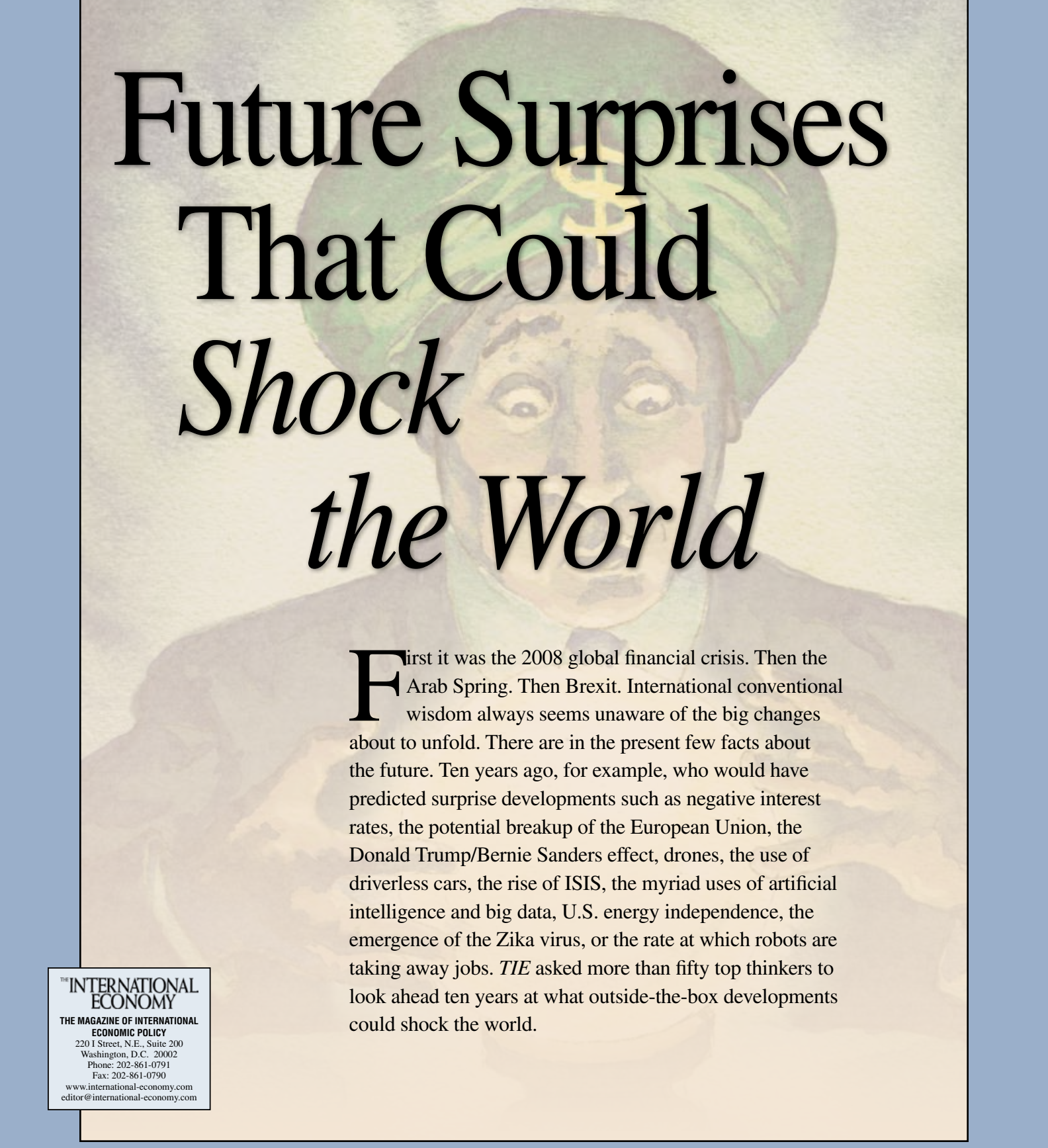
Future Surprises That Could *Shock the World*



First it was the 2008 global financial crisis. Then the Arab Spring. Then Brexit. International conventional wisdom always seems unaware of the big changes about to unfold. There are in the present few facts about the future. Ten years ago, for example, who would have predicted surprise developments such as negative interest rates, the potential breakup of the European Union, the Donald Trump/Bernie Sanders effect, drones, the use of driverless cars, the rise of ISIS, the myriad uses of artificial intelligence and big data, U.S. energy independence, the emergence of the Zika virus, or the rate at which robots are taking away jobs. *TIE* asked more than fifty top thinkers to look ahead ten years at what outside-the-box developments could shock the world.

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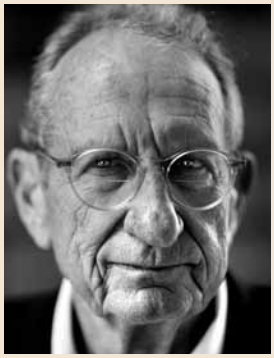
The problem is that free global markets clash with sovereignty and national identity. Popular revolts in the West are understandable. But it is more difficult to forgive the failure of those in power, especially after the global financial crisis, to grasp how interconnected the world had become.

Central bankers and other policymakers should have focused on how the key driving forces in the global economy fit together and what that meant for their economy. Instead, over the past couple of decades, they have continued to view the world through the narrow prism of their own countries, taking the rest of the world as an external influence and choosing their policies accordingly.

Different thinking would have produced choices that could have helped the world amplify and spread the benefits of globalization better. Instead, a destructive economic and financial crisis was spawned and allowed to fester. The world economy is far from being fully back on its feet.

To make globalization work, we need an internationally coordinated policy where not only the borrower economies bring their overall debt to sustainable levels but also the saving gluttons act to reduce their malign savings excess. Instead, the world has plunged into a currency war, but no one wins from competitive devaluation when global demand is weak because of excessive savings, as remains the case today. Unfortunately, a global policy response just seems too difficult to achieve in today's political climate.



It's possible, though not certain, that climate change could be less severe than expected.

JOHN M. DEUTCH

Institute Professor, Massachusetts Institute of Technology, and former Undersecretary, U.S. Department of Energy

Global leaders may be exercising collective self-deception by spreading alarm about the catastrophic dangers of climate change. Scientists have made a compelling case that anthropogenic emissions of greenhouse gases inevitably contribute to global warming. However, climate sensitivity, which reflects the transformation of greater atmospheric concentration of emissions into higher temperatures, and their climate impacts involve processes that are enormously complex, with many subtle feedback effects, and thus is subject to great uncertainty. Political leaders often speak with much greater certainty than scientists do about dramatic consequences such as extreme weather events, droughts, and migration.

Why is the impact of climate change on human society and natural ecosystems so uncertain? The most important reason is the difficulty in predicting its time scale, geographical distribution, and severity, compounded by the uncertainty about the ability of human and natural systems to adapt to these changes. Economists struggle to develop methods and models that can determine the "damage function" that describes the net of costs and benefits, both over time and across different regions, as the world reacts to global warming. A proper "damage function" is necessary to establish the "social cost of carbon," which should shape expectations about climate outcomes and influence climate policy.

New technology may lead to advances that reduce emissions and therefore the inventory of greenhouse gases in the atmosphere. The uncertain natural variation in solar radiative forcing and climate geodynamics can and will also influence consequences of climate change. The best strategy may be to shift some of the costs of mitigation today to investing more in research and development and adaptation for tomorrow.

If climate change turns out to be less severe than is currently expected, it would indeed be a big surprise for many. In the meantime, we should support scientific inquiry to gather evidence to narrow uncertainties, and avoid excessive zeal that focuses on extreme outcomes.

Taxing climate pollution instead of productivity will be a societal breakthrough.

DEBORAH GORDON

Senior Associate and Director, Energy and Climate Program, Carnegie Endowment for International Peace, and co-author, "A Smart Tax: Pricing Oil for a Safe Climate" (2016)

Carbon will be taxed on a global scale. This policy transformation will start in the United States, despite current hurdles from both political parties. Canada and Mexico will follow the United States. This makes