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# Incumbent Vertical Market Power, Experimentation, and Institutional Design in the Deregulating Electricity Industry

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LYNNE KIESLING

Vertical market power has been an essential characteristic of the regulated electricity industry for the past century. A vertically integrated, regulated utility has complete downstream market power; this vertical monopoly power is subsumed within the business model because regulation erects legal entry barriers and regulated electric utilities have been vertically integrated. Unfortunately, regulation can enable such market power to persist even when economic dynamism and technological change might otherwise erode it.

This regulation-reinforced vertical integration in the electricity industry has broken down to some extent over the past three decades, with some liberalization and regulatory restructuring in the 1990s due primarily to the dynamic effects of innovations in electricity generation that have reduced economies of scale. But despite some statutory changes in regulatory institutions in some states, retail competition for residential customers remains sluggish, and little innovation in products, services, or pricing has occurred in those markets. Regulatory restructuring has nominally

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Lynne Kiesling is Distinguished Senior Lecturer in the Department of Economics at Northwestern University.

*The Independent Review*, v. 19, n. 2, Fall 2014, ISSN 1086-1653, Copyright © 2014, pp. 239-264.

reduced legal entry barriers in retail markets in fifteen states and the District of Columbia, but in most states entry has been small, and few innovations in products, services, or pricing have occurred.

Regulation-enabled incumbent vertical market power reduces experimentation by both producers and consumers in these restructured states. Such experimentation is the essence of the entrepreneurial market process. An incumbent's presence in a downstream market can act as an entry barrier, undermining producer and consumer ability to experiment by raising costs and reducing variety. In regulated industries such as electricity, the kind of economic experimentation that has become common in our digital society cannot occur because legal rules erect entry barriers and define market boundaries that reinforce the vertically integrated organizational structure of regulated monopolists. Yet technological change occurs outside the industry, putting external pressure on those boundaries and business models. By so doing, it also affects how competitive markets that were previously subject to stringent economic regulation, such as retail electricity markets, can be.

Innovation in retail residential energy products, services, and pricing are increasingly feasible due to innovations in digital communication technology happening outside the industry. Digital innovation has happened at a rapid pace and has become a driver of new value creation and economic growth. Vint Cerf, one of the original creators of the Internet, attributes this pace and impact to its bottom-up, distributed creation and its nature as a platform for “permissionless innovation”: “When I helped to develop the open standards that computers use to communicate with one another across the Net, I hoped for but could not predict how it would blossom and how much human ingenuity it would unleash. What secret sauce powered its success? The Net prospered precisely because governments—for the most part—allowed the Internet to grow organically, with civil society, academia, private sector and voluntary standards bodies collaborating on development, operation and governance” (2012).

One project that tested the individual and system effects of the combination of digital, transactive technology with dynamic pricing was the GridWise™ Olympic Peninsula Testbed project in 2005–2006 (Chassin and Kiesling 2008; Chassin 2010).<sup>1</sup> In this project, each household had a price-responsive thermostat that the customer could program to respond autonomously to changes in electricity prices over the course of the day, without any further homeowner intervention or manual control; this capability is also known as “transactive control.” Homeowners could also choose a retail contract from a portfolio of contracts comprising a fixed retail price, a time-of-use retail price with two peak periods per day, and a real-time retail price that reflected wholesale prices in five-minute market intervals.

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1. A current follow-on project, the Pacific Northwest Smart Grid Demonstration Project (<http://www.pnwsmartgrid.org/>), is testing transactive control and autonomous distributed price response for sixty thousand residential customers in six states in the Pacific Northwest.

This combination of distributed transactive technology and retail dynamic pricing improved consumer welfare while maintaining system reliability, preventing outages, and providing other supply-side and infrastructure benefits. Automation reduced the transaction costs for individual consumer response to price signals, with meaningful implications for household electricity expenditures, peak demand, and required investments to meet peak demand. The average customer participating in the project saved more than 10 percent relative to the prior year's electricity bill; the savings varied across the different contract types, with the real-time price customers saving the most on average. The combination of enabling technology, dynamic pricing, and contract choice led to reductions in peak demand of approximately 15 percent, and during some high-stress weather events this combination led to sustained peak reductions of 50 percent. Although common wisdom in this industry suggests that residential customers avoid price volatility and do not prefer a real-time contract, in this case most of the participants preferred it both *ex ante* and *ex post* because they knew they had the enabling technology to make their responses and participation autonomous. Finally, and most important from a theoretical and methodological perspective, the network of distributed price-responsive technology changed the network and the control environment. No longer was this a centralized control environment in which the only way to manage the grid was through centralized decisions to shut substations down; the distributed technology accessed the intelligence, the diffuse private knowledge at the edge of the network, in the preferences of the residential customers themselves. Thus, the distributed technology changed the network to a complex adaptive system by making the network transactive. This project provides one illustration of the kind of innovations that are possible in a retail-market environment in which producers and consumers are free to choose and experiment. Here I argue that incumbent vertical market power in retail markets deters such experimentation.

None of these innovations has emerged entrepreneurially from the regulated distribution utilities, operating in a regulatory environment nearly the opposite of permissionless innovation. Independent technology developers have struggled to build markets (e.g., Tendril), although some (e.g., Opower) have succeeded in persuading regulated-distribution utilities to use their technology to meet regulatory energy-efficiency requirements (Jaffe 2013). These technology adoptions for energy-efficiency programs are occurring largely in vertically integrated, regulated states, not in restructured states, and residential customers still receive retail service under regulated rate tariffs. The slow pace of retail residential competition in restructured states, coupled with the slow pace of new product, service, and pricing innovation within the industry despite dramatic innovation rates outside of electricity, suggests that entry barriers to these markets still exist despite their apparent statutory removal.

When incumbents can exercise vertical market power in nominally competitive downstream markets, that market power can act as an entry

barrier.<sup>2</sup> In electricity, this incumbent vertical market-power persistence takes the form of an incumbent default-service contract. In fifteen of the sixteen U.S. jurisdictions that have restructured electricity regulation, the regulated incumbent is either allowed or required to provide default basic electricity service to residential customers who have not affirmatively chosen a retail service provider. Thus, the incumbent, rather than providing only a regulated wires service, continues to serve as the retail service provider. This incomplete incumbent exit from the retail market raises entry costs to suppliers who might otherwise offer differentiated products, product bundles, and new technologies and services that customers might value if competitors had an opportunity to experiment with them by offering them to consumers in competitive markets.

Electricity is not the first vertically integrated, regulated industry to experience the challenges accompanying the dynamics of incumbent market power in a potentially competitive downstream market. This issue was the core of the antitrust lawsuit brought against AT&T, which was settled in 1982 with the breakup of the Bell system and its exit from the downstream customer-premise equipment (CPE) market. This lawsuit established Baxter's Law, or the Bell Doctrine, in which William Baxter argued that a vertically integrated, regulated firm's participation in a downstream market can have anticompetitive effects. Baxter's remedy was to quarantine the monopoly with a structural separation—require AT&T to divest its ownership and control of the parts of its business in competitive markets from the ownership and control of the wires networks. This separation, along with the disruptive innovations in the wireless telephony sector, has contributed to vibrant rivalry, product differentiation, price discrimination, and consumer choice in telecommunications retail provision and consumer equipment.

Electricity regulatory policy has not incorporated the competition policy lessons of the Bell Doctrine, nor is the deregulation process enabling the kind of value-creating permissionless innovation seen in the Internet. By exploring the empirical case of retail electricity markets in conjunction with the historical case study of the Bell Doctrine, this article examines the problem of incumbent vertical market power in deregulating markets. The general failure to quarantine the monopoly wires segment and its regulated monopolist from potentially competitive retail markets contributes to the slow pace and lackluster performance of retail electricity markets for residential customers as well as to the slow adoption of digital end-use energy devices and applications.<sup>3</sup> The form of this failure to quarantine the monopoly is the persistence

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2. A very good analysis of a similar case is Thomas 2009, which explores the medieval Cologne brewers guild's attempts to prevent deregulation in the face of technological change.

3. This failure to quarantine the monopoly from retail electricity markets is in contrast to the liberalization of wholesale power markets in the restructuring that occurred in the 1990s; with some cross-state variation, legislators and regulators generally paid careful attention to the potential anticompetitive effects of the regulated monopolist in wholesale power markets and thus required substantial or complete divestiture of generation assets to promote competitive wholesale markets. For a prospective view of this process before it occurred, see Joskow 1989.

of an incumbent default-service contract that was intended to be a transition mechanism to full retail competition, coupled with the regulatory definition of product characteristics and market boundaries that is necessary to identify the default product and evaluate the regulated monopolist's performance in providing it. The consequence of the incumbent's incomplete exit from the retail market suggests that as regulated monopolists and regulators evaluate customer-facing smart-grid investments, regulators and other policymakers should consider the potential anti-competitive effects of the failure to quarantine the monopoly.

The theoretical framework underlying Baxter's argument to quarantine the monopoly relied on neoclassical formal economic models of the effects of market power, not on an argument that such incumbent vertical market power can have dynamic effects by reducing experimentation and innovation. This paper's argument focuses on the process of rivalry and experimentation underlying competition. An overlooked driver of increasing consumer and producer surplus in competitive markets is market experimentation—the market process of applying new technologies to create and offer new, differentiated, and/or bundled products and services that were heretofore not feasible and of consumers trying, testing, and evaluating these new offerings. This focus on market experimentation reinforces and extends the original “quarantine the monopoly” argument.

A broader, more dynamic theory of how competition creates value—not by reducing prices for a given product or service, but by giving entrepreneurs incentives to create new products and services as well as new combinations and bundles of new and existing products and services—highlights the role of economic experimentation in value creation. This framework synthesizes Schumpeterian and Kirznerian concepts to complement Baxter's (as well as Paul Joskow and Roger Noll's [1999]) neoclassical analysis. Joseph Schumpeter's and Israel Kirzner's work on the dynamics of rivalry, the beneficially disruptive role of innovation, and the opportunity-seeking entrepreneur as the agent of change who creates new value out of bringing newly imagined product and service combinations to market provides insights into the importance of producers' and consumers' freedom to engage in economic experiments. Nascent competition in the managed and administered retail electricity markets has taken the form of fixed-price competition because of the dominant market role played by the incumbent monopolist, the inertial customer, and the product differentiation limitations of the installed base of electromechanical technology. In contrast, bold, imaginative, creative entrepreneurial actions disrupt an economy's hypothetical circular-flow equilibrium. This disruption can take several forms and results in creative destruction that changes product and service qualities, changes market boundaries and definitions, and makes some previous products and services obsolete. As a consequence of this process, dynamic growth-generating competition takes the form of product differentiation, bundling, and other new arrangements, not of price competition among products with known, given, and unchanging market variables.

This argument suggests a policy recommendation: eliminate the incumbent default-service model and prohibit incumbent regulated utilities from offering products or services beyond their regulatory remit. In other words, follow the Texas model of retail competition, which quarantines the regulated wires monopoly and focuses on creating an institutional environment in which competitive rivalry grounded in entrepreneurial experimentation can thrive. The next section presents the argument that incumbent default service is an entry barrier in residential retail electricity markets. Then I present a case study of the economic issues in the AT&T case and the resulting Bell Doctrine. After that, I propose and develop an entrepreneurial experimentation-based theory of competition that reinforces and extends the Bell Doctrine and applies that model to residential retail electricity markets. The final section concludes that regulatory decisions that affect downstream competitive markets undermine experimentation, reducing consumer surplus and entrepreneurial entry and profit; it also makes policy recommendations that regulatory policy should incorporate the insights of competition policy, the Bell Doctrine, and the essential role of producer and consumer experimentation in generating the benefits of competitive markets. To do so, they must quarantine the incumbent monopoly from the retail electricity market.

## **Incumbent Vertical Market Power and Incumbent Default Electric Service**

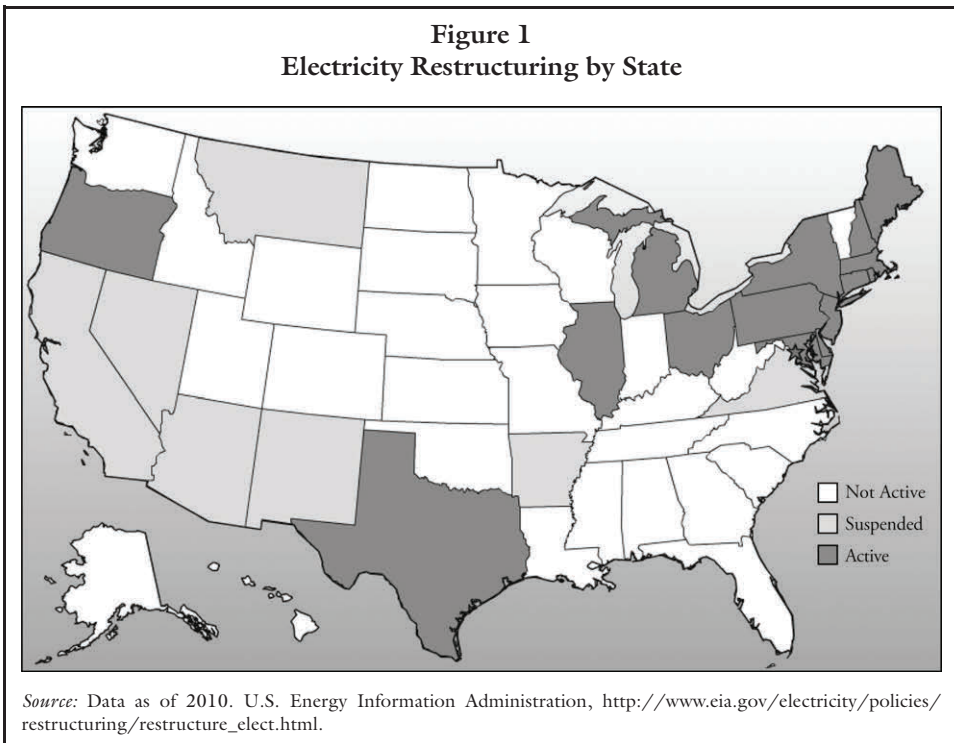
If firms in industries with entry regulation are less likely to innovate, then reducing entry barriers should enable competing suppliers to enter the market and provide new, differentiated products, services, or pricing. Yet restructured residential retail electricity markets in the United States have experienced both sluggish retail competition with little entry and slow adoption of end-use digital energy-management technologies. One hypothesis is that the deregulation process has left incumbent distribution utilities with substantial vertical market power in their downstream retail market for residential customers. Incumbent vertical market power reduces rivalrous entry and new product creation by competing suppliers. Although systematic empirical data to test this hypothesis are rare, Knut Blind (2012) finds in his study of the effects of different types of regulation on innovation in Organization for Economic Cooperation and Development countries some support for the argument that market-entry regulation has negative dynamic effects on innovation. Blind observes that “market entry barriers make it very difficult for innovative companies to enter markets, which is negative for the overall innovative performance in these markets” (393), and that rate-of-return regulation does not leave regulated utilities with sufficient resources to engage in Schumpeterian innovation.<sup>4</sup>

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4. See also Phillippe Aghion and his colleagues’ (2005) model and analysis of industry-level U.K. data suggesting a nonlinear, inverted U-shape relationship between competition and innovation. Earlier work on regulation’s effects on innovation in electricity includes Braeutigam 1979 and Joskow and Rose 1989.

Does incumbent vertical market power persist in this deregulating industry? The electric power industry and its regulatory institutions are in the midst of a transition from a vertically integrated, regulated monopoly with government-granted service-territory monopolies to an industry that is competitive or potentially competitive in most parts of the value chain. Notwithstanding the current natural-monopoly characteristics of the transmission and distribution wires network, the generation and retail functions either are already performed through market transactions or might be performed through market transactions if regulatory institutions were to adapt to the underlying social, economic, and technological fundamentals that have evolved over the past three decades.

Since the mid-1990s, fifteen states and the District of Columbia (see figure 1) have restructured their electricity regulation, with most including provisions to allow retail competition. Restructuring has had the largest impact on wholesale market competition by enabling generators not affiliated with incumbents to sell electricity in newly liberalized wholesale markets. Retail-market rules vary by state, although they commonly include some transition period to competition for residential customers, different transition paths and timing for industrial, commercial, and residential customers, and some form of a default-service contract for customers who do not affirmatively choose a retail service provider.





Because this transition to competition in electric power cannot be instantaneous, from an analytical and a policy perspective we must analyze transition paths to understand the enduring effects of regulation and the potential value of competition to various stakeholders. Transitions are characterized by the reconfiguration of the institutional framework, which is itself an incremental process.

One reason for the incremental nature of institutional change in the transition to retail electricity competition is the concern over balancing two objectives: (1) the desire to remove obstacles to competition and to enable competition to bring benefits to consumers and (2) the desire to protect the interests of consumers who do not move quickly to avail themselves of new competitive alternatives to incumbent retail supply. Regulatory institutions include a history and, in many cases, a statutory mission of consumer protection, so one institution that evolved to meet the second objective while pursuing the first is the default-service offering.

Default service is a basic electric service, with rates determined by cost of service in the traditional regulated manner (Tschamler 2000; Reitzes et al. 2002). Default service can provide continuity of service from the incumbent utility for those end-use customers who do not affirmatively choose a competitive retail provider; this protection is seen as vital for some customers, such as elderly residential customers. In restructured states, default service was initially intended as a transition mechanism to enable residential electricity customers who do not make an affirmative choice of retail provider to adapt to retail competition while still allowing active customers to choose a different retail-service provider.

However, the design of the default-service offering can have substantial effects on the ability of this set of transition institutions to achieve the objective of removing barriers to retail competition. In particular, a default-service contract that has the regulated incumbent distribution utility provide the service can act as an entry barrier in the downstream retail market. All restructured states except for Texas have the regulated incumbent monopolist provide default or standard-offer service as a way to insulate residential customers from price volatility in wholesale electricity markets. Thus, a high incumbent market share persists, and little supplier entry occurs, despite the nominal reduction of entry barriers into residential retail electricity markets.

Barbara Alexander (2011) provides the most thorough data available on default-service rules in the sixteen restructured jurisdictions in the United States. Table 1 summarizes her data and analysis. It reports state-level data on the incumbent's role in residential retail markets. These data show that in all states except Texas the incumbent provides default service to residential customers in its historical regulated-service territory. Table 1 also reports how the default-service provider procures energy to meet its obligations; in most states, it enters long-term contracts with generators for periods from six months to three years. These contracts are typically laddered, meaning that the forecast future demand is split into multiple groups (tranches) that are open to bids in staggered intervals. Finally, customer

**Table 1**  
**State-Level Data on Incumbent Default-Service Provision, Procurement to Fulfill Default Service, and Residential Market Share, 2011**

State	Incumbent Default Service	Form of Default Procurement Contract	Residential Switching by Utility (%)	Comments
Connecticut	Yes	Laddered six- or twelve-month contracts, annual price change	35–40	Incumbents required to inform residential customers of their competitive supply alternatives.
District of Columbia	Yes		4.6	Incumbent required to provide default service.
Delaware	Yes	Laddered three-year contracts	3.0	
Illinois	Yes	Laddered three-year contracts, annual price change	< 1	Municipal aggregation in 2013 increased switching to competing suppliers.
Maine	Hybrid	Laddered three-year contracts, annual price change	< 1	Some nonincumbent providers. Commission-determined prices to meet “lowest price” requirement.
Maryland	Yes	Laddered two-year contracts	6.5–18.7	
Massachusetts	Yes	Laddered six-month contracts	5.7	Municipal aggregation, Cape Cod, increases switching to 14%; default customers can opt in to a variable rate.
Michigan	N/A		0	Adopted retail competition in 2000, but negligible residential choice.
New Hampshire	Yes	Laddered six- or twelve-month contracts, semiannual price change	< 1	

(Continued)

**Table 1**  
**(Continued)**

State	Incumbent Default Service	Form of Default Procurement Contract	Residential Switching by Utility (%)	Comments
<b>New Jersey</b>	Yes	Laddered three-year contracts, annual price change	6.5	
<b>New York</b>	Yes	Rules, pricing, contracts vary by incumbent	19.2 avg. (6–34)	Some incumbents are required to inform residential customers of their competitive supply alternatives
<b>Ohio</b>	Yes	Met by incumbent-owned generation	0–71	Most switching (70%) due to municipal aggregation, not to individuals.
<b>Oregon</b>	N/A		0	Residential retail market not open.
<b>Pennsylvania</b>	Yes	Incumbent must submit least-cost procurement plan	0–35	Law adopted in 2008 required “unbundling” of default service and quarterly price changes.
<b>Rhode Island</b>	Yes	Laddered six-, twelve-, or eighteen-month contracts	< 1	Regulatory requirement for “least-cost procurement.”
<b>Texas</b>	No		51	Incumbent-affiliated retail providers retained customers through introducing choice in native territory.

*Sources:* Analysis from Alexander 2011. Specific locations: Connecticut, [http://www.ct.gov/pura/cwp/view.asp?a=3356&Q=405992&puraNav\\_GID=1702](http://www.ct.gov/pura/cwp/view.asp?a=3356&Q=405992&puraNav_GID=1702); District of Columbia, <http://www.pepco.com/home/choice/dc/sos/dcaqsos.aspx>; Delaware, <http://depdc.delaware.gov/sos.shtml>; Illinois, <http://pluginillinois.org/fixedrate.aspx>; Maine, [http://www.state.me.us/mpuc/electricity/standard\\_offer\\_rates/index.html](http://www.state.me.us/mpuc/electricity/standard_offer_rates/index.html); Maryland, [http://webapp.psc.state.md.us/intranet/ElectricInfo/SOSrates\\_new.cfm](http://webapp.psc.state.md.us/intranet/ElectricInfo/SOSrates_new.cfm); Massachusetts, <http://www.mass.gov/eea/energy-utilities-clean-tech/electric-power/electric-market-info/basic-default-service/>; Michigan and New Hampshire, <http://www.puc.state.nh.us/electric/electric.htm>; New Jersey and New York, <http://www.energyderegulationnewyork.com/energy-deregulation/electricity-deregulation-ny/>; Ohio, Oregon, Pennsylvania, and Rhode Island, <http://www.ripuc.org/utilityinfo/electric.html>; Texas, Kiesling (2009).

switching data indicate the share of residential customers who have affirmatively chosen a retail-service provider. Switching is an imperfect measure that understates retail choice by ignoring incumbent innovation, but it does indicate incumbent market share in the retail market.

Alexander's analysis of default-service rules and incumbent retail-market share suggests that incumbent vertical market power has persisted in residential retail markets due to the prevalence of the incumbent default-service contract. In Ohio and Massachusetts, municipal aggregation enables municipalities to negotiate residential supply contracts on behalf of their residents, which increases the appearance of customer switching. Only Texas has a nonincumbent residential retail-market share higher than 50 percent.<sup>5</sup>

Texas did not assign default-service contract provision to the incumbent, and this institutional design choice may be one reason why Texas has a more robust retail market for residential customers than any other retail state in the United States (Kiesling 2009; Energy Information Administration 2011). In Texas, providers bid for the default-service contract, and the incumbent in that service territory was precluded from providing default service (whereas in other restructured jurisdictions the incumbent is required to provide it).

Georgia's deregulation of its retail natural gas market provides another model for designing nonincumbent default service. Following Senate Bill 215 in 1997 and House Bill 822 in 1999, the transition period did not involve automatic assignment of customers to a specific default-service provider. Instead, all customers were required to make an affirmative choice of retail provider by August 11, 1999, and those who had not done so (numbering 288,000) were assigned to the retailers in the market according to their market shares at that time. Most analysts view the process of deregulation in the Georgia gas market as having attracted entrants and becoming a reasonably competitive oligopoly, although entry barriers and concerns about market power persist (Costello 2002). These alternatives demonstrate that the elimination of incumbent default service would not result in customers losing service if they failed to make an affirmative choice of retailer.

This federalism-enabled natural experiment is beginning to suggest the benefits of retail competition for residential consumers (Kiesling 2008, chap. 4) and that "it is time for power market reform to allow for retail customer participation" (Caramanis 2012). In the nominally competitive retail states, simplistic price competition prevails currently, and product differentiation takes only the form of credit card offers and other companion discounts, with little technology-based product differentiation. Some states (Illinois, Ohio) are also experiencing municipal aggregation, in which municipal governments negotiate with retail electric service

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5. The rates of switching in Connecticut and New York are somewhat higher than in the other states with incumbent default service. Both states require the incumbent to provide residential customers with information about competing retail-service providers, which may account for their higher market shares.

providers on behalf of residents. Such anemic retail competition is due in part to the difficulty of technology-driven product differentiation without widespread residential installation of digital meters, but even before such widespread installation, Texas has developed a vibrant, rivalrous retail market.

### **Incumbent Vertical Market Power and the Bell Doctrine**

The history of AT&T's vertical market power, its antitrust settlement, and the ensuing Bell Doctrine serves as a case study of incumbent vertical market power in which the incumbent leveraged its regulated status to increase market power in a downstream competitive market. It thus provides competition policy insights relevant to today's changing electricity industry. This case also points to broader questions about the nature of competition and the role and form of regulation in an industry undergoing technological change. Historical precedent and economic theory combine to provide a framework for analyzing the effects of incumbent vertical market power.

In the origins of the U.S. telecommunication industry, Bell Telephone's near-monopoly in the late nineteenth century arose out of its patents that reduced competition in two vertically related markets—the provision of telephone service and the manufacture and sale of telephone equipment, including customer-premise equipment (CPE). As these patents expired in the late nineteenth century, entrants challenged Bell and reduced its market share in both markets, but Bell's acquisition of long-distance telephony patents in the early twentieth century opened up another market in which Bell could profit from its market power (Noll and Owen 1994, 329–30).

Bell exercised vertical market power and pushed back against competition in several ways. First, it refused to connect with independent networks to complete calls. It also refused to sell CPE to the independent firms from its manufacturing affiliate, Western Electric, which eventually led to the development of independent telephone-manufacturing companies that would sell to Bell's competitors. At the same time, Bell began acquiring some of its competitors, consolidating its market power, and arguing for government regulation.

The independent firms complained to antitrust authorities about Bell's acquisitions, leading to an agreement known as the Kingsbury Commitment in 1913. Bell agreed not to acquire competing companies, and it also agreed to connect with independent networks, conditional on those networks meeting their technical standards. The Kingsbury Commitment enabled independent firms to connect to Bell networks, but they would no longer be acquisition targets. It also paved the way for economic regulation of Bell Telephone/AT&T, with the jurisdiction for such regulation divided between the Federal Communications Commission (FCC) for long-distance service and the individual state public-utility commissions for local-exchange service; this split jurisdiction parallels (but is not identical to) that seen in the regulation of the electricity industry.

Under regulation, Bell retained its vertically integrated structure, including Western Electric, and purchased equipment exclusively from Western Electric. Even after the Kingsbury Commitment, regulators remained concerned about the effects of Bell's equipment purchases from Western Electric and the effects of Bell's regulated status on its market power in this vertically related market. These transactions made regulating Bell's local and long-distance services more difficult because equipment purchases provided a margin on which Bell could increase profits by charging inflated transfer prices. Bell also tried to prevent its customers from purchasing non-Western Electric CPE, a strategy that succeeded initially but had eroded somewhat by the time of the U.S. Department of Justice (DOJ) lawsuit in the 1970s. Two legal landmarks in that erosion were the Hush-a-Phone case (1956) and the Carterfone case (1968).

Introduced in 1921, the Hush-a-Phone was a small cuplike device fitted over a telephone receiver to make conversations more private by preventing people nearby from hearing the speaker. AT&T informed distributors and users of the Hush-a-Phone that the use of any device "not furnished by the telephone company" was prohibited and could result in the termination of service, among other possible penalties. In 1948, the makers of the device filed a complaint with the FCC, arguing that the AT&T tariff should be removed as unreasonable.<sup>6</sup> After several years of keeping the matter under review, the FCC ruled in 1955 that the tariff would not be considered "just and reasonable," as required under the law, if the device did not actually impair service. However, the commission found that the Hush-a-Phone did damage service, and therefore AT&T could forbid its use on the public telephone network. On appeal, the U.S. Court of Appeals for the Federal Circuit disagreed with the FCC ruling and disallowed the AT&T tariff as unreasonable. The FCC had found that the Hush-a-Phone did not impair any of the physical systems of the phone but, as the appeals case described the FCC argument, was still "deleterious to the telephone system."<sup>7</sup>

More significant than the Hush-a-Phone decision to the development of consumers' right to operate private equipment on the telephone network was the FCC decision in 1968.<sup>8</sup> The Carterfone was a device that allowed a two-way radio system to be connected to the telephone network. In 1957, AT&T advised customers that the use of the device was prohibited and that users could be subject to penalties,

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6. 20 FCC 391 (1955).

7. 99 U.S. App D.C. 190 (1956), at 420. The court noted that the damage supposedly caused by the Hush-a-Phone was the loss of clarity in the user's voice. AT&T argued that although privacy was a legitimate goal for users, a customer could achieve the same effect by cupping his hand over his mouth and speaking softly. The court noted that this action, too, would cause muffling in a conversation and that "to say that a telephone subscriber may produce the result in question by cupping his hand and speaking into it, but may not do so by using a device which leaves his hand free to write or do whatever else he wishes, is neither just nor reasonable" (at 238). However, the general principle of the tariff's reasonableness was left unchanged.

8. 13 FCC 2d 420 (1968).

including termination of service, if they used it. Specifically, the company relied on the FCC tariff, stating that “[n]o equipment, apparatus, circuit or device not furnished by the telephone company shall be attached to or connected with the facilities furnished by the telephone company, whether physically, by induction or otherwise” (at 420). Carter Electronics, the manufacturer of the device, brought an antitrust suit challenging the legality of the tariff. The district court deferred the decision to the FCC as the competent authority in regulating the telephone network.

AT&T argued that allowing the Carterfone would have at least two negative results for network integrity. First, it would divide responsibility for maintenance of the functioning of the network. Second, it would cause users of independent equipment to resist development and improvement of the system, which could render their devices obsolete. The FCC, citing the Hush-a-Phone precedent, found that the tariff was unreasonable because the device did not adversely affect the operation of the network. It went even further, deciding that the tariff had been “unreasonable, discriminatory, and unlawful in the past” and should be stricken entirely because maintaining it in its present form would “put a clearly improper burden upon the manufacturers and users of other devices” (at 425). The court reasoned that standards barring users from attaching devices that actually caused harm were sufficient to protect the integrity of the network. Furthermore, there was no reason that AT&T could not upgrade the network so long as it released new connection standards. In retrospect, AT&T’s objections to both devices had no technical engineering foundations and cost AT&T some credibility and reputation.

The Hush-a-Phone and Carterfone cases resolved some, but not all, of the anticompetitive vertical foreclosure issues arising from AT&T’s downstream integration into this related market. On the basis of these concerns and similar concerns about the innovation-enabled potential competition in long-distance service, the DOJ filed an antitrust suit against AT&T in November 1974; settlement of the case came through a consent decree and divestiture in 1982, after the DOJ had presented its case against AT&T.<sup>9</sup>

The case’s two primary issues were AT&T’s alleged use of its local-exchange monopoly to dominate the long-distance market and its alleged use of its local-exchange monopoly to dominate equipment markets, including CPE. The long-distance market had become potentially competitive due to ongoing technological change since the early twentieth century, and the CPE market was already demonstrably competitive. In both markets, the antitrust issue was the regulated monopolist’s incentive and ability to use its regulated monopoly status to gain market power in related potentially competitive markets. The DOJ argued that AT&T’s vertical presence as a large customer of a related seller in the CPE market deterred entry by other electronic equipment manufacturers and therefore had anticompetitive effects on the prices and features of CPE available for consumers.

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9. *United States v. Western Electric Co.*, 569 F. Supp. 990 (D.C.C. 1983).

Joskow and Noll summarize the economic analysis that Assistant Attorney General William Baxter and the DOJ performed in making the case for a structural divestiture of AT&T (1999, 1259–60). The charge brought was anticompetitive vertical foreclosure, in which a firm with a legal monopoly or a position of market power in one market uses that power to gain an advantage in a related market. Vertical integration can either benefit or harm consumers, so an analysis of the potential anticompetitive effects of vertical integration must include an evaluation of whether the vertical integration reduces efficiency in the related market or otherwise harms consumers. Vertical integration's benefits can include exploiting economies of scale and scope, cost savings, and managerial and transaction-cost benefits up to a point (e.g., Klein, Crawford, and Alchian 1978). Vertical integration can harm consumers if the firm's pricing includes cross subsidies that distort demand patterns, deadweight loss when the related market is a monopoly, and deadweight loss from regulatory evasion (Brennan 1987).

Joskow and Noll survey the vertical-restraint antitrust case history and frame the issues in the AT&T case from a neoclassical and new institutional economics perspective, making a standard efficiency argument when they evaluate the consequence of both the cost of vertical integration with market power and the cost of inferior regulation, stating that either one leads to inefficient production (1999, 1260). With respect to the benefits of vertical integration and forms of long-term vertical contracting that can reduce holdup and lead to beneficial outcomes for consumers, Joskow and Noll as well as William Baxter (1983) use institutional and transaction-cost arguments from Ronald Coase (1937) as well as from Benjamin Klein, Robert Crawford, and Armen Alchian (1978), among others, to evaluate the relative benefits of vertical integration versus its potential anticompetitive effects on consumers and producers in the related market.

Baxter's analysis combines the economic weighing of the benefits of vertical integration against the anticompetitive effects of vertical integration in related markets with a shrewd analysis of the political economy of regulation. Regulation is necessarily imperfect, and one of its largest imperfections is regulators' incentives in their political market due to their desire to pursue other official positions in the state. In the case of AT&T, Baxter argued that these motivations gave regulators incentives to cross-subsidize in-state services through higher prices on services that out-of-state residents consumed disproportionately (1995, 601–4). Thus, imperfect regulation arises out of a combination of information asymmetry, regulatory lag, and subsidization of the services of politically vocal customers.

Another way to analyze vertical foreclosure is as an entry barrier. By integrating into a related market, the regulated monopolist can raise rivals' costs or reduce its own costs through economies of scope (if they exist), thereby enabling it to charge a lower price in the related market. It also achieves that outcome through cross-subsidization (Baxter 1995). However, if the regulated monopolist's market power is due to its superior product, service, or business model, then its



rivals must compete with that merited, justified market position by innovating their own products, services, and business models. The DOJ's argument against AT&T was consistent with the claim that it could leverage its regulated status into downstream market power, which constituted an anticompetitive entry barrier that harmed consumers.

Based largely on the court's assessment of Baxter's analysis, the settlement's outcome was divestiture to quarantine the monopoly to remove both the incentive and the opportunity for the monopolist to exercise market power in a related, potentially competitive market. This quarantine typically takes one of two forms—structural separation, in which the monopolist divests ownership and control of the business lines in the related market, or functional separation through a firewall to separate ownership and control of the monopoly business from the related market business. Another common antitrust remedy is behavioral rules to promote competition, in which there is ongoing monitoring of the firm's actions. However, in the AT&T case the source of the monopoly power was the existence of regulation, which constrained the behavior of the monopolist and would make behavioral monitoring either difficult or irrelevant (Joskow and Noll 1999, 1262). In the AT&T settlement, the remedy was therefore structural, requiring the divestiture of long-distance and equipment operations.<sup>10</sup>

Thus, the Bell Doctrine: a regulated monopolist has both the opportunity and the incentive to exercise its market power to gain advantage through vertical integration in related markets, and if those markets are potentially competitive, the appropriate regulatory and competition policy response is to quarantine the monopoly so that its presence in the related market does not stifle competition in that market. Baxter (1983) defined four necessary conditions that must hold in order to apply the Bell Doctrine:

The firm has market power in the primary regulated market (which may have been the impetus for regulation initially).

The firm is subject to cost of service regulation, with regulation as binding constraint. There is inefficient control by regulation over affiliate transactions (i.e., regulations allow for cross-subsidization or simply imperfect monitoring of cost allocation across business functions).

The related or affiliated market is structurally potentially competitive.

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10. A downfall of the Bell settlement, however, was the necessity of judicial oversight in the monitoring and enforcement of the divestiture, and Judge Harold H. Green's way of doing so added substantial complications and compliance costs to the process. As Joskow and Noll observe, "[Judge Green] amended the agreement in several ways, the most important of which were to allow the BOCs [Bell operating companies] to publish commercial telephone directories, while requiring them to make customer information available to competing directory companies, and to institute a formal 'waiver' process by which BOCs could obtain exceptions to the 'bright line' principle that they could only offer regulated monopoly services. . . . The waiver process led to a flood of requests for exceptions, and had the effect of converting Judge Green into a second FCC for licensing telephone companies" (1999, 1265).

The broad implication of the Bell Doctrine is that the ongoing presence of a regulated incumbent in a competitive market can undermine competition in that market. An incumbent regulated monopolist offering a regulated product in a nominally competitive market that is increasingly competitive due to technological change can undermine the creation of consumer and producer welfare through competitive processes. The issue is the incumbent's failure to exit, which in the case of a regulated industry is a failure of regulatory policy to enforce quarantining the monopoly.

## **Incumbent Vertical Market Power, Experimentation, and Regulation: Theory and Application**

The government's argument in the AT&T case rested on the premise that regulation is necessarily imperfect at achieving its stated objectives.<sup>11</sup> It relied primarily on the neoclassical theory of vertical foreclosure, but the standard benefit–cost analysis of vertical integration embedded in Baxter's analysis is not the only argument in favor of quarantining the monopoly in the presence of technological dynamism. Here I extend the Bell Doctrine's theoretical framework to include economic experimentation as a generator of competitive benefits and then apply that analysis to the process of retail deregulation in the changing electricity industry.

### *Theory: Experimentation and Incumbent Vertical Market Power*

Although recognizing the role that technological change in particular played in the evolution of the telephone industry, the theory of competition underlying the Bell Doctrine did not incorporate the economic experimentation processes that turn creativity, innovation, and technological change into new value propositions for consumers, changing market boundaries and creating economic growth in the process. An entrepreneurial theory of competition that does address those processes has experimentation as one of the most substantial drivers of value creation through competitive market processes—the ability of producers to bring new products and services and business models to market, of producers to combine and bundle existing and new products and services in novel ways, and of consumers to discover these new value propositions and learn how much they do value them.<sup>12</sup>

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11. In addition to Baxter's political economy analysis described earlier, Roger Noll and Bruce Owen observe that "partially effective regulation creates an entering wedge for attempted evasion of regulatory constraints and for financially lucrative anticompetitive actions" (1994, 334).

12. Everett Rogers (1962) identifies experimentation as one of the primary factors influencing the diffusion of innovation. For related work in the economic history of technology and the role of economic experiments, see Rosenberg 1992 as well as the analysis of "learning by using" in Rosenberg 1982. The corporate-strategy literature also has some related analyses. Scott Shane (2000) argues that when technological change occurs, market experimentation allows entrepreneurs to discover how best to exploit the new technology. He grounds his argument in Hayekian diffuse private knowledge that is accessible to others only via market signals such as prices and profits/losses. The profits earned or losses incurred

Competition is a rivalrous process that creates value through forms of experimentation and trial and error that include technological change, innovation, new business models, product differentiation, and alertness to commercial and profit opportunities. Both producers and consumers are entrepreneurs that discover new profit opportunities through their alertness. This experimentation-based theory of competition combines the Schumpeterian disruptive entrepreneur who generates creative destruction with the Kirznerian alert entrepreneur who interacts with those changes to create value as well as more stability and equilibration in the process. This model complements and extends the scope of the Bell Doctrine to reflect the role of experimentation in generating consumer benefits (and profiting by so doing) and thus strengthens the traditional competition policy argument for quarantining the monopoly.

Schumpeter's (1934) pioneering work on how disruptive innovation creates economic growth ("economic development," in his words) contradicts the model of a static, well-regulated "circular flow" economy with known, unchanging variables in equilibrium. Such a well-regulated economy is stagnant, and, as Schumpeter argues, in a free-enterprise economy this stagnation will not persist because individuals seeking to thrive will create "new combinations" of materials and forces, leading to change away from equilibrium (1934, 65).<sup>13</sup> That process of creating new combinations is one of experimentation.

Producers are thus agents who initiate dynamic, growth-generating change, but they do so not through entering existing markets to produce and sell existing goods and services produced using the same techniques and at lower prices. They do so by entrepreneurial activity comprising the five categories of new combinations that Schumpeter defines: introducing a new good or service, adding new features to an existing good or service, introducing new production technology or methods, opening new markets, capturing new sources of raw materials or new methods of industrial organization (1934, 66, 75; see also 136–37).<sup>14</sup> Schumpeter calls the carrying out of these new combinations "enterprise" and those who do it "entrepreneurs" (1934, 74).

From this analysis, Schumpeter's most famous argument and metaphor derive naturally. Competition in dynamic, free-enterprise societies is a process of change

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indicate the value consumers can generate with the technology, product, or service as well as whether the firm has an organizational structure that enables it to control the costs of bringing this new value proposition to market. Shane Greenstein (2008, 2012) argues that economic experiments played a significant role in creating value in the markets for Internet access; his analyses suggest that although economic experimentation is a driver of value creation, pre-1990s federal spectrum policy erected a regulatory barrier to such experimentation. See also Stern 2005.

13. I use the word *thrive* to denote both pecuniary and nonpecuniary motives for action, although Schumpeter focuses on pecuniary motives.

14. Note, though, that Schumpeter argues that the entrepreneur is not the risk taker because the entrepreneur uses credit to finance the new combinations; thus, Schumpeter views the credit provider as the risk taker.

and creative destruction, with new combinations making previous ones obsolete (1942, 84). Dynamic competition often takes the form of product differentiation and bundling to compete *for* the market. Rivalry occurs among differentiated products; innovators and entrepreneurs change market definitions and boundaries by creating new products and services as well as new bundles of products and services (Schumpeter 1942, 79). Disruption of the circular-flow equilibrium arises as a consequence of these new combinations, and the new value created through this change constitutes economic development. Similarly, the larger process by which competition creates value is not one of driving down prices and the costs of producing existing goods and services; rather, it is a process in which new value propositions may make old ones obsolete. Thus, the nature of growth-generating competition is dynamic, not static—feature driven, not just price and cost driven. That dynamic discovery of new value propositions necessarily takes place in an experimentation process in which different producers interact, as do old and new combinations, to meet the market test of consumer value creation.

What does Schumpeter's model of dynamic competition and innovation imply for vertically integrated, regulated industries? It supports the argument, both generally and specifically as applied in the Bell Doctrine, that organizational structure and product as well as market definitions are not static. As entrepreneurs devise new combinations, the products and services, the firms, and the industries change form as individual producers and consumers make decisions at the margin in response to these discontinuous changes. The resulting outcomes, not ever static equilibria, are unlike any that would have been feasible or imaginable via increased investment in the old combinations (Schumpeter 1934, 64 n. 1). When regulation interferes with this process of growth-generating creative destruction, it makes consumers and potential competitors of the incumbent monopolist worse off and forestalls more potential growth. This observation provides another theoretical justification for the Bell Doctrine that complements Baxter's theory: when a related market is competitive (or has evolved into being competitive through innovation), the failure of the regulated monopolist to exit the related market exacts a real cost in terms of the failure to develop new combinations, new value creation, and new rivalry because the incumbent regulated monopolist's regulated retail product acts as an entry barrier in the related market.

The entrepreneurial activity of Schumpeter's bold, disruptive innovator finds its complement in the entrepreneurial activity of Kirzner's alert, aware, equilibrating entrepreneur (Kirzner 1973, 1982, 1997, 1999, 2009). Kirzner explores the role of individual entrepreneurial decisions in the competitive market process. His "entrepreneur as equilibrator" (2009, 147) uses differential alertness to profit, at least in expectation, from an existing opportunity to create net value. Differential alertness means awareness of and openness to an opportunity that has yet to be widely noticed. The simplest example of entrepreneurial activity grounded in alertness is price arbitrage—alertness to the existence of price differentials, taking

action to resolve them, and profiting from doing so.<sup>15</sup> Even this simple form of entrepreneurial activity illustrates the dynamic nature of market competition in contrast to the static, equilibrium-focused model of competition. This entrepreneur is not a Schumpeterian disruptive creator but engages in trial-and-error experimentation that sets equilibrium in motion. The entrepreneur as equilibrator plays a coordinating role by adapting to underlying changing conditions. The presence of multiple alert, equilibrating entrepreneurs leads to widespread decentralized coordination. Commercializing new products and services as well as new bundles of products and services is also an example of equilibrating entrepreneurship.

Another important aspect of decision making for differential alertness is uncertainty. One area of uncertainty concerns possible available value opportunities, an area that necessarily has an intertemporal element. Kirzner (1997) calls this form of uncertainty “sheer ignorance.” Due to sheer ignorance, the set of all possible value opportunities is unknown, and thus when an individual discovers a new value opportunity, there is necessarily an element of surprise in the discovery. Discovery by both buyers and sellers increases mutual awareness of opportunities that were previously unknown; that awareness creates new entrepreneurial and profit opportunities that can benefit both buyers and sellers. In such environments, entrepreneurial activity arising from differential alertness will necessarily be speculative; thus, some portion of entrepreneurial profit is due to applying alertness intertemporally and being better at judging and anticipating future conditions.<sup>16</sup>

Kirzner characterizes coordination gaps as profit opportunities for all types of agents, not just producers/firms, and argues that the equilibrating tendencies in market processes are the result of entrepreneurs looking for, discovering, and grasping profit opportunities. Entrepreneurs are both buyers and sellers who use information gaps to make profit and by doing so reduce those information gaps in order to move the market toward equilibrium. Importantly, agents act on ex ante perception and on their expectations of future outcomes, both of which can be incorrect ex post. Thus, agents can make errors, but errors are only errors ex post. Such errors can be disequilibrating, leading to divergence instead of convergence, but when many heterogeneous agents are simultaneously striving to grasp profit opportunities, such divergence is likely to be short-lived, and error-correction processes will be robust. Note the value of an institutional structure that enables the simultaneous actions of distributed, heterogeneous agents acting on their private

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15. Indeed, the word *entrepreneur* comes from Richard Cantillon ([1720] 1997), who described the “undertaker” (*entrepreneur* in French) who undertook to buy rural crops and transport them to a city market in expectation of a higher price and profit and by so doing led to the equilibration of prices across the two markets.

16. See also the work of Nicolai Foss and Peter Klein (2012), who emphasize the extent to which entrepreneurs exercise judgment in the face of uncertainty by taking actions. Decision-making control and the active allocation of resources constitute entrepreneurial activity in their model, which provides an entrepreneurship-grounded theory of the firm.

information. These simultaneous, distributed actions can lead to decentralized coordination, new value creation, and convergence to some, albeit moving, focal point due to the heterogeneity of their interests and actions. Thus, the impetus of Kirznerian entrepreneurship in both producers and consumers complements Schumpeterian entrepreneurship by creating value through adapting to the new combinations.

These ideas are relevant to regulatory institutions and institutional change in electric power because decentralized coordination through market processes offers forward-looking coordination of future behavior that is not available to central authorities, including regulators. Markets offer agents of all types opportunities and incentives to make profitable discoveries through experimentation. Regulation as it is currently practiced does not. Regulatory institutions are based on equilibrium models grounded in static concepts of cost recovery that do not incorporate or allow for perceiving opportunities and making discoveries.

*Application: Experimentation, Incumbent Vertical Market Power,  
and the Process of Retail Electricity Deregulation*

This experimentation theory of competition suggests that innovation, new combinations, and alert opportunity seeking are foundations of dynamic competition and economic value. Those foundations arise only in an institutional environment that is conducive to decentralized economic experimentation. Competition by its nature shifts product and service characteristics and boundaries, and therefore shifts market definitions and all of the margins upon which previous vertical integration and regulation have been based in industries such as telephone and electricity. The implications of these features of dynamic competition complement and extend the neoclassical and new institutional arguments supporting the divestiture of AT&T for which Baxter argued. The incumbent regulated monopolist's failure to exit the retail market reduces value creation by stifling both producers' and consumers' market experimentation.

By providing a basic service through the incumbent monopolist, incumbent default service discourages customers at the margin from searching, learning about different providers, different product and service bundles, all of which are ways that consumers engage in experimentation. This entry cost facing potential retail entrants has two related sources: switching costs and consumer inertia. After a century of the consumption of an administratively defined electricity product provided by a regulated monopolist, residential customers are likely to perceive the costs of switching to a less-well-known retail provider as high, even if that provider offers lower prices, differentiates products that match better with their preferences or that change their preferences, or bundles technology and services in a novel and attractive way. Thus, default service persists owing to switching costs and consumer inertia, exacerbating the already high customer-acquisition costs of

retail electricity market entrants, who have little or no brand recognition and are competing with a known (although not always trusted) incumbent.

By embedding inertia bias and raising entry costs, incumbent default service deters entry and stifles market experimentation on both the supply side and the demand side. With such an entrenched incumbent, entrants must incur substantial costs to develop and communicate their value propositions to residential customers, and these costs are barriers to their ability to discover the product and service characteristics and combinations that consumers value. The persistence of incumbent default service is a consequence of failure to have the incumbent exit the retail market after the regulatory transition period and to quarantine the monopoly. These policies constrain entrepreneurial product and service experimentation and discovery by both producers and consumers.

In earlier analyses of the Bell Doctrine, Timothy Brennan (1987) and Joskow and Noll (1999) applied its principles to the electricity industry. Both analyses focus on generation and wholesale markets as potentially competitive, but they did not anticipate potential retail competition in the near future, despite its technical feasibility. Their analyses of the prospects for residential retail competition predate innovation in digital end-use technology, as illustrated in the Olympic Peninsula project, which changes the set of possible retail-value propositions (Chassin and Kiesling 2008). Digital communication technologies enable a wide range of opportunities for homeowners to automate management of their energy consumption, from analyzing overall data from the home's digital meter in near-real time to automating real-time appliance response to changes in electricity prices and to bundling with other services in an integrated home-management system accessed via an Internet-ready television. They will also see savings immediately rather than at the end of the month on the bill, which would overcome some inertia. Many more applications are possible beyond those examples, and alert entrepreneurs will be the ones to discover and disseminate them if institutions and incentives exist to enable permissionless innovation.

## Conclusion

Despite restructuring legislation in several states and Schumpeterian innovation in customer-focused communication technologies, incumbent vertical market power persists in the deregulating residential retail electricity industry in the form of the incumbent default-service contract. The incumbent default-service contract violates the Bell Doctrine's policy recommendation to quarantine the monopoly when a failure to exit a downstream market has anticompetitive effects. An entrepreneurial theory of competition based on experimentation reinforces that recommendation.

Texas is the only restructured U.S. state that, in ways consistent with the Bell Doctrine, specifically quarantines the wires monopoly from the retail market in its restructuring legislation. Texas is also the only state in the country with a fully

deregulated wholesale and retail electricity market for all consumers. Texas law stipulates very clearly that the regulated wires utilities will be barred from providing “competitive energy services” in their incumbent wires territories, and the law defines “competitive energy services” as including in-home CPE (e.g., smart thermostats or home energy-management systems) and related retail products and services.<sup>17</sup>

The exogenous evolution of technology has catalyzed a potentially competitive retail electricity market, although in most states vertical integration and retail regulation persist. With more transparent and timely consumption information in the hands of consumers, many more buyers can acquire and access timely information about their individual electricity consumption patterns and the ability to program their demand functions into transactive devices that can respond autonomously to price signals. Technology now enables consumers to use competitive alternatives to protect *themselves* from the exercise of market power. Thus, one of the traditional functions of regulation is becoming obsolete due to technological change.

The issue for anticompetitive consequences in the case of electricity, much like the case of AT&T, is not that of a monopolist entering a related market, but instead that of a monopoly insufficiently exiting a related market that innovation and dynamism have made potentially competitive as well as the failure of regulation to facilitate that exit. Failure to exit differs from barrier to entry because the anticompetitive effects arise largely from incumbency and consumer inertia. Restructuring should take into account such inertia and should eliminate policies such as incumbent default service that embed entry barriers. Moreover, retail competition is the market design and process best able to facilitate the economic experimentation that is most likely to lead to value creation, increased consumer surplus, and increased total welfare, which are the objectives of sound competition policy.

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**Acknowledgments:** I thank Robert Whaples and two anonymous referees for their advice and suggestions. I am grateful to Shane Greenstein, Roger Meiners, Michael Munger, James Speta, Diana Thomas, and conference participants at the Searle Center on Law, Regulation, and Economic Growth 2011 Conference on Federalism and Energy; the 2012 Great Lakes Symposium on Smart Grid; the 2012 and 2013 Southern Economic Association meetings; and the 2013 Public Choice Society meetings for helpful comments on earlier versions of this paper. I thank Chris Vickers for valuable research assistance.