Interview - Leonardo Martinez-Diaz

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Leonardo Martinez-Diaz is Global Director of the Sustainable Finance Center at the World Resources Institute (WRI), where he leads a team of researchers working, among other things, on how the private sector can better incorporate climate risk into financial decision-making. Prior to joining WRI, Leonardo served as Deputy Assistant Secretary of the Treasury for Energy and Environment, where he directed Treasury's domestic and international work on climate finance, represented the United States on the governing boards of several multilateral climate and environmental funds, and participated in the Paris Agreement negotiations. Leonardo is co-author, with Alice C. Hill, of*Building a Resilient Tomorrow: How to Prepare for the Coming Climate Disruption*.

Where do you see the most exciting research/debates happening in your field?

Right now, there is some very interesting research and debates happening in a couple of places. One of those is at the intersection of climate change and economics. People are trying to understand how climate change could affect economic activity, productivity, and financial markets. Basically, everything that we have been studying and taking for granted for the last couple of centuries in modern economics is now potentially going to be affected by climate change, and folks are trying to understand exactly what the mechanics are for that and how we prepare for these types of impacts. The big debates, of course, are about the magnitude of the impacts and some of the mechanisms through which the economy could be affected. It is in the early stages still, but there is a lot of interesting research coming out, which suggests pretty significant impacts. So, the debate will likely continue.

I think there is another place where there is a very interesting, incipient debate going on, which is at the intersection of climate change and international security. Alice Hill and I devoted a chapter to that in our most recent book. There is a general sense that climate change will make the vulnerable even more vulnerable, especially in fragile states. The concern is that climate change will exacerbate that fragility or it could lead to disruptive, chaotic situations with the potential for forced migration and displacement of people. This raises all kinds of significant questions about humanitarian assistance and national and international security. So, I think this area will be very active, the debate will draw attention and a lot of expertise will be required.

Of course, emerging debates about the impact of climate change on the economy and international security are related. The more unpredictable agriculture, for example, becomes because of climate-related phenomena, or the more unproductive labor becomes because heat-related conditions make it harder for outdoor workers to do their jobs, then the harder it becomes for communities to create income and wealth. That, in turn, means there are fewer resources available for health, education, and infrastructure. And, in a place that is already fragile, that is already suffering from historical inequality or historical development deficits – poverty and disease, or example – climate change and its impact on economic activity could further exacerbate the situation and lead to development in reverse, which is what international development experts are most concerned about.

How has the way you understand the world changed over time, and what (or who) prompted the most significant shifts in your thinking?

Well, that is a very broad question. But one insight is that the things people want are remarkably similar across the world. Maybe that is somewhat obvious, but it became clear to me during my time in Indonesia around the turn of the

century, when I had a chance to visit a society that was radically different from my own in a very faraway place. Over time, you realize that the things people are striving for – namely, economic stability and security, opportunities for their children, and an ability to pursue their intellectual and religious freedom – are things that you can strive for everywhere. People can strive for these things in different ways, of course, but there is a surprisingly similar set of ideals that people are looking for. And, that's helpful in a sense that maybe we can develop some common behavior that helps us tackle international problems, including climate change, because it means we can appeal to similar ideas of belonging and a shared future. It's what President Obama used to call "our common humanity," and ultimately that is really essential if we are going to work together to solve problems that are transnational in nature.

How did you first get involved in sustainable finance, and how did you merge your expertise in these two fields? How do finance and sustainability build on each other?

I began my academic career focusing very much on the political economy of finance. I was interested in questions like, how do regulations of banks and financial markets develop? Why do countries regulate their financial institutions the way they do? What is the effect of financial crises on bank regulation? I was interested in finance because it touches everything in society. Finance is the lifeblood of the modern economy. So, that was the first set of intellectual questions that drew me in, and that is where I spent my energies in graduate studies. Over time, it became clear to me that climate change, and its impact on communities and society in general is going to require mobilizing a lot of resources both to reduce carbon emissions and also to build resilience. So, the question that naturally follows is, where is this money going to come from? And, why is it that the financial system appears to be devoting little money relative to what is necessary to tackle these twin challenges? That question is what drove me to pay more attention to the intersection between finance and climate change, specifically, but also sustainability, which is a more general term.

Ultimately, economists talk about market failures – ways that the markets are somehow not channeling resources to things that society considers to be valuable. Some of the answers have to do with information – perhaps, markets do not have the information they need to make decisions. Part of it is that time horizons are too short and markets focus only on tomorrow or the next week or the next month, but not on what happens in ten, twenty years, which is where sustainability and climate change really matter. Partly, it's that we don't have the right regulations in place. Without a carbon tax or a carbon pricing regime, investors do not see the economic rewards of investing in sustainable activities. Once you identify those market failures, the question for us is, well, how can we change that? What are the ways to begin to address the failures so that markets can work again?

What are some of largest challenges you see for communities trying to strengthen their resilience?

First, I think communities need to understand the risks that they're facing. Climate change is not a traditional type of risk. Of course, many communities are already aware of hurricanes and droughts and heat waves because they've always had these types of events. But now, communities have to increasingly think about new extremes: in some cases, more frequent extreme events, in other cases more intense extreme events. And, in some places, communities will need to deal with new risks that were not present before – like, for example, the prevalence of infectious diseases that were only seen in tropical areas suddenly arriving further and further north. Communities need to understand what their risks are and what is their probability. Without understanding the risk, it is very difficult to plan for it and manage it. So, you need data, you need modelling, and you need technical expertise.

The second thing, as I talked about earlier, is that you need resources – financial resources. Managing climate risk requires raising money in some cases. In other situations, it requires using the money you already have more effectively. And then the question becomes, how do you prioritize? Do you spend your dollar of resilience on elevating homes? Do you spend it building seawalls? Do you spend it on better early warning systems? How do you make those decisions? Those are very concrete, practical decisions that local governments, local businesses, farmers, and so on have to make. They need tools and information in order to be able to do it. Without these things, folks are in the dark, and it's quite difficult to move forward.

What are some of the financial mechanisms that communities can use to strengthen their resilience to

climate change? How are these mechanisms similar or different in the context of developing and developed countries?

In most countries, there are certain, fairly old-fashioned and well-established mechanisms for raising revenue. Obviously, taxation is one. There are some places in the United States and abroad that are now introducing climate-related taxes specifically to deal with the impacts of climate change. You have the Miami Forever Bonds in Florida to deal with coastal protection. You have the special levy that's been adopted in Fiji to deal with adaptation. In San Francisco, you have similar initiatives. So, taxation is going to remain a part of the toolkit. Another is bonds, which allow you to borrow from the market, which countries, cities, and states do all the time. Insurance is another. Insurance for households and businesses, but also increasingly for states and countries will become more important as they seek to protect themselves from the cost of some climate change impacts.

Then you have other, relatively novel mechanisms. For example, green bonds, which have so far been used primarily to fund emissions reductions, could be applied to resilience. There may be investors out there who are willing to hold, for various reasons, bonds that are earmarked expressly for resilience purposes. As I mentioned earlier, some of the revenues generated by carbon pricing mechanisms – especially a cap-and-trade or carbon tax system –could be committed to resilience. That's not happening yet to a large extent. Then, there's something called value-capture, in which you calculate the private benefits that will arise from a resilience project, and you basically share the costs of the project with those private beneficiaries, whether those are homeowners or businesses. So, the government puts in a certain percentage, but then the private beneficiaries also pitch in. That's less tested so far, but these are some of the tools that will come in handy.

Some of these instruments can be used everywhere. Even with rudimentary financial systems, it is possible to have taxes and borrowing from the market. The problem is the cost in some cases. Many developing countries are worried that climate change will make their borrowing costs more expensive. If the market perceives a country to be more vulnerable to climate impacts, it may demand more money for lending to that country than would otherwise be the case because the investors worry that a major climate impact would make it harder for that country to pay back its debt. So, the costs for that country to borrow may go up. This is a double injustice in the sense that, first of all, you have countries that are getting hit by climate change first and hardest even though they have produced very little to contribute to the problem in the first place because they are the lowest emitters of greenhouse gases. And then, the second injustice is that they have a harder time preparing for those impacts because they market punishes them with higher borrowing costs.

Your recent book (co-authored with Alice Hill), discusses the fact that we have so much data on climate change that sometimes we don't know what to do with it. Both finance and climate change research use enormous amounts of data. How can researchers make their data actionable for decision-makers in local, state, and national government?

Well, they first need to understand what information end-users need to make their decisions, whether they are business-owners or local governments or farmers. Once you put yourself in their shoes and identify those pieces of information that are most important, then you're able to just focus on those portions that are useful. So, identifying the needs is one key thing. The second thing is to build an interface that is user friendly and that is going to consider the fact that many small businesses and households and relatively small public entities don't have lots of people with sophisticated training that can operate complicated tools. And that you need to be able to use this data without needing to have a PhD to understand how to make sense of it. You need an interface that guides people who have limited time, money, and expertise and get to the right data they need to make the right decisions. So, the interface needs to be sensitive to that. Finally, there's cost. You need to be able to provide all of this – the right data and the right interface – at a cost that is going to be accessible to the broad majority of users and not just the upper end of the market.

Your book also talks about the role of markets in driving forward resilience efforts. What sorts of data are needed to make markets work effectively for resilience?

What's needed is data that is harmonized, that is consistent, that is comparable, and that describes the nature and the magnitude of the risk. Two companies that produce beer or soda, for example, both use water extensively. They are highly dependent on a stable supply of water to make their product. What the market – the owners, buyers, and sellers of shares in stock in that company – is looking for, is how much of a risk of climate-related water shortages are those companies facing? What are they doing to mitigate those risks? What are the possible losses that could result from less water being available? What happens if there is a shock? Can they source this water from somewhere else? Can they rely on facilities somewhere else to make up for the lost production? Those are the kinds of fairly detailed, but crucial pieces of information that investors are going to be thinking about. Right now, we just don't have a framework that allows investors to compare one company against another and have a harmonized system that gives us a common language to talk about this risk.

A further need is for data that takes into account future risks from climate change. A lot of what we do today in terms of business operations, construction, infrastructure – all of that is based on the idea that the climate is stable and that the future climate will resemble the past climate. Well, we are increasingly aware that that is not the case. We don't yet apply systematically the tools and expertise to incorporate that into all kinds of decisions today. That is clearly going to put us on a path to building things that are not going to be well-suited to the future or engaging in behavior that could make us more vulnerable later. Right now, the priority has to be how to bring the future into today's decisions and how to become aware of what the climate scenarios could be when we are planning and making decisions that will affect all manner of economic activity.

Meanwhile, climate model projections have some uncertainties and are necessarily probabilistic. We don't know if the world is going to get its act together and drastically reduce its greenhouse gas emissions over the coming decade. The world might do that, or it might not. We don't know how natural systems are going to react to the warming that has already occurred and that might occur in the future. We don't know how fast that change will take place. We don't know how increased temperatures are going to correlate with increased sea-level rise or incidences of dangerously hot days and wildfires. So, there's uncertainty in all of these things, but that doesn't mean we can't plan. It doesn't mean we can't prepare. And, the way to do it is to think probabilistically. What do the models say is the most likely, central outcome given certain assumptions? So, you prepare for that baseline for sure. But you also have to consider that things may be worse – that we don't get our act together to reduce emissions, that things move faster than we had feared, that tipping points are triggered. We have to start thinking also about worst-case scenarios. That's part of risk management that you deal with all the time in financial regulation and in planning for national defense, and so even though there's uncertainty, there is a range of outcomes. We have to understand what the worst outcome could be and how to take precautions against it. Of course, it's too expensive to prepare for every worst outcome. That would be economically unrealistic and unreasonable. But, can you put in place certain flexibilities, certain features of, for example, infrastructure design or of other types of economic activity that can allow you to change course – to raise that bridge higher, to strengthen that seawall, to move people more effectively – if you have to in the future? So, understand the baseline, understand the worst-case scenario, and plan flexibly.

What is the role and responsibility of government in preparing for climate change, especially in terms of regulating markets in favor of sustainable outcomes?

Government has a crucial role to play in both mitigation and adaptation. There are a lot of things the government can and must do. On the mitigation side, the government has to play a crucial role in coordinating activity in the economy across the country so that we can reduce our emissions in the most effective and efficient way possible. That's why it's so important to adopt a sensible carbon pricing mechanism, whether it's a cap-and-trade or a carbon tax. That's a function only government can perform – you need a centralized process to do that, and that's why legislation on this is so important. You cannot do this by executive action alone – I think that's become pretty clear in view of the current administration. You need a broad, political consensus that a carbon price is needed, and you need legislation to enact it so that it can be embedded in law and send stable signals to the market that this is going to be the rule of the game for the foreseeable future.

In terms of adaptation, it's not only the federal government, but also state, city, and local government. They all have to play a role here because while mitigation – the reduction of greenhouse gas emissions – is a global phenomenon

that knows no boundaries, the impacts of climate change are going to be very localized. They will manifest themselves in very specific ways in different locations, so local governments will have to help communities prepare, and that will require close coordination and cooperation between all levels of government plus the non-governmental sector.

These are all complicated things that are ultimately about executing two major transformations at the same time. On the mitigation side, we're trying to change the way we produce and consume energy. On the adaptation side, we're trying to change the way we plan, build, and live in cities and rural villages and suburban areas. We're trying to change the way we farm and use water in a world that is going to be warmer. Executing those two transformations in parallel is going to be the greatest challenge we have ever faced. People talk about these challenges being akin to wartime mobilization – really requiring an all-of-society effort to work together. So, they're tough, but the alternatives are unacceptable. I suspect that the desire of people to avoid those terrible outcomes is going to pull everyone together. You can see that already with the generational change that's happened on climate change. You see young people everywhere beginning to take action and to urge their political leaders and their elders to get their act together because they understand that not doing anything is an unacceptable outcome.

What is the most important advice you could give to young scholars?

I'd say make sure that your research contributes to solutions, especially with climate change, which could be a defining – if not *the* defining – problem of the 21st century. We need all hands on deck. We need every brain engaged on this challenge. There are so many different ways to address it. Every profession, every discipline in the hard sciences and the social sciences and the arts, humanities, engineering, law – everybody will have to help us reckon with the dual transitions needed for climate action. My urgent recommendation is that folks devote their careers to this challenge.