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Arctic Economics in the 21st Century: The Benefits and Costs of Cold. By Heather A. Conley. Contributing Authors: David L. Pumphrey, Terence M. Toland, and Mihaela David. Washington, D.C.: Center for Strategic and International Studies; Lanham, Md. and Boulder: Rowman and Littlefield, 2013. Pp. iv, 66. Paper. ISBN 978–1–4422–2487–2, cloth; 978–1–4422–2488–9, e-book.

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The Arctic is cold, harsh, remote, and dangerous. It holds massive natural resources and many economic opportunities, but also unusual large costs and huge hidden risks. What makes economic development in the Arctic special? Mostly, it is the extreme cold, the extreme weather, the extreme remoteness, the extreme difficulty in transportation, and the generally untouched nature of the "nature" up there. In addition, climate change (even if it is just variance) is rapidly affecting humans' ability to access these large, heretofore untapped resources.

Arctic Economics in the 21st Century, a sixty-four-page report by the Center for Strategic and International Studies, describes the current state of known resources and economic opportunities primarily in the U.S. Arctic region, and discusses some of the barriers to harvesting these opportunities, including the lack of infrastructure and environmental and regulatory risks. This report is free on the CSIS website (<https://csis.org/publication/arctic-economics-21st-century>), so as an economist, I suppose my first comment should be that you cannot beat the price.

In a (too) short introduction, the authors describe some of the problems the United States might face in creating "a national economic strategy for the American Arctic . . . in

an increasingly resource-constrained and politically polarized environment” (p. 2). There are valuable resources, especially hydrocarbons, that might exceed \$1 trillion, as well as “rare earth or so-called strategic minerals, iron ore, nickel, and palladium” (p. 3), but due to cold, remoteness, and a shortage of infrastructure, some of which are unique to the Arctic, substantial challenges remain. (The conclusion chapter is excellent and should probably be read first.) While the authors dedicate a few pages to other Arctic areas (Canada, Greenland, Iceland, and some mention of Russia), the report is mostly about Alaska and the United States.

The report’s six main chapters cover hydrocarbon (oil and gas) and mineral extraction, shipping, fishing, ecotourism, and infrastructure. While the report spends too much time on the value of the resources and not enough time on what makes the Arctic a particularly difficult place for economic development, toward the end the report focuses on many of these factors in a way that is useful and illuminating. The chapter on Arctic shipping, which covered the Northern Sea Route, the opening of the Northwest Passage, and the strategically important Bering Strait, demonstrates both the opportunities and risks involved with opening the Arctic. Similarly, the chapter on Arctic ecotourism (with its focus on Arctic cruise ships and the potential for disaster), and the penultimate chapter on Arctic infrastructure investment (or the lack thereof), highlights key issues and risks related to Arctic economic development. The portions of these chapters that point out that the United States is severely lacking icebreakers (and relies on the Russians to break ice to supply Nome, Alaska) should be read by all military and economic policymakers and anyone considering economic activity in the Arctic. The lack of infrastructure such as roads, deep-water ports, and airports will affect the costs of economic development for some time.

However, as economics deals in trade-offs and risks, it would have been nice to have more discussion of the risks involved in the Arctic. While the report mentions risks related to the lack of safety infrastructure, other risks due to uncertainty, extreme weather, and particularly climate variation as they affect business were not developed, even though these risks are a key issue in

Arctic economics. Many, such as the risks due to climate variation, are a major focus of discussion elsewhere. The Nobel Peace Prize-winning UN Intergovernmental Panel on Climate Change (IPCC) Working Group II report recently noted that **“There is increased evidence that climate change will have large effects on Arctic communities . . .** Some commercial activities will become more profitable while others will face decline. Increased economic opportunities are expected with increased navigability in the Arctic Ocean and the expansion of some land- and freshwater-based transportation networks” (Larsen et al. 2014, p. 3; bold in the original). The IPCC report also noted climate change effects on resource exploration, agriculture and forestry, open and freshwater fisheries, marine transportation, and infrastructure. While the IPCC report came out after this report, the papers cited in the IPCC report predate this report and, therefore, these risks could have been discussed in more detail.

In the end, this report is exactly that: a report. It tends to be long on individual facts regarding current resources and short on economic analyses of what might change, and why, and what the effects might be. There were not any regressions, data analyses, or even a calculation of benefits and costs for any particular project in dollars and cents. For example, the first few chapters on oil and gas and mineral extraction start with a recitation of facts (how many cubic feet, dollar value, where located, etc.) from publicly available sources. While about the Arctic, one could have written a similar style report about hydrocarbons in North Dakota. These sections could have benefited from more of a focus on what makes Arctic development of these resources more difficult than those in North Dakota, the Gulf of Mexico, Saudi Arabia, or Africa. One area the report does cover is the potential for environmental impact, which, although true in all of these areas, may have special impact in fragile Arctic regions. Overall, however, the report feels at times like it is a summary of Internet searches or a bunch of Wikipedia pages, and so reads more like a particularly good student summary report on the Arctic than original research.

However, perhaps this is the report’s true virtue. When I made this comment to my long-time

close friend, coauthor, and social scientist Dr. Henry Huntington (Senior Officer–International Arctic for the Pew Charitable Trusts), he wisely commented that even if all the information is available, sometimes it is just nice to have it all in one place. I liked the extensive use of footnotes; just about every other sentence is footnoted with citations from the Internet, which will greatly aid future researchers on this issue. The case study in chapter 2 on Shell’s “drilling efforts in the Beaufort and Chukchi Seas” (pp. 14–18) did a great job of combining all of the issues and difficulties of exploring and exploiting natural resources in the Arctic, including illuminating examples of a rig slipping off its mooring and almost running aground, a different rig running aground on Kodiak Island, and the effects of a short and varying season due to “encroaching ice floes” (p. 17).

I have a few minor quibbles. First, while the report has pictures (all of which are in the public domain), there are no tables, graphs, or maps in the report; a table on the location, amount, and value of hydrocarbons, for example, would have been useful. Also, the footnotes indicate that most of the information has come from Alaskan news sources or the U.S. Government, even though the *New York Times*, *Washington Post*, and *Wall Street Journal* have all run large and interesting stories on economic development in the Arctic, as have, I am sure, *Time*, *The Economist*, and other periodicals. It would have been nice to see more

citations from more broad-based and established media, particularly as these sources may also have more integrative analyses of the issues involved.

In the end, this report is a good summary of current resources and (lack of) infrastructure in the Arctic, particularly Alaska and the U.S. Arctic. It has a wonderful list of footnotes and sources, which will be helpful to economists and future researchers focusing on energy, mineral extraction, transportation, fisheries, tourism, and climate change, particularly as they relate to the Arctic. It also has interesting issues related to the global political economy and economics/strategy/military security. Given its price (free), the interesting topic (economics in some of the harshest places in the world), and its approachable writing style, it would be appropriate for students in economics, political economics, and resource engineers. It is well written and easy to read, and so should be read by policymakers and all those interested in the Arctic.

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Transportation Economics is aimed at advanced undergraduate and graduate civil engineering, planning, business, and economics students, though the material may provide a useful review for practitioners. While incorporating theory, there is a very applied bent to the course, as all the ideas covered are intended to help inform the real decisions that are made (or should be made) in practice. 2

Introduction. Figure 1 A toll booth on the Garden State Parkway. Transportation systems are subject to constraints and face questions of resource allocation. The topics of supply and demand, as well as of equilibrium and disequilibrium, arise and give shape to the use and capability of the transportation system. 5. Introduction. 2.1 What is Transportation Economics? Economic Systems. Q. Agricultural and Natural Resource Economics – Environmental and Ecological Economics. R. Urban, Rural, Regional, Real Estate, and Transportation Economics. Y. Miscellaneous Categories. Z. Other Special Topics. A. General Economics and Teaching. A1. General Economics.

Transport economics is a branch of economics founded in 1959 by American economist John R. Meyer that deals with the allocation of resources within the transport sector. It has strong links to civil engineering. Transport economics differs from some other branches of economics in that the assumption of a spaceless, instantaneous economy does not hold. People and goods flow over networks at certain speeds. Demands peak. Advance ticket purchase is often induced by lower fares. The networks themselves