Modern corporations as insulators against climate shocks

Episode 79 | Big Ideas

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Transcript

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Abstract

Climate change research has mostly focused on how firms and workers adapt in place: better air conditioning, safer roofs, stronger worker protections. Viral Acharya offers a different lens. He argues that the modern corporation, simply by having multiple establishments spread across different locations, acts as a built-in mechanism for diversifying climate risk, much like an old risk-sharing practice from village India.

Acharya traces the idea back to economist Robert Townsend's work on village India, where families married their children across districts with different rainfall patterns specifically to share risk. He argues that the modern corporation institutionalizes this same logic at scale. Using the example of a firm with plants in hot Arizona and cooler Seattle, he walks through how a company can shift production toward climate-friendly locations when heat shocks hit, effectively insulating the aggregate economy even as individual regions suffer. This leads him to a methodological point: studies that measure climate damage by looking only at the directly affected location may miss how firms reallocate production elsewhere, meaning the true aggregate impact could look different from the local one. He also flags a spatial consequence, some regions become climate change "winners" as production shifts toward them, while others see falling wages and shrinking local economies.

The talk closes with implications for India, where Acharya worries that a fragmented, small-firm agricultural sector lacks the scale to diversify climate shocks the way large modern corporations can, and where the resulting damage could carry a distinctly stagflationary character. The chapters below trace this argument from its historical roots to its practical stakes for an economy like India's.

Supplementary Resources

- **Do Firms Mitigate Climate Impact on Employment? Evidence from US Heat Shocks** by Viral Acharya, Abhishek Bhardwaj and Tuomas Tomunen (Working paper) [1]

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Risk sharing through marriage in rural India

[00:00:09] Viral V. Acharya: Hello everyone. So today I wanted to speak about a relatively novel idea in climate change and climate finance research. If you think about old times, and think about the village Indian economy as the economist Robert Townsend wrote about, there people took care of climate shocks like nature of rainfall being variable across different villages or different districts, by coming up with some risk sharing mechanisms.

[00:00:44] Viral V. Acharya: So, low and behold, the risk sharing mechanism in the village Indian economy was one of marrying people across the districts. Why? Because if your bride was with a groom in a neighboring district, but with a different rainfall pattern, the families would get a risk sharing benefit from that. So this idea that diversification might be a way to deal with climate change is actually quite old.

[00:01:16] Viral V. Acharya: But in the modern version of adaptation and mitigation by firms and economies, the more prominent idea is that they will do something to deal with damages a little bit better or they will make the conditions better for workers from excess heat using extra air conditioning, et cetera. They will put some safety mechanisms in place.

The modern corporation as climate insulator

[00:01:43] Viral V. Acharya: And what we find, and what I wanted to talk about today, is that there is one mechanism in the modern economy that resembles the mechanism of marriage in the village Indian economy. And this mechanism is that of the modern corporation. What is a modern corporation? It's a large corporate entity which has multiple establishments, multiple locations, and through that, I want to try and tell you about how climate shocks can be diversified in a little bit better way than they are in an economy without the modern corporation.

[00:02:22] **Viral V. Acharya:** So, of course, this is not close to the idea of marriage, which is at the level of individuals, but the beauty of the modern corporation is that it institutionalizes the arrangement that the marriage across districts was trying to achieve, by actually setting up multiple locations and then optimizing into where the production is going to happen, how the risk sharing can be done with profit transfers or investment transfers across locations, and therefore the economy gets insulated as a whole.

[00:02:57] **Viral V. Acharya:** This is a joint research with Abhishek Bharadwaj, who is now at the Indian School of Business, and Thomas Tomunen, who is at Boston College. So let me tell you how we go about this research and then what the big findings are, okay? So let's say there's a heat shock in Arizona. Arizona is a very hot state in the United States.

[00:02:57] **Viral V. Acharya:** It routinely gets temperatures above one hundred and ten Fahrenheit, so something like forty degrees Celsius, or even higher.

Arizona and Seattle heat shock example

[00:03:30] **Viral V. Acharya:** Last summer it had a spell of ten to eleven days with temperatures above one hundred and fifteen Fahrenheit. So let us say there's one firm that has a plant in the state of Arizona, which is the super hot state, and it has another plant in say the state where Seattle is, Washington. And it's trying to deal with how to manage the problem of heat shocks, okay?

[00:03:57] **Viral V. Acharya:** So you get a summer with excess heat in the state of Arizona, and then they get spells, several days, maybe even several summers in a row. They figure out that maybe climate change is for real, they should anticipate that this kind of risk could arise in the long run. Maybe it is not a good idea to concentrate all their production network into the state of Arizona. Maybe they are doing seventy percent production in Arizona, thirty percent in Seattle, in the state of Washington.

[00:04:32] **Viral V. Acharya:** And now the COO, CFO, and the CEO get together and they start saying, what can we do to get around this climate change risk? Okay. So they say, we have another plant in the state of Washington in Seattle. Why don't we use that and expand the capacity of that plant, okay?

[00:04:32] Viral V. Acharya: So let us say, for example, this is Amazon, it has a warehouse in Arizona, it has a warehouse in Seattle. They say maybe we have to expand the warehouse capacity in Seattle and operate and ship more products out of there.

[00:05:08] Viral V. Acharya: Now, of course, there'll be constraints on how much of this can be done because maybe the shipping costs will have to rise if they are sending stuff to locations that could be served better from the state of Arizona. But in modern days and times, e-commerce clearly works from areas that are very distant from the delivery locations. And so those costs can be optimized, but if you have a summer of hot temperatures, there is lower worker productivity.

[00:05:40] Viral V. Acharya: There might even be worker injuries and fatalities, roofs of your warehouses could collapse, et cetera. These are risks that a firm will have to spend many more dollars to insure their employees against, to rebuild the warehouses, to have a certain roof design that is compatible with growing climate change, et cetera. And the point I want to make is that the mechanism of adaptation and mitigation that most people seem to focus on is the mechanism that the roofs will now have to be manufactured in a better way in these locations like Arizona.

Why aggregate labor productivity estimates mislead

[00:06:20] Viral V. Acharya: But they don't realize that it's the production entirely that could be shifted over to places that are more friendly for climate change. So what is the subtle implication of this point? Okay, so there are several. One is that the modern corporation is acting like a climate change insulator, in this particular example, the heat insulator for the economy.

[00:06:49] Viral V. Acharya: So it's managing the shocks by diversifying them away from Arizona towards Seattle or the state of Washington. The second implication is that the labor productivity need not be declining as much in the aggregate as you would measure by studying the labor productivity impact just in the state of Arizona. So most studies of climate change would isolate a climate event like a wildfire or a hot day, a really hot day occurring in some location, and study locally, from an empirical standpoint, what is the impact on labor productivity in that region.

[**00:07:36**] **Viral V. Acharya:** But that kind of ignores the fact that the entire production network of the firms is going to actually move over time to locations which are friendlier in terms of climate change developments, okay? So the narrow estimates that you get out of studying individual affected locations of climate change on labor productivity, on growth, on aggregate outcomes such as those, might not be a full reflection of what the impact on the aggregate economy might be, if the production networks of the large modern corporations, which have multiple establishments to diversify these shocks, can optimize, reoptimize, recalibrate their production to actually diversify these shocks away.

[**00:08:24**] **Viral V. Acharya:** Okay, the third implication is that, of course, however, there will be regional effects. There'll be a spatial redistribution of how labor productivity and aggregate effects would be. So take this example of Arizona, there would be a rise in unemployment in Arizona, there would be a gradual collapse in wages over there because the supply of labor will be greater than the demand for labor if the production is getting shifted away from Arizona, and there would be a shrinkage of the local economy as production moves to alternative locations.

Spatial redistribution and climate change winners

[**00:09:02**] **Viral V. Acharya:** But the beauty of this modern corporation is that a negative shock to one destination is actually a positive shock to another destination. Okay, a negative shock to Arizona is at the same time a positive shock to Seattle, okay? So when you go around in the world, you hear statements like, okay, some parts of the world are beneficiaries of climate change. So in the US, Michigan and Chicago, and Seattle are probably locations like this.

[00:09:33] Viral V. Acharya: In Europe, probably Sweden and Stockholm are locations like this. So there's something deeper in that simple observation that Michigan, Chicago, Seattle and Stockholm are going to be beneficiaries of climate change, which is that they will take over parts of what the likely affected regions by climate change are going to be, okay? So coming back to this fact that narrowly studying the impact on one location might not lead to the right aggregate implications, is the fact that every heat shock that occurs in Arizona is actually a positive shock to a firm that has a location out in Chicago or in Detroit or in Seattle or in Stockholm.

[00:10:21] Viral V. Acharya: So the production impact, the aggregate impact has to be thought about through this lens of the modern corporation as far as climate change is concerned. So what are the implications of this for an emerging market, or say a country like India? So one, it shows that the modern corporation is a very, very important entity to help develop, to help finance well, and to actually grow in large numbers.

Fragmented agriculture and India's climate risk

[00:10:55] Viral V. Acharya: So take the example of agriculture in India, it's really fragmented in how the farmers work. Land aggregation is not possible in a big way in India because of trouble with land rights and records and state level restrictions on that. So one impact that I am personally quite worried about is the fact that climate change in an economy like India, which has a lot of small firms, which has a lot of small unit agri firms or even individual household run farms, this is going to become a big problem, okay?

[00:11:37] Viral V. Acharya: Okay, the village Indian economy can insulate some of these shocks by doing marriages across districts, but clearly that is not a very powerful mechanism to diversify these shocks as could be possible if shocks in hot regions like Madhya Pradesh could actually be shared with regions like Mohali in Punjab.

[00:12:02] Viral V. Acharya: So one, we need to figure out a way to get at this issue of aggregating smaller agricultural firms into larger modern corporations that would then be able to optimize their production and become heat insulators for the economy. Okay? Now up until we have an aggregation of such smaller agri units into a larger modern agricultural corporation, then my fear is that the impact of heat shocks on labor productivity, et cetera, might be a bigger national risk.

[00:12:46] Viral V. Acharya: It might be a bigger risk to the Indian economy. And what is a feature of these climate shocks? So they are quite stagflationary. On the one hand, they reduce the crop yields, say in the context of agriculture, they will reduce agricultural output.

[00:12:46] Viral V. Acharya: On the other hand, because they are reducing that, they will also create a supply side shock to inflation, okay, which is that the demand for urban consumption for goods won't decline at the same rate as the growth shock arises.

Climate shocks as a stagflationary force

[00:13:24] Viral V. Acharya: So climate change in an economy can be diversified better if you try to use the modern corporation, if you try to develop the modern corporation. Thinking about why the modern corporation works requires thinking hard about what are the factors of production that they optimize on. These are land, power, water supply, et cetera. In case of agricultural production, all of these might be relevant.

[00:13:56] Viral V. Acharya: But if you are at an emerging market or a developing level as far as agriculture is concerned, then you might have to factor in the stagflationary risks that you have from climate change to your economy.

[00:14:10] Viral V. Acharya: Thank you so much.

References

[1] Acharya, Viral, Abhishek Bhardwaj, and Tuomas Tomunen. "Do Firms Mitigate Climate Impact on Employment? Evidence from US Heat Shocks." 2023. https://doi.org/10.3386/w31967.