Book Reviews

Edited by Robert Herren

The Climate Casino: Risk, Uncertainty, and Economics for a Warming World. WILLIAM NORDHAUS. New Haven, Connecticut: Yale University Press, 2013. Pp 378. $30.00

Emissions of carbon dioxide (CO_2) and other greenhouse gases (GHGs) and their increasing concentrations in the atmosphere are causing climate change. The prominent component of climate change is global warming. Since the beginning of the Industrial Revolution, increasing amounts of carbon-based fuels have been used, first to power factories and later to provide energy for electric power plants, transportation, and other uses. Burning a carbon-based fuel such as coal or gasoline releases energy, heat, and CO_2. The CO_2 builds up in the atmosphere and traps heat. This has become increasingly problematic in the wake of worldwide economic growth, as GDP and CO_2 emissions are positively correlated.

In formulating his analysis of climate change, Professor Nordhaus used integrated assessment models (IAMs) and the Dynamic Integrated model of Climate and the Economy (DICE) developed at Yale University. His discussion and projections are based on these models.

Climate change and global warming are projected to cause problems in many areas. One area is agriculture because temperature increases in excess of 3°C worldwide are considered harmful to crop and livestock production. Temperature increases will be more harmful in areas that are currently warmer than optimum. However, adaptation and market forces mitigate the impact of warming on agriculture. Adaptation refers to changes in the ways crops are managed and changes in the location of crop production. As the temperature rises, farmers can alter planting dates, and they can substitute other crops. In the longer term, crops can be moved to geographic areas that are cooler. Another mitigating factor is global markets. With global trade in agricultural products, the agriculture industry can compensate for production losses in one geographic area by increasing production in other areas. These and other adjustments can lessen the impacts of global warming on food production.

Another area of concern is human health. Rising temperatures will create additional heat stress for human populations. Fans, air conditioning, and the construction of shaded areas and indoor facilities are just a few of the projected adjustments to heat stress. Rising temperatures also create the potential for the spread of diseases associated with warmer climates.

Three of the most difficult problems associated with climate change involve the oceans. These problems are: sea-level rise, hurricane intensification, and ocean acidification. There are two parts to the rise of sea levels: (1) the expansion of ocean water as it warms ("thermal expansion"); and (2) the melting of the large ice sheets in Antarctica and Greenland. As the oceans warm and these ice sheets melt, the oceans rise and begin to encroach on coastal areas. Many of the most populous cities in the world are in coastal areas. Economists, who study the impact of climate change, project the long-term migration of populations inland from the coastal cities as they are threatened by rising sea levels, severe storms, and flooding.

Speaking of storms, an increase in ocean temperature will affect hurricanes. As the oceans warm, areas conducive to the initiation of hurricanes will expand. Warmer oceans will also increase hurricane wind speed.

A third ocean-related problem is ocean acidification. This is a problem separate from global warming; it is related directly to increasing amounts of CO_2 in the atmosphere. Some of this CO_2 mixes with ocean water, causing an increase in ocean acidity. As ocean acidification advances, it robs the ocean of much-needed calcium carbonate and harms species dependent on calcification, such as corals and shellfish.

An additional projected impact of climate change is ecosystem loss and related species loss. Climate change will harm ecosystems from the poles to the equator. Scientists anticipate a high rate of species extinction in the wake of uncontrolled climate change and rapid warming.

Strategies for managing and controlling climate change include mitigation, removal of CO_2 at the site of combustion, and new technologies. Approximately 75 percent of CO_2 emissions come from coal and oil. Mitigation involves lowering CO_2 and other GHG emissions, primarily by burning less coal and fewer oil-based products.

A second strategy would be to catch (trap) the CO_2 as fossil fuels are burned. The CO_2 would then be transported to storage sites. One preferred storage site would be a rock formation deep underground.

A strategy that is currently being implemented is the development of new, low-carbon renewable-energy technologies. Examples are wind and solar power. These technologies are being used today on a relatively small scale. Research and development in clean renewable-energy technology will take time, but it must be part of a long-term plan for low-carbon energy development.

Strategies are important in the struggle to moderate climate change and global warming. However, complementary policies are also needed. This is especially true in the case of mitigation. Therefore, economists have proposed two policies to aid in the lowering of carbon emissions: a "carbon tax" and "cap and trade."

A "carbon tax" is a tax on carbon emissions. With a tax, carbon emissions become costly, and firms have an incentive to reduce emissions. Professor Nordhaus proposes a carbon tax of $25 per metric ton of CO_2.

A second policy is "cap and trade." With this policy, a country sets a restriction, or cap, on CO_2 and methane emissions, and it issues permits for emitting carbon that match the cap. The cap must be lower than the emissions level of the free market. The permits are tradable, and as they are traded, the price rises to reduce emissions to the cap level.

A third policy approach consists of government rules that require energy-efficiency improvements. The United States and many other countries have these types of regulations for automobiles, heating and air conditioning equipment, etc. This is an important area of policy because greater efficiency reduces energy use and CO_2 emissions.

In the international arena, controlling climate change and global warming will require the full participation of nations around the world. It will also require consistent and uniform policies. This implies an effective and binding international agreement.

There are unusual obstacles to an effective international agreement. These obstacles include: (1) nationalistic interests and ambitions; (2) a concern for the present and a disregard for the future; (3) partisanship within nations; and (4) the vested interests of coal and oil producers. These obstacles will be difficult to overcome. However, we are seeing a lively interest in the problem from the scientific community, and from powerful and influential individuals and firms. Also, many nations have a strong interest in solving this difficult and very troubling problem.

At the beginning of my discussion of William Nordhaus's book, I envisioned him answering three questions: What is the problem? How

does the problem affect the environment and the people who inhabit the planet? How can we solve the problem?

He answers these questions and provides much more information. This is a book that should appeal to economists because it discusses and analyzes climate change and global warming from an economic perspective.

Nordhaus makes a strong case for measures to combat and arrest climate change. However, I wish that he had directed his book toward a wider audience: using stronger language, reaching out overtly to the general reader, and choosing a mainstream publisher with a larger promotional budget. Because the stakes are very high in "the climate casino," and there is a need for broad based public support for constructive policy. The future of planet Earth hangs in the balance.

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Worker Leadership: America's Secret Weapon in the Battle for Industrial Competitiveness. FRED STAHL. Cambridge, MA: MIT Press, 2013. Pp. xiii, 245. $29.95.

The author, Fred Stahl, is a former Boeing executive and founding contributor to MIT's Lean Aircraft Initiative (LAI). This initiative was a consortium funded by MIT, government and industry. Its mission was to study industries that have adopted Toyota's methods of organizing and managing manufacturing processes. The knowledge gained was intended to assist Boeing in the design of new factories in order to reduce the cost of airplane production.

Toyota is known for its "lean manufacturing" production methods and just-in-time inventory management system. The objective of lean manufacturing and inventory control is to continually improve worker productivity and minimize inventory costs to increase the profitability of manufacturing automobiles. If workers can increase automobile production with no change in quality and with a minimum auto parts inventory, waste can be eliminated lowering costs and improving profits.

Japanese workers accept an intense work environment that pushes them to their physical limits while impeding their cognitive development. Japan's culture emphasizes harmony, obedience and duty. These cultural