

## *Broadband: Should We Regulate High-Speed Internet Access?*

*Edited by Robert W. Crandall and James H. Alleman. 2002. Washington DC: Brookings Institution Press. Pp 338, paperback \$22.95.*



This collection of papers was presented at a conference October 4-5, 2001 at the AEI-Brookings Joint Center for Regulatory Studies, plus two more papers from a later conference at Columbia University. The book tackles two main tasks. The first is to explain some of the technological complexities of broadband, or high-speed Internet access, for people who don't know DSLAM from DOCSIS. The second is to discuss the theoretical regulatory framework, as well as the specific policy proposals in Washington to regulate or deregulate this field, for the people who can't tell the difference between Tauzin-Dingell and the Telecommunications Act of 1996.

This diverse group of papers includes a good mix of descriptive, theoretical, and empirical work, including some experimental economics. Sponsored by both AEI and Brookings, there is also a mix across the political spectrum. The book is a success in that it does manage the tasks listed above. The only problem, unfortunately a major one, is its timeliness. Not only has technology moved quickly in this field since the conference was held, but there have been big changes in the business world and Washington as well.

Hal Varian illustrates the technology lag, in what appeared to be a promising paper. It provided the results of an experiment to determine the demand for broadband Internet access via a controlled market experiment. Unfortunately, the experiment took place in 1998 and 1999, and the "broadband" was a 128 K ISDN line, less than one-twentieth the speed of the broadband connection used in sending this review to the Business Economics editors. In that time frame, before Napster and Kazaa and with streaming video in its infancy, there wasn't an overwhelming reason to demand higher speeds. While the methodology and reasoning in the article are quite interesting, the results are no longer meaningful. (To be fair, the editors do point out that the study is from "an ancient era in Internet time.") Another article, by Paul Rappoport, Donald Kridel, and Lester Taylor, provides a more recent demand estimate, with data from dial-up and broadband users from mid-2001.

The next group of papers describes the actual technology of broadband. A paper by Charles Jackson covers the wired technology of digital subscriber lines (DSL), which provide broadband over phone lines and cable modems, which use the wires of the cable company. The technology is more than just background information, since most regulatory or pro-competition plans call for the granting of access or divestitures at particular points in the broadband flow. To understand the regulatory schemes, you need some understanding of where they are in the technology.

A companion article by Jerry Hausman looks at the technology of wireless connections, and given its

2001 origins, looks almost exclusively at a discussion of Internet services via 2G and 3G (generation) cellular systems. Fast-forward to 2003 and the action has moved elsewhere. While the cellular companies have cell phones that browse the web and receive email, if you ask most industry people today what they think of when you mention the words "wireless" and "Internet," they think of something else entirely. The hot topics now in wireless broadband are WiFi and public hotspots. The former word hadn't been invented in 2001, but in 2003 it is only the marketing term for 802.11b wireless networking. The technology was around in 2001 but was pricey and unreliable. Now it is cheap and standardized (with more advanced standards on the way) and operates in what is now an unregulated part of the electromagnetic spectrum. People are making serious business plans to provide public access to networks of WiFi devices in places as varied as airports, hotels, Starbucks, and McDonald's. (None of the authors envisioned that we could get fries with our broadband.) A check of the book's index shows no entry for 802.11b. That's not a fault of any of the authors; it is just an indication of how quickly things move in Internet time.

The last half of the book focuses directly on regulation. While some of the articles focus on what were the legislative current events of the time, others provide a broader framework for discussing regulation, de-regulation and their effects on the broadband providers. A good introduction to this is Jerry Hausman's article "Internet-Related Services: The Results of Asymmetric Regulation" which points out that the two broadband technologies, DSL and cable

modem, reside in two different industries and face two vastly different regulatory frameworks. Also of value was the last paper in this section, “The Benefits of Broadband and the Effect of Regulation” by Robert W. Crandall, Robert W. Hahn, and Timothy J. Tardiff. They summarize others’ research on the benefits to the economy of broadband, and also provide a guided tour of much previous regulation and de-regulation in communications (including telephone, television, and cable). They also point out many of the unintended consequences that were a result of this regulation.

Austan Goolsbee has some interesting points in his paper, which looks at ways to close the “digital divide” between those with broadband and those with dial-up. He compares two basic ways—subsidizing usage of consumers versus subsidizing fixed costs of providers. He finds that although consumer subsidies would cost more and encourage more adoption, the overall consumer welfare gain would be less than gains via producer subsidies. An important caveat is that all of the costs are now lower than when the study was conducted; and the results may be different now, as well.

These papers were being written and revised after the dot-com bubble had burst, and many of them mention the roll call of bankruptcies that had already begun in the Internet and telecom field, although they do not anticipate the depth of the fall. The hot regulatory topics have changed, too. The two biggest issues in this field now are digital rights management and the media concentration rules, and two years from now it will be something completely different. That’s why the most important part of this section is the big picture on regulation, rather than the details on the

hot topics of 2001.

A minor quibble with the book—some, but not all, of the contributors are well known. The list of contributors is only a page long, and contains only names and affiliations. The combination of a broadband connection and Google meant that it wasn’t hard to find the backgrounds, but it wouldn’t have taken more than a couple of pages to include a paragraph each on the authors.

Overall, the book has value, but due to what it covers, the value depreciates rapidly. That is a byproduct of the topic, and not the fault of the authors.

Bruce Kratofil  
BJK Research  
Cleveland, OH

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### *Technological Revolutions and Financial Capital: The Dynamics of Bubbles and Golden Ages*

By Carlota Perez. 2002.  
Northampton, MA: Edward Elgar Publishing, Inc. Pp 225. \$70.00 cloth; \$30 paperback



Economists have a fondness for categorizing historic events into phases that permit easier analysis and also reveal the periodicity of similar events that will support sweeping generalizations about patterns of economic forces. Perhaps the most familiar is the analysis of economic events according to cyclical behavior, together with an analysis of

which economic time series turn ahead of, are coincident with, or lag cyclical turning points. Other categories that come to mind are the Kondratieff waves and shorter periodic fluctuations as described by Juglar and Kitchen. And Schumpeter proposed a theory based on the actions of entrepreneurs as a dynamic factor that disturbs economic equilibrium.

In her book, Carlota Perez builds most effectively on Schumpeter’s work as a base, binding economic growth and technological transformation to financial capital. She argues that historically technological revolutions arrive with remarkable regularity, and economies react to them in a predictable fashion. In linking technology to finance, she explains how financial capital flocking into new investment leads to speculative bubbles and financial crises before more harmonious growth emerges.

The author’s background is well suited for the research reported in this volume. Carlota Perez is an honorary research fellow in science and technology policy research at the University of Sussex, UK, an adjunct senior research fellow at INTECH, Maastricht, The Netherlands, and an international consultant and lecturer on changing strategies and technology policy based in Caracas, Venezuela.

At the outset, the author defines five broad technological revolutions, or Techno-Economic Paradigms as she calls them, since the end of the eighteenth century. They are listed below, together with the year a major technological break-through initiated the revolution:

- The Industrial Revolution—1771
- The Age of Steam and Railways—1829
- The Age of Steel, Electricity and Heavy Engineering—1875

- The Age of Oil, the Automobile and Mass Production—1908
- The Age of Information and Telecommunications—1971

Each of these revolutions has a life cycle of about 50 years and goes through a cyclical pattern. The first stage is the installation period, which has an eruption phase, when a new innovation is introduced and spreads in conflict with old products and technologies. The second is the frenzy phase, when financial capital drives the build-up of new technologies but develops tensions within the system. A turning point occurs, usually with a recession that follows the collapse of a financial bubble, and regulatory changes are made to facilitate and shape the period of development. Then follows a period of deployment, which initially has a synergy phase, when conditions are all favorable for the full flourishing of the new technology, and then the maturity phase, when signs of dwindling investment opportunities and stagnating markets appear.

The author makes the point that no attempt should be made to use a rigid, long-wave interpretation of the five phases within a narrowly defined economic system. Long waves are not economic cycles but much wider systemic phenomenon where social and institutional factors play key roles in first resisting and then facilitating the unfolding of the potential of each technological revolution. Therefore, seeking regular ups and downs in GDP and other aggregate variables should be resisted, along with the idea that such cycles must occur simultaneously worldwide.

The author also distinguishes between financial and production capital. Production capital is closest to the economists' definition of capital—assets used to produce output. Perez focuses not on the amount of

these assets but on the agents and their purposes, that is, the motives and criteria that lead people to perform—or hire others to perform—a particular function in the process of wealth creation within the capitalist system. Financial capital represents the criteria and behavior of those agents who possess wealth in the form of money or other paper assets and whose objective is to make money grow. Production capital embodies the motives and behavior of agents who generate new wealth by producing goods and services and their objective is to accumulate greater and greater profit-making capacity. Financial capital is mobile by nature, while production capital is tied to concrete products. And it is financial capital that invests in the new products and whose activities lead to financial bubbles.

The book is full of challenging ideas but is not an easy read. The style is academic and at times difficult to follow, and this reviewer, at least, wishes synonyms for “paradigm” were used occasionally instead of being constantly repeated so many times in the text. However, for a book that will stretch the imagination, broaden the horizons, and challenge the thinking of the business economist immersed in his daily tasks, this book is worth time invested in reading it.

Edmund A. Mennis  
*Investment Management Consultant*  
*Palos Verdes Estates, California*



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