papers and books on green finance, pioneered innovation in the financial sector, and also advised central banks, sovereign wealth funds and policymakers. So he's one of the great innovators in green finance instruments, and that's exactly what we'll be discussing with him.