

Current U.S. immigration policy, which is driven by the objective of unifying families, favors relatives of naturalized citizens and resident aliens. Thus, current policy works mainly to the benefit of recent immigrants (those most likely to have close relatives abroad) and imposes costs on the native population generally.

Borjas argues that current immigration policy has contributed to a decline in the skills brought to the labor force by immigrants, has led to a widening disparity between earnings of immigrants and native workers, and may lead to adverse changes in the socioeconomic structure of the nation. He further argues that current policy forgoes the opportunity to increase productivity through strategic selection of immigrants, and that by increasing the supply of low-skilled labor it probably has led to lower wages among the poorest segments of the native population. As an alternative to current immigration policy, Borjas proposes selection criteria that emphasize immigrants' skills, especially those skills associated with higher levels of educational attainment and high earning potential.

OPTIMAL POLICY WOULD FILL GAPS

THE CORRECT POLICY IMPLICATION OF Borjas's theoretical insight is subtler than the policy he proposes, however. An optimal immigration policy would select immigrants to complement the gaps and shortages of specific skills in the domestic labor force. The resulting mix might include, for example, some highly educated workers, who are capable of performing high-value-added tasks, and some less-educated workers, to fill jobs that native workers are unwilling or unable to perform. Strategic labor shortages might best be identified by the rate of change in wages rather than by their absolute level.

Borjas gets it half right: we would probably benefit more, economically, if we were to select immigrants who have more education and earning potential than the immigrants accepted under current policy. But we would benefit even more if we were to select immigrants whose skills complement those

of the native population.

Borjas does not offer much insight as to how to implement a policy that emphasizes complementary immigrant skills. His description of point systems used in Canada and elsewhere is of little value because such systems rely on immigration officials' judgments about the weighting of various skills and educational attainments; they lack a pricing mechanism to guide allocation decisions. In reality Borjas does not propose an economic solution but a political solution clothed in economic data.

A FUNDAMENTAL RESOURCE

PUTTING ASIDE THE ISSUE OF HOW TO implement an economically rational immigration policy, *Heaven's Door* car-

ries the right message about current immigration policy: it fails to consider, let alone serve, the economic welfare of the native population, which is a valid strategic objective of immigration policy.

Immigration policy is not purely a matter of economics; it also has political, ethical, and social dimensions. But the economic dimension is important, and by overlooking it, a policy can also fail politically, ethically, and socially.

Borjas's work establishes an essential foundation for research and understanding of the economic implications of immigration policy. Despite its flaws, *Heaven's Door* is, and is likely to remain, a fundamental resource for anyone interested in the serious study or formulation of immigration policy. ■

Making Sense of Electricity Deregulation

Reviewed by Peter VanDoren

POWER LOSS: The Origins of Deregulation and Restructuring in the American Electric Utility System

by Richard F. Hirsh

406 pp. Cambridge, Mass.: MIT Press, 1999

UNLOCKING THE BENEFITS OF RESTRUCTURING: A Blueprint for Transmission

by Shimon Awerbuch, Leonard Hyman, and Andrew Vesey

286 pp. Vienna, Va.: Public Utilities Reports Incorporated, 1999

DESIGNING COMPETITIVE ELECTRICITY MARKETS

Hung-po Chao and Hillard Huntington, editors

212 pp. Boston, Mass.: Kluwer Academic Publishers, 1998

BTHE EARLY 1990'S, REGULATION of electricity in the United States had yielded wide state-to-state variations in retail electricity prices. Even though the regulation of electricity failed to protect consumers from high electricity costs, no one proposed eliminating regulation. Instead, the policy response has been to restructure electricity markets

through mandatory open access, under which an electricity producer has the right to sell electricity to whomever it chooses, using the wires of an incumbent utility.

Although mandatory open access has fostered competition among generators of electricity, the transmission and distribution (T&D) of electricity remain regulated. The time-dependent prices that are available in the wholesale interstate market are not reflected in the rates paid by retail consumers.

PROBLEMS WITH PARTIAL DEREGULATION

Partial deregulation through mandatory open access has been accompanied by some predictable problems:

- Generators set prices above marginal cost.
- Transmission constraints limit the ability of distant generators to compete

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during the daytime, especially in summer.

- The pricing of T&D, the analysis of T&D investment incentives, and the incentives that govern the substitutability between generation and T&D have been ignored.

Those economists who call for the control of market power because generators price above marginal cost argue correctly that market forces may not eliminate excess profits in partially deregulated electricity markets. (See, for example, “Electricity Restructuring: Deregulation or Reregulation?” by Severin Borenstein and James Bushnell [*Regulation* 23, no. 3 (2000): 46].)

Demand response cannot eliminate excess profits because current pricing regimes give consumers no incentive to reduce peak demand. If customers pay 7¢ a kilowatt hour even when the price on the wholesale market is 70¢ or \$7 a kilowatt hour, generators will not worry about a demand response to their high prices.

The installation of “smart” meters—to measure time-dependent prices and enable consumers to vary their usage in response to those prices—would be time-consuming and expensive, and would probably meet strong political resistance. The development of insurance and hedging schemes to allow consumers to manage the risks associated with fluctuating electricity prices is also in its infancy.

As for T&D, additions to capacity confer benefits and costs across all generators and consumers on the grid. Who should decide when to add capacity, and how should additions be priced?

The three books under review offer some insight into those questions. The first gives a history of the electricity regulatory system. The second argues for a regulated for-profit transmission system. The third presents academic papers that wrestle with the important questions about the organization of the electricity industry.

THE HISTORY OF ELECTRICITY REGULATION

RICHARD HIRSH'S *power loss* IS A detailed history of the regulation of the electric power industry that nicely com-

plements the classic economic analysis of the electricity industry found in *Markets for Power*, by Paul Joskow and Richard Schmalensee. Readers who are familiar with the electricity industry will find no surprises in Hirsh's book, but they will find its detailed analysis invaluable as a reference tool.

Professor Hirsh argues that utility executives always have tried to reduce competition through the use of state regulation. They succeeded for a very long time, but the shocks generated by inflation and high nuclear and independent power costs in the 1970s and 1980s destabilized their comfortable regulated environment. Professor Hirsh thinks that utility managers and owners have forever lost control of the system over which they had exclusive control for so long.

Hirsh starts with the decentralized direct current industry in the 1880s and its transformation to alternating current after 1896, which allowed the transmission of electricity over longer distances. He then tells us how progressive politicians and utility executives in Wisconsin and New York promoted the creation of state-regulated monopolies to serve their respective interests.

Many now refer to electric distribution systems as natural monopolies. But an important case in 1908 suggests that the monopolies were state-created. In that case, the New York Public Service Commission denied permission for the Long Arc Electric Light and Power Company to issue stock and compete with existing electric companies. The commission's ruling stated that even if competition were to occur it was in the public interest to stop such behavior:

It is coming to be generally recognized that monopoly control of electric light, heat and power may be very beneficial to the public.... That competition cannot be depended upon to protect the consumer from high prices has been fully demonstrated. (p. 27)

Hirsh tells us that the monopoly franchise state-regulated system would remain unquestioned as long as it re-

sulted in cheaper electricity. Cheaper electricity, in turn, depended on technological developments in boiler and steam-turbine efficiency, which stalled in the early 1960s.

Nuclear and Independent Power Drove Costs Higher Several additional events conspired against utilities' efforts to reduce costs further. First, many utilities decided to turn to nuclear power. In the early 1960s many thought that nuclear power would be too cheap to meter. And nuclear power also seemed to solve utilities' air pollution difficulties. To be sure, the least expensive nuclear power plants turned out to be cheaper than the least expensive coal plants, but many nuclear power plants turned out to be terribly expensive.

Additionally, post-1968 inflation and the higher price of oil after 1973 interacted in perverse ways with the declining-block electric-rate structures in place at the time. Rates signaled consumers that additional electric consumption was cheaper, when in fact it was more expensive at the margin because new plants were more expensive than existing plants.

In his 1977 National Energy Plan, President Carter urged states to eliminate declining-block rates and allow alternative generators to build new capacity in lieu of incumbent utilities. The 1978 Public Utilities Regulatory Policies Act (PURPA) required incumbent utilities to accept generation from independent producers at rates set by state utility regulatory commissions to reflect the costs utilities would have expended if they had built new generation themselves. Some states (New York and California, for example) set rates based on the expectation that fossil-fuel prices would remain high. Accordingly, those rates were far too high.

Mandatory Open Access: A Consensus Policy Response The combined effect of expensive nuclear and PURPA power in the Northeast and California led commercial and industrial customers in those states to demand rate relief. Rather than deregulate the industry, states are attempting to combine an unregulated

market for electricity generators with a regulated T&D system through policies that are analogous to the mandatory open-access regime found in telephone regulation.

Professor Hirsh ends his book by asking whether utility executives will again be able to shape the restructured regulatory environment to serve their own interests. He concludes that utilities have forever lost their ability to manage their environment through regulation.

THE INDUSTRIAL ORGANIZATION OF TRANSMISSION

THE BATTLE BETWEEN THOSE WHO want decentralized agents and a system of property rights to “govern” the electricity market and those who want regulation to play a strong role is far from over, however. The battleground simply has shifted from the generation sector to T&D. Two books that I have found invaluable in developing my thoughts about the role of markets and regulation in electricity are *Unlocking the Benefits of Restructuring: A Blueprint for Transmission*, by Shimon Awerbuch, Leonard Hyman, and Andrew Vesey; and *Designing Competitive Electricity Markets*, edited by Hung-po Chao and Hillard Huntington.

Nonprofit vs. For-profit The first institutional design problem encountered in implementing mandatory open access was preventing traditional utilities from favoring their own generators by manipulating the access to and pricing of transmission facilities owned by the traditional utilities. The answer to that problem, in the words of Awerbuch and his co-authors, was to

hand the operation of the [transmission] network to nonprofit entities—independent system operators (ISOs)—organized by the old utilities and to a great extent run by the same people who ran the power pools. A few of us thought that putting a not-for-profit monopoly operating under the old regulatory rules in charge of creating an efficient, competitive market was a bizarre move. (p. xv)

Awerbuch and his coauthors believe that a “private, for-profit firm that owns and operates the transmission network ... will create a more efficient, more dynamic, more customer-oriented system than the ISO” (p. xv).

Other observers of electricity policy share the concerns of Awerbuch et al. Bruce Radford, the editor-in-chief of *Public Utilities Fortnightly*, an electricity industry trade journal, said earlier this year:

Now I know where all the laid-off utility executives ended up. They leave their jobs as control area operators to do the same thing at the independent system operator.... At a time when state public utility commissions and even the FERC itself are losing clout, the ISOs are creating a new bureaucracy of their own, of staggering proportions. They have seized a whole new turf—the regulation of electricity transmission—that once fell into a sort of no man’s land. (April 15, 2000, p. 5)

As Robert Michaels notes elsewhere in this issue of *Regulation*,

It has become increasingly clear that an ISO is a political institution being called on to do an economic job. It is an institution whose structure invites inefficiency, inconsistency, and dominance by transmission owners, with decisions made by internal processes whose implications no one can fully understand today.

Traditional vs. Incentive Regulation Awerbuch et al. lay out their vision of a for-profit transmission world and relentlessly contrast it to the nonprofit ISO world. In their view not only must operation and ownership be unified rather than separated as under the ISO model, but regulation also must change from traditional rate-of-return (ROR) regulation to what is called incentive-based (IB) or price-cap regulation.

Under ROR regulation, assets are depreciated over 40 years and all unexpected profits to the regulated firm are perceived to be the result of excessive prices rather than innovation on the

part of the firm. Such profits are returned to consumers in the form of rebates or price decreases, even though consumers contributed no capital to the firm. Thus, under traditional regulation, firms would appear to have little incentive to innovate. But as Professor Hirsh points out in *Power Loss*, vertically integrated electric companies did achieve an astonishing rate of increase in the thermal efficiency of their generators from 1910 until the early 1960s (p. 57). That increase in efficiency occurred in part because the costs of innovation by GE and Westinghouse could be recovered by utilities from captive ratepayers. The rate of innovation actually may have been too fast from an efficiency viewpoint.

Under IB regulation, prices are allowed to rise by the anticipated rate of inflation, less a “reasonable” estimate for increased productivity. Any extra profits that arise from innovation or unexpected productivity gains remain with the firm. As long as regulators do not renege on their promise not to expropriate excess profits, IB regulation gives firms an incentive to innovate.

The arguments for IB regulation are well known to those who follow the literature of regulation. Awerbuch et al. advocate a little-known technique: the use of a three-part tariff for electricity transmission prices under IB regulation. Generators would pay a fee that varies with the peak loads that they impose on the system to cover the fixed costs of the system and provide an incentive for the system to handle peak loads. They would pay a second fee that equates supply and demand when the system is congested. And they would pay a third, per-unit, throughput fee that provides an incentive for the transmission owner to increase rather than reduce throughput.

Many object to private, for-profit transmission companies because they would have an incentive to restrict use of their lines and raise prices, as any monopolist would, until they face genuine rivalry, either from competing wires or distributed generation from decentralized natural gas generators. The third part of the three-part tariff

overcomes such objections because it allows a for-profit company to make more money by increasing rather than decreasing throughput in the transmission system.

Pigou vs. Coase The intellectual fight about the structure of the electricity transmission industry also involves disputes over how centralized or decentralized the transmission market can be. *Designing Competitive Electricity Markets* is an excellent source of insight about these arguments. This book contains thoughtful essays by a who's who of academic electricity experts, including Paul Joskow, Shmuel Oren, William Hogan, Vernon Smith, Robert Wilson, and Hung-po Chao.

How large a role can decentralized markets play in the operation of the transmission system? There is no easy answer to that question because the United States has three electricity systems: one east of the Rocky Mountains, one west of the Rocky Mountains, and one in Texas, which remains connected to the rest of the eastern system through direct current rather than alternating current, to avoid federal regulation.

Within each of these three systems all generators affect each other's ability to deliver power because the physics of electricity dictates that electricity follow paths of least resistance rather than take the shortest route between generator and user (loop flow). Bilateral contracts between any willing seller and buyer of electricity affect all other buyers and sellers within each interconnected system. The proper way to manage those externalities is the subject of great dispute.

Some argue that with the assistance of computer models, the multiple and complicated effects of each additional unit of power injected into a system by a particular generator can be anticipated and understood. Property rights reflecting these effects can be developed and allocated to generators in proportion to their historic average power generation. Thus, buyers and sellers of electricity can engage in decentralized trading and reach an efficient equilibrium without central direction, as long as every sale is accompanied by trans-

mission rights that reflect the physical ability of the transmission system to carry the flow. The operator of the transmission system would play the role of a Coasian facilitator, telling the generators of electricity when their attempts to sell power were incompatible with the flow constraints of the grid and what trades with other rights holders would eliminate the constraints.

Others advocate a Pigouvian, central-planner, welfare-optimizing solution. They argue against the decentralized solution because the need for many agents to facilitate the development and trading of transmission rights would entail enormous transaction costs. They also argue that central intervention would be required, anyway, because transmission rights could not reflect the true effects of generator output on a system.

In the Pigouvian solution, a transmission network operator takes willingness-to-supply power bids from all generators and plugs them into an optimal-power-flow computer model of the transmission system, which develops prices for power at every node in the system. Those prices, which are publicly displayed, inform all participants of high-price anomalies that create profitable opportunities for entry by new generators or the addition of transmission capacity.

Paul Joskow's chapter provides an excellent overview of the Coasian and Pigouvian views. Hung-po Chao, who has played a central role in the development of the decentralized line of thinking, describes his views in an accessible, nontechnical chapter, written with Stephen Peck. In another chapter, William Hogan, who has played a critical role in the development of the centralized line of thinking, convincingly defends nodal pricing against a plan some prefer, called zonal pricing. Zonal pricing suppresses significant variations in prices between individual generators within a geographic area. That suppression, in turn, increases the possibility that generators will charge more than marginal cost for their output and restrict entry.

The resolution of the Pigou-Coase controversy may come from the data. The Pennsylvania-New Jersey-Maryland

Interconnection, known as PJM, most resembles the Pigouvian model; California has restructured its electricity market with more decentralized elements. As pricing data from the two systems are analyzed and compared, we will learn more about the relative efficacy of the two methods of structuring electricity markets.

Dynamic Investment Efficiency Another issue of central importance in transmission policy is the identification and funding of new transmission investment. Again there are two sides to the debate: one advocates centralized solutions and the other advocates decentralized solutions. A chapter by Vernon Smith and his coauthors argues strenuously for the decentralized solution. Smith et al. treat new transmission as a "club good" that enables generators to get their product to market. Consortia of generators would fund new investment and, in turn, get rights to inject or take power from the system in proportion to their financial contributions. (Those rights would be accompanied by transmission rights that reflect the physical ability of the transmission system to carry the flow, according to computer simulations.) If existing generators lose money because the new transmission investment alters their ability to sell power, so be it.

Paul Joskow offers the more traditional centralized view of transmission investment:

Transmission investment decisions do not immediately strike me as being ideally suited to relying entirely on the invisible hand. Transmission investments are lumpy, characterized by economies of scale and can have physical effects throughout the network. The combination of imperfectly defined property rights, economies of scale and long-lived sunk costs for transmission investments, and imperfect competition in the supply of generating services can lead to either underinvestment or overinvestment at particular points on the network if we rely entirely on market forces. (p. 24)

Robert Wilson is pessimistic about decentralized solutions but offers some hope:

I know of no design presently that addresses fully the longer-term (and, due to complex externalities and nonlinear features of transmission networks, theoretically unsolved) problem of creating incentives for sufficient strengthening or expansion of the transmission system, or that collects surcharges reserved to pay for future expansion. One partial measure is that traders who build a new link to ease congestion are entitled to receive user charges, perhaps in the form of TCCs [transmission congestion contracts]. (p. 170)

Although the obstacles noted by Joskow and Wilson are very real, there is strong evidence to support decentralization.

THE CASE FOR DECENTRALIZATION

Rivalry Is Possible Although Joskow is correct that the characteristics of transmission and distribution are not those usually associated with textbook competitive markets, I think that rivalry is possible and important for both static and dynamic efficiency, but rivalry is now suppressed because of state monopoly franchise laws.

In the cable TV industry, where analogous monopoly franchises exist, entry has occurred where it is allowed, in spite of characteristics analogous to those described by Joskow. For example, Montgomery County, Maryland, authorized a second cable company to wire the county in 1999.

Mandatory Open Access Blunts Incentives to Invest Our experience with mandatory open access in telecommunications since 1996 should make us very wary about going down the same road in electricity policy. Mandatory open access eliminates the incentive to invest in new infrastructure. Under the regime that seems to be in place in the states that have restructured, large commercial users and

independent generators are going to demand that the transmission system serve them rates determined by public service commissions. As Robert Crandall put it,

there is no limit to the ideas that I may have for using your property at prices that are as low as I could obtain by building the facilities myself.... Unfortunately, this [open access policy] is based in large part on assuming that sharing the infrastructure built under all of the distorted incentives created by regulation will somehow lead to efficient competition. ("Managed Competition in U.S. Telecommunications." Washington, D.C.: AEI-Brookings Joint Center for Regulatory Studies. Working Paper 99-1, March 1999, pp. 19-20)

How Would Decentralization Work? If decentralization is to work, those who invest in new infrastructure must find those investments worthwhile. The expected present value of their benefits (increased generation output times price discounted over time adjusted for uncertainty) must exceed the present value of their costs (largely the fixed costs of adding new capacity).

One possibility, suggested by Vernon Smith in *Designing Competitive Electricity Markets*, is that generators would form transmission clubs to build new transmission capacity. Another is that merchant transmission companies would build capacity and charge two- or three-part tariffs for access. It is not a fatal defect of decentralization if other generators, who do not buy rights and do not participate in the club, also receive benefits because of loop flow. It is necessary only that those who pay receive benefits that exceed their costs.

Let me offer a less theoretical example as evidence. My neighbors clearly benefit from the effort that I take to maintain the appearance of my lawn and the exterior of my house, but this positive externality does not induce me not to maintain my lawn. I maintain the lawn because it yields benefits that exceed my costs. To be sure, my neigh-

bors might be willing to pay me to do additional maintenance, but my maintenance may be acceptable (if not optimal), despite the externality.

Pigou vs. Coase Again? Can decentralization achieve the least costly mixture of additional local generation and transmission? In the last issue of *Regulation*, Douglas Hale et al. demonstrated that extra investment in transmission capacity in northern Vermont would reduce the price of electricity significantly throughout New England. (See "Competition Requires Transmission Capacity: The Case of the U.S. Northeast." *Regulation* 23, no. 3 [2000]: 40.) Should we invest in extra transmission to reduce New England's power costs or would new generation capacity in New England itself be cheaper? Just asking the question this way moves the debate into the Pigouvian world and away from the Coasian one.

Investors are always simultaneously pursuing potential customers through multiple avenues in ways that duplicate or overlap. For example, traditional brick-and-mortar enterprises try to make money by bringing goods closer to consumers (the retail equivalent of the local generator solution in electricity). At the same time, e-businesses are investing in the hope of making money by selling goods from distant locations (the retail equivalent of the transmission solution in electricity).

Which of these solutions is the least costly? Won't we end up with wasted duplicated investment in local retail and e-commerce infrastructure? We don't ask those questions about retail markets, even though market solutions may lead to "wasted duplicated investment." We should ask the same questions about electricity markets only if decentralization is hopelessly unable to perform satisfactorily. But we don't know whether decentralization can perform satisfactorily because we have never allowed it to be tried.

The right question to ask is not whether investing in decentralized transmission would be optimal, but rather if it would be good enough to work. ■