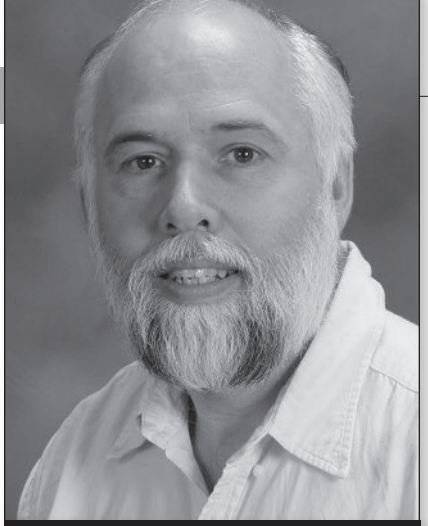
Knot Good: How Climate Change Harms Rich, Industrial Economies



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When Jan van Gils and colleagues' paper on the Red Knot problem hit the news this past spring, no doubt some were initially befuddled with the distinction between knot, as in a rope, and Knot, the bird. Red Knots are amazing little shorebirds about the size and weight of your fist. They migrate in some cases almost ten thousand miles, breeding in the Arctic and over-wintering in the southern hemisphere.

Climate change is making their life harder. Insects now breed earlier in the year in the Arctic, but Knots have not shifted, and arrive a couple weeks too late, so there is less food to feed their young, and not surprisingly, adult Knots now weigh less. Inadequate nutrition also reduces the length of their bill, forcing Knots to eat less desirable foods when over-wintering. It is a careful paper, with great data, and a thoughtful, convincing analysis.

Alas, the conclusion that these birds are harmed by climate change is also somewhat subtle and tenuous, because of the inevitable scientific uncertainty, as duly and unimaginatively reported by the popular media.

A small bird can't change with the climate, boding ill for humans

Here, and often elsewhere in science, I don't give a damn about the uncertainty. Though I will gladly take whatever rigor is offered, contrary to what one might believe from legal opinions and the popular media, the primary focus of science is not rigor, but models. And what has been entirely overlooked here is that this little, weird, obscure bird is a great model for the harmful impacts of climate change on industrial economies.

The Knot moves itself to its food resources. By contrast, in industrial economies, we humans mostly stay put and instead move resources, on ships, railroads, and trucks. After we have moved these resources we harvest from nature, we then combine them in complicated and beneficial ways, and then move them some more.

As one example, that darling of green energy, the solar photoelectric cell, has components sourced literally from across the globe, including boron and phosphorus to dope the silicon, plastics made from oil to house electronic components, copper in wires, steel and aluminum in the metal frame, intellectual know-how from Silicon Valley, and manufacturing facilities in South Korea. And each of these components then has its own supply chains, and net of economic interdependencies. Our industrial economy is just a large flock of Knots, traveling the globe at our behest, moving and combining stuff.

Van Gils's study of Knot economy is elegant in its simplicity. There is only one species, and relatively few variables, so van Gils was able to gather good quantitative data. By contrast, human industrial economies are hugely more complex than the Knot economy. The more complexity, the more scientific uncertainty.

More critically, there are compelling a priori reasons to think that the Knot economy will be materially more resilient to climate change than are industrial economies. The Red Knot has genetic and behavioral means of adapting (through DNA, and through learning), which have been empirically tested (and succeeded) in actual practice over literally billions of years. Yet climate change is proving too rapid for Knots to adapt.

By contrast, our modern industrial economies go back only to World War II, more or less, and hence the resilience and adaptability of their economic, political, social, and legal institutions, and indeed the ability of industrial economies to survive, has not even been tested for a century. It is absolute folly to think that somehow industrial economies that have existed for scant decades are going to successfully adapt to climate change, when natural systems, with billions of years of experience successfully adapting to change, cannot.

The Knot economy is powered by solar energy, whereas our industrial economy is powered by fossil fuels. As with our other comparisons of Knot versus industrial economies, observe that solar energy has been tested and succeeded for billions of years, as a sustainable energy source. Fossil fuels have not succeeded for even a thousand years.

The Knot is being forced to adapt to change that, from its perspective, is exogenous. By contrast, climate change is endogenous to industrial economies. When we transport stuff, and combine it in factories, we burn fossil fuels, which release carbon dioxide, which pollutant now threatens the very economic system that created it. A system harmed by its energy source simply cannot, over the long term, survive.

The Knot economy is built on DNA, learning, and solar energy, all having been tested and survived in actual practice over billions of years. Human industrial economies will necessarily show less resilience and ability to survive than the Knot. And climate change is driving the Knot to extinction.