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Learning from the Past Insights for the Regulation of Economic Activity

Nancy L. Rose

The past thirty-five years have witnessed an extraordinary transformation of government economic intervention across broad sectors of the economy throughout the world. State-owned enterprises were privatized. Price and entry controls were largely or entirely dismantled in many industries, particularly those with multifirm competition, ranging from natural gas production, to trucking and airlines, to stock exchange brokerage and retail banking. Traditional “natural monopoly” sectors such as electricity, telecommunications, and oil and gas pipelines were restructured, as more market-based institutions replaced traditional cost-of-service regulation or state ownership in many jurisdictions. Although government intervention that focused on risk, product quality, health, or environmental impact was rarely “deregulated,” there was some diffusion of more market-based instruments, such as tradable permits to regulate power plant sulfur dioxide emissions and nitrous oxide emissions, the European Union Emissions Trading System for greenhouse gases, and global capital requirements for banks that “priced” the risk associated with different asset classes.

The political economy of the reform movement has been heavily debated. Policy entrepreneurs, ideological shifts, and macroeconomic dislocations undoubtedly played a role in the torrent of reform over the late 1970s

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and 1980s.¹ But a rich economics literature also had much to contribute. Studies demonstrated that regulation increased costs both directly and by reducing firm incentives to pursue more efficient operations, impeded the efficient allocation of goods and services to their highest value use, and often retarded innovation.² Many of the policy changes were bolstered by empirical analyses that documented the costs of regulation within a particular industry, and suggested the prospect of substantial gains from its reform.³ Early studies of the aftermath of reforms confirmed many of the anticipated benefits, particularly in structurally competitive industries, and may have spurred extension to other settings.⁴ Theoretical advances in understanding optimal regulation, particularly in the presence of asymmetric information, stimulated more effective policy design in some of the sectors subject to continuing regulation.⁵

The movement toward less intrusive economic regulation was far from linear or universal, however. For example, cable television in the United States underwent a relatively rapid succession of price deregulation, re-regulation, and deregulation between 1984 and 1996, as Congress grappled with the implications of price, service, and technological changes in that industry. The US intervention in the pharmaceutical industry has continued to focus on product-level entry regulation to ensure product safety and efficacy, with no direct price oversight for purchases outside government Medicaid and Medicare systems. That stands in sharp contrast to pharmaceutical controls in most other developed economies, where governments determine not only which products may be sold but also at what price, with regular price review and resetting. The electricity sector exhibits considerable heterogeneity in regulatory institutions. Many countries, led by England and Wales in 1990, and some US states have aggressively restructured this sector, creating competitive wholesale generation and retailing markets and implementing incentive regulation of remaining monopoly segments. At the other extreme are the many US states that retain vertically integrated monopoly electric utilities, subject to cost-of-service regulation that has changed only modestly over the past several decades.

Some of this variability reflects ambivalence by policymakers and various interests. The wisdom of the regulatory restructuring movement has been challenged from a number of directions, often from its earliest days.

1. Derthick and Quirk (1985), Noll (1989), and Peltzman (1989) analyze the politics of reform from a roughly contemporaneous perspective. See Landy, Levin, and Shapiro (2007) for a more recent analysis and assessment of successes and failures of the reform movement.

2. See, for example, Joskow and Rose (1989). Winston (1993) provides a critical review of much of this literature.

3. See, for example, Bailey (2010) on the role of academic economists and their research in airline deregulation, and Derthick and Quirk (1985) on the broader US deregulation movement.

4. Joskow and Rose (1989) and Joskow and Noll (1994) discuss much of the early literature.

5. See, for example, the body of theoretical work developed and inspired by Jean-Jacques Laffont and Jean Tirole (e.g., Laffont and Tirole 1993), and the discussion of incentive-based regulatory theory and practice by Paul Joskow in this volume.

Much of the most vocal criticism originated with groups that had benefited from the regulations and saw these gains dissipate with the policy shift. These included executives of firms confronting unfamiliar management challenges and uncertain profitability, labor unions dealing with downward pressure on wages or employment resulting from intensified competition, and subsets of customers who had benefitted from regulated price structures. But there also has been recurrent dissatisfaction with the turbulence of market-driven outcomes, at times fueled by a conviction that reimposition of (possibly smarter) regulation would lead to more orderly markets characterized by low prices, plentiful service, generous wages, and assured returns on investments (e.g., Longman and Khan 2012).

Disparagement of reforms substantially broadened and intensified after the turn of the twenty-first century. Tumult in electricity markets, particularly the California electricity crisis of 2000 and 2001 and the Northeast blackout of 2003, was blamed on rising market power in the aftermath of utility deregulation and inadequate incentives for infrastructure investment in this setting. The bailout of individual airlines and wave of airline bankruptcies following precipitous declines in revenue and traffic subsequent to the September 11 terrorist attacks reinvigorated calls for restoring “order” through regulation of capacity, service, and even prices.⁶ Broad indictments of regulatory reforms reached a crescendo with the 2008 financial crisis and its aftermath, whose roots were argued to lie in the deregulation of the financial sector, the elimination of the Glass-Steagall prohibition on investment banking activities by commercial banks, and the failure of regulators to adequately monitor and discipline bank activities.

Today, mistrust of markets abounds, and a popular credo attributes many of our current economic problems to “deregulation.”⁷ Concerns about conflicts of interest and the inability of regulators to monitor and control “too big to fail” financial institutions, apparently chronic financial instability in the airline industry, market power in restructured electricity markets, wage and work condition pressures in interstate trucking, rising rates for some railroad customers, failures in workplace and product safety, and myriad other issues have led to calls for renewed government oversight and intervention across a wide range of industries.

With the economy still languishing in the years following the 2008 financial crisis, attention has focused particularly on the financial sector, which some commentators argue might have avoided the crisis had more stringent and effective regulation been implemented earlier.⁸ A number of economists

6. This was implemented on a limited scale in the Hawaiian intrastate air market; see Kamita (2010).

7. See, for example, Lazarus (2013). At the same time, “regulation” is criticized by others for slowing recovery and job creation, though these criticisms generally concern broader business regulation and tax policies than those issues analyzed in this volume.

8. Lo (2012) provides an assessment of the academic, policy, and media debate over the role of financial regulation in the crisis.

have called for renewed invigoration of regulation, arguing that when markets deviate from conditions of perfect competition, as they often do, outcomes will be improved by corrective government intervention. Acknowledging past regulatory failings, they argue that we can regulate better than we have in the past, in part by adopting clearer legislation, delegating less to agencies, employing some version of smarter regulators, and better insulating regulators from “capture” by the groups they regulate.⁹

How should one assess these critiques, and what lessons should one take away from the history of regulation and its reform? These questions invoke a number of others: What have been the costs and benefits of economic regulation? When might “light-handed” incentive regulation, or oversight of firms through the general antitrust or tort litigation framework, effectively substitute for more intrusive intervention in firm decision making, and when won’t this work? What new challenges are raised when regulated monopolies are restructured into structurally competitive sectors that must interface with regulated monopoly network providers downstream? Are there lessons from regulation of other industries that could inform current debates about financial sector regulation?

This volume brings together a panel of distinguished scholars to discuss what we have learned from the history of economic regulation, in an effort to answer questions such as these. The research spans a range of industries, with particular attention to those historically subject to control of competition through “price and entry” regulation (most common in the United States) or state ownership (more common elsewhere in the world). These papers were selected to highlight a diverse set of salient issues in the evaluation of economic regulation through the early twenty-first century. The work in this volume describes the origins of regulation of economic activity, assesses the consequences of regulatory reforms over the past three decades, and discusses the implications of academic research and policy experience for many of the most significant contemporary concerns in restructured and deregulated industries. While the primary focus of this volume is on the regulation of competition, a number of the chapters also address risk and product quality concerns, which have been at the center of some recent policy debates. Many of the insights gained from the regulation of competition have broad applicability to these debates over the design of health, risk, and environmental regulatory policies.¹⁰

9. For example, Stiglitz (2009, 18) describes a rationale for the Bureau of Consumer Financial Protection, created by the 2010 Dodd-Frank legislation: “One of the arguments for a financial product safety commission . . . is that it would have a clear mandate, and be staffed by people whose only concern would be protecting the safety and efficacy of the products being sold. It would be focused on the interests of the ordinary consumer and investors, not the interests of the financial institutions selling the products.” See also various chapters in Balleisen and Moss (2010).

10. For discussions of these debates, and more in-depth analysis of risk, product quality, and environmental regulation, see, for example, the National Bureau of Economic Research

The studies open in chapter 1 with an assessment by Dennis Carlton and Randall Picker of the two key instruments, apart from state ownership, that government has to influence the quality and terms of competition: antitrust (or competition) policy and regulation.¹¹ As governments have reduced their use of economic regulation and state ownership to control competition, there has been increased global reliance on oversight of markets by competition policy authorities, who are charged with jurisdiction over broad sectors (or all) of industry. In the United States, these responsibilities are shared at the federal level by the antitrust division of the Department of Justice and the Federal Trade Commission; state attorneys general also may intervene in areas of specific concern to their state. Where economic regulatory agencies have been dismantled (or never existed), competition policy is the primary means to control the nature of competitive interactions and to influence market structure and hence performance. Where regulatory agencies have economic oversight of an industry, lines of authority may be more blurred. As regulatory reform and industry restructuring has gained traction, understanding how best to demarcate these responsibilities has become increasingly important.

Attention in a number of industries has shifted from trying to ensure an adequate number of “horizontal” competitors (in the same market) to mediating “vertical” interactions. These are particularly relevant in network industries, where authorities may wish to prevent the owner of an essential or “bottleneck” facility in one market from impeding or foreclosing competition in a related market, using an intervention that minimizes distortions in both markets. But relying on competition to discipline markets has limitations when competition is imperfect. Carlton and Picker draw on a rich history from the origins of federal antitrust and regulatory policy to the present. They discuss a framework for considering both the positive and normative rationales for choosing between these two policy instruments, and highlight conditions under which competition policy and regulation may be complements rather than substitutes in the policy arsenal. They draw upon examples from the airline and telecommunications industries surveyed in this volume, as well as from the railroad and trucking sectors, to illustrate these arguments.

Chapter 2 turns to the airline industry, to which has been ascribed credit—or in some circles, blame—for setting off the economic deregulation movement in the 1970s (e.g., Kahn 1988, 22). Severin Borenstein and Nancy Rose

conference volumes on *Regulation vs. Litigation* (Kessler 2010) and *The Design and Implementation of US Climate Policy* (Fullerton and Wolfram 2012); Surowiecki (2010); and Coglianesi (2012). For discussions of regulatory issues across a broad spectrum, see also Landy, Levin, and Shapiro (2007) and Balleisen and Moss (2010).

11. Antitrust, or competition policy, focuses on remediation of imperfect competition and harms that result primarily from monopoly power. Kessler’s (2010) volume focuses attention on the choice of regulation versus litigation in the context of mediating health, safety, and risk choices by firms, addressed largely through tort law.

begin by documenting the evolution of airline regulation and the assessment of its operation through the early 1970s. This chapter describes the movement to deregulate the industry, and the impact of those reforms on prices, operations, service, and performance of the industry. In the airline industry, as has been common across other deregulated sectors, the transition from a regulated to competitive marketplace has been long, and the path far from smooth. Some adjustments, such as changes in the level and structure of prices, were rapid. Others, including network reconfiguration and entry of new carriers, took place over several years. And some changes, such as effective penetration of low-cost carriers at the national level, have taken decades.

While the Airline Deregulation Act of 1978 discontinued domestic price and entry regulation and dismantled the Civil Aeronautics Board, government intervention in this sector remains ubiquitous, even beyond the Federal Aviation Administration's ongoing regulation of aircraft and airline safety. Borenstein and Rose discuss the continuing dependence of performance in this sector on a variety of government policies, a pattern that is quite common among other "deregulated" industries. Since 1988, the Antitrust Division of the Department of Justice has had jurisdiction over airline mergers, alliances, and code sharing agreements. The Department of Transportation has responsibilities for administration of the program of subsidies for air service to small communities; monitoring service quality from flight on-time performance to passenger overbookings; and fare disclosure, most recently involving (chronically postponed) plans for a rulemaking on disclosure requirements for ancillary fees on global distribution systems (GDS). Local airport regulation and investments in both airport and public air traffic control system infrastructure have significant implications for capacity, and hence congestion, at both local and national levels. And competition in many international air service markets remains restricted by treaty more than three decades after domestic US airline deregulation.

This chapter tackles several concerns that dominate discussions of the contemporary airline industry: the financial viability of unregulated airline markets, the ongoing role of market power, and the adequacy of infrastructure investment and capacity allocation mechanisms. The conclusion that markets are "messy" and competition is flawed, but nonetheless may yield benefits over bureaucratic regulation of a dynamic industry, establishes an important theme that recurs throughout the volume.

Gregory Crawford's chapter on cable television regulation (chapter 3) expounds on a striking contrast to the "once and for all" nature of airline deregulation. Cable provides a rich laboratory for economists in search of policy variation, as Crawford carefully chronicles in his history of regulation, deregulation, re-regulation, and deregulation once again in this sector. He notes that the wealth of empirical evidence on the effects of these policies is discouraging for those who seek to limit prices through regulatory intervention in an industry with a rich strategy space for firms. Crawford con-

cludes that regulation of cable prices generally (though not always) reduces price, but also appears to be associated with reduced product quality and investment. He notes suggestive evidence that despite popular complaints about rising cable rates, consumers may on net prefer the higher price, higher-quality offerings associated with unregulated markets. This highlights a pervasive difficulty confronting regulators who try to use a simple regulatory instrument such as price caps to influence outcomes when firms operate in multidimensional strategy space. In another nod to the critical importance of measuring regulation against dynamic efficiency, Crawford's analysis suggests that entry into multichannel video programming by satellite systems and local telephone providers may provide more compelling benefits to consumers than did price regulation, by encouraging both price and quality competition. Crawford closes with a discussion of the dangers of mandatory à la carte channel offerings and the ongoing threats to a more competitive landscape posed by bundling in the programming market, vertical integration of content and distribution, and the potential for foreclosure in both traditional and online video distribution.

In a number of network industries where only part of the vertical chain of production has been carved out from economic regulation, new policy challenges have emerged. These comprise many of the "natural monopoly" sectors that were liberalized in the wave of policy reform following the early transportation and energy deregulation movement. The challenges posed by these new industry structures are discussed in the next group of chapters, which include Frank Wolak's analysis of wholesale electricity markets, Paul Joskow's treatise on incentive regulation in electricity distribution and transmission, and Jerry Hausman and Gregory Sidak's discussion of telecommunications policy.

The 1990s witnessed substantial restructuring of electric utilities throughout the world and in many US states.¹² In these jurisdictions, vertically integrated monopoly state-owned or investor-owned regulated utilities were divided into separate generation, transmission, and distribution sectors. Ownership of generating assets often was divested to create competitors in a newly designed wholesale generation market. Operation of the wholesale generation market and transmission network generally was assigned to an independent system operator, and responsibility for the distribution network was assigned to a regulated utility. In many liberalized markets, customer-facing retailing and billing functions are now distinct from electricity distribution, and open to competitive entry. This movement confronted regulators with the challenge of how to design and mediate the interface between

12. In the United States, electric utilities generally are regulated at the state level, so regulatory reforms must be decided by individual state legislatures. This has led to considerable variation in regulatory structures across the contemporary US electric utility sector. In other countries, this sector typically was restructured at the national level, often as an accompaniment to privatization of state-owned utilities.

newly competitive generation and retail sectors and continuing monopoly transmission and distribution services, in addition to that of monitoring the behavior of competitors in the deregulated sector and efficiently regulating the ongoing monopoly services.

Recent studies of the generation sector suggest that competition improves operating efficiency relative to regulated monopoly (e.g., Fabrizio, Rose, and Wolfram 2007; Davis and Wolfram 2012). But these benefits come with the cost of greater complexity in market design and monitoring. As Frank Wolak's chapter on wholesale generation markets emphasizes, getting each of these right is much more difficult in the vertically disintegrated markets at the heart of electricity restructuring than in the traditional regulated monopoly utility setting. Errors may involve considerable transfers of rents, as highlighted by the California electricity crisis of 2000 and 2001. Moreover, seemingly modest differences in institutions across markets may yield substantial differences in their relative performance. For example, markets in which a significant fraction of wholesale generation is sold under forward contracts, or is vertically integrated into distribution at fixed retail prices, restrict the exercise of market power and can moderate equilibrium prices (Wolak 2007; Bushnell, Mansur, and Saravia 2008). This can be especially important when demand is near capacity. Wolak argues that the failure to appreciate the role of vertical relationships was one of the key contributors to the magnitude of California price spikes in 2000 and 2001. The trade-off between imperfect regulation and imperfect markets¹³ and the importance of understanding the pivotal role played by market institutions are at the heart of this analysis, and establish vital lessons for the design and study of regulatory frameworks in general.

In market sectors subject to ongoing government oversight and control, advances in regulatory design create the potential for improving upon traditional regulatory price setting. Paul Joskow's chapter describes the theory and implementation of one of the great contributions of economic research on regulation: insight on how to incorporate incentives to design more efficient economic regulation in the context of asymmetric information between firms and their regulators. Joskow begins by laying out the evolution of models of optimal regulation in the presence of asymmetric information when regulators care about both efficiency (encouraging firms to minimize costs) and rent extraction (keeping profits, and hence prices, as low as possible consistent with firms covering their costs); see, for example, Laffont and Tirole (1993). This theory has been at the heart of reforms implemented by the UK's Office of Gas and Electricity Markets (OFGEM), which has not only pioneered the use of sophisticated incentive mechanisms in its regulation, but also has demonstrated the inherently dynamic nature of effective regulation. For example, when early implementation revealed

13. See, for example, Joskow (2010).

that firms responded to strong incentives to cut costs by both increasing efficiency and reducing spending on quality, OFGEM reacted by incorporating quality of service metrics into its next round of incentive schemes, and has continued to expand and refine its use of quality-mediated incentive mechanisms. Had regulators not been monitoring the industry and appropriately adapted their policies, the move to incentive regulation might well have been labeled a failure. The importance of sufficient resources, attention, and agility in the regulatory system to adapt to unanticipated firm responses is a theme that echoes across regulatory experiences in many industries.

Joskow's analysis also describes the complexities involved in translating the theory into practice, and the many nuanced ways in which the actual implementation often differs from its stylized discussion. For example, the "RPI-X" price cap regulation of utilities in the United Kingdom often is described as less information intensive than traditional cost-of-service regulation in the United States. Instead of building up allowable prices from detailed analysis of costs, including capital costs and allowed rates of return, stylized price cap regulation fixes a maximum allowed price, which changes over time by a formula based on the rate of inflation ("RPI") less a targeted productivity improvement rate ("X"). But Joskow describes how the institutions of price cap regulation have much in common with the practice of cost-of-service regulation, including the detailed cost accounting systems and data collection for use in benchmarking analysis, the separation of operating and capital cost allowances in determining the level of the price cap, decisions by regulators on the target capital expenditures for the future period that drive much of the X factor in these capital intensive industries, and the periodic reviews and resets of the cap. Thus, the real advantage of incentive-based regulation is not that it requires less to implement; it may well require greater collection of data and analysis. Rather, as Joskow notes, it is that these systems use the information they collect in a more forward-looking way. He urges more study of their ex post performance to assess whether the reality of incentive regulation lives up to its promise.

While mediating partially deregulated sectors poses significant regulatory challenges, if handled well, both the challenges and some of the residual regulation may prove transitory. Jerry Hausman and Greg Sidak argue that designing mechanisms that encourage investment and viable long-term entry can speed the transition to competition in local telephone markets, while rules that impede investment by requiring incumbents to grant entrants access to their network at artificially low prices may hinder such a transition, and force reliance on regulatory adjudication indefinitely. They focus on access regulation in the United States, United Kingdom, and New Zealand, with particular attention to the rationale for "total element long-run incremental cost" (TELRIC)—or "total service long-run incremental cost" (TSLRIC)—style pricing rules, which have been argued to provide

new entrants with access to elements of the local telephone network at “as if competitive” prices. Hausman and Sidak argue that determining “as if competitive” prices is fraught with pitfalls, with significant damage occurring when regulators fail to account for the sunk nature of physical investment in local telephone networks. They conclude that while TSLRIC-based prices might increase the market share of new entrants, by pricing access below its economic cost, such regulations are likely to discourage investment in physical networks. Without true facilities-based competition, local carriers will retain their monopoly over the physical network and regulators will find themselves in a “regulation forever” regime—or at least until new technologies, such as wireless communications, invent around the landline systems to provide effective substitutes. This study draws attention to the importance of considering the dynamic nature of firm responses to regulation: static costs and benefits may dramatically understate the true costs or benefits of regulatory systems after effects on investment and innovation are properly accounted for.

Although the bulk of this volume focuses on economic (price and entry) regulation, regulators are charged with oversight of risk, product safety, or product quality decisions in many industries. Few of those responsibilities have been diminished by reforms over the past thirty-five years, and many have increased. Patricia Danzon and Eric Keuffel’s chapter highlights the challenge of regulating safety and efficacy in the pharmaceutical industry while encouraging productive innovation. They also describe a variety of approaches countries use to mitigate the incentives insurance or single-party payer systems create for increasing pharmaceutical rents through higher markups and greater promotional activity. Their analysis highlights the complexities introduced when regulating a highly dynamic industry with multiple dimensions of performance that consumers and regulators care about, but may observe only imperfectly, echoing a theme in Joskow’s incentive regulation chapter. For example, safety and efficacy regulation by agencies such as the Food and Drug Administration (FDA) can substitute expert judgment for costly and imperfect assessment of product quality by individual consumers or their doctors. But the FDA evaluation process currently requires an average of eight to twelve years of research, preclinical testing and human clinical trials, and an estimated mean cost in the range of \$1 billion (Danzon and Keuffel, chapter 7, this volume; Adams and Brantner 2010)—costs that may discourage R&D investment in drugs with smaller potential markets, less wealthy patient populations (such as those targeting disease in developing economies), or for which effective patent lives would be short. Prices for pharmaceuticals vary considerably across markets, due both to price discrimination and price regulation in many markets. Historically, prices in the United States have been market based, while those in most other developed countries were controlled by governments in an effort to mitigate the moral hazard in pricing created by price inelastic demand that arises

from patients' insurance coverage or national health systems. Finding the balance between mitigating market power and encouraging pharmaceutical innovation can be difficult, and the global market for many pharmaceuticals may create incentives for some countries to "free ride" on the investment incentives created by others.

Recognizing that the economic regulatory environment may interact—perhaps in unexpected ways—with product quality and risk choices by firms may be especially important for understanding the past three decades in the banking sector. Myriad government agencies at both federal and state levels exercise oversight of the balance sheet, lending activities, and risk profile of depository institutions, yet were unable—or some claim, unwilling—to avoid the catastrophic failures that gave rise to the 2008 financial crisis. Randall Kroszner and Phillip Strahan's narrative on banking regulation (chapter 8) provides an alternative perspective to the regulatory incompetence or capture views that have been advanced postcrisis, particularly in the popular media. Their chapter reviews the history of banking regulation from the 1930s through the early 2000s, describes its political economy, and assesses the economic impact of liberalization over the 1980s and 1990s.

This analysis emphasizes the dynamic nature of the industry and its regulation, and the difficulty regulators have in keeping up with the rapid evolution of behavior in this sector (see also Romano, forthcoming 2014). Kroszner and Strahan's discussion of the relaxation of price and entry restrictions on depository institutions over the 1970s and 1980s suggests that some of these changes may have been dictated by changes in the economic climate. For example, elimination of Regulation Q controls on deposit interest rates responded to the inflation-induced disintermediation occurring in the banking and savings and loan sectors in the late 1970s, which threatened widespread insolvency. This policy change may have reflected both public interest and private objectives, as "a regulation that at one point helped the industry may later become a burden and sow the seeds of its own demise" (Kroszner and Strahan, chapter 8, this volume). Kroszner and Strahan cite evidence that relaxing entry restrictions on banks permitted them to expand geographically and increase their scale, reducing their riskiness and increasing their efficiency relative to the industry of the 1970s. However, increased competition, by reducing bank charter values, also may have created incentives that in the long run work against the objectives of risk regulation.

The chapter highlights the difficulty regulators have had in keeping up with new sources of risk. For example, banks responded to new risk-based capital regulations in ways that minimized their cost of those regulations, such as changing their portfolio mix and shifting activities off-balance sheet and therefore beyond the view of regulators. Unlike the OFGEM regulators described in Joskow's chapter, depository institution regulators appear to have been slow to recognize and adapt to the rapid evolution of industry behavior. The contribution of regulation to the 2008 financial crisis may

have been driven more by misjudging incentives created by particular regulations and failing to anticipate or react to innovations by firms to minimize the cost of regulatory constraints, than from “deregulation” per se.

The closing chapter, by Eric Zitzewitz, discusses regulation of the retail securities and investments industry. The Securities and Exchange Commission (SEC), created early in the Great Depression, is the primary federal regulator; competition policy authorities at the state and federal level share overlapping jurisdiction in some areas. Unlike the sectors analyzed in the earlier chapters, price and entry regulation have played no real role in this industry. Instead, regulation historically has focused on market failures arising primarily from costly and imperfect information or free rider problems, and more recently has begun to incorporate the impact of cognitive limits on investor decision making. Regulation has been most concerned with leveling the playing field across investors, ensuring the disclosure and quality of information, and mitigating conflicts of interest (“agency problems”) that may arise between investors and financial advisors or between investors and security issuers or investment managers. Zitzewitz describes the challenges inherent in pursuing these objectives under the best conditions. He also details the institutions that may lead the SEC to identify with the interests of industry it regulates, noting that these may function better in disciplining the behavior of rogue individuals (the Madoff scandal notwithstanding) than in “correcting systemic market failures that are also sources of economic rents” (chapter 9, this volume). The lessons in Zitzewitz’s chapter may prove especially helpful as the government shifts its general regulatory focus from industries where market power in pricing is of primary concern toward greater regulation of risk, health and safety, and externality regulation.

Before turning to the individual chapters that comprise this study, it is instructive to note several broad themes that emerge from these studies of regulation, and that may be of value in considering regulatory policies going forward (see also Rose 2012).

Institutions Matter

One of the impediments to forming generalizations about regulation (e.g., “price controls reduce quality,” or “entry restrictions generate supranormal rents for firms and labor”) is that seemingly modest differences in institutional settings can lead to dramatically different impacts of otherwise similar regulations. The centrality of this was recognized by Fred Kahn in titling his encyclopedic treatise on *The Economics of Regulation: Principles and Institutions* (1970–71). Paul Joskow’s classic 1974 *Journal of Law and Economics* paper on utility regulation exemplifies the importance of this lesson for researchers. Regulatory economists in the late 1960s and early 1970s were engaged in a spirited debate over the Averch-Johnson (A-J) model, which highlighted the distortionary effect of rate-of-return regulation on

capital choices by utilities. Amid a burgeoning theoretical and empirical literature devoted to proving or disproving the effect, Joskow (1974) stepped back from the debate to ask “what do regulators actually do?” He noted that regulators do not set a rate of return that continuously binds, as in the model. Rather, regulators adjudicate the allowed rate of return as an input to determining the cost of capital, which itself is a component of costs that utilities are entitled to recover. Then regulators fix the price firms may charge, not the rate of return, until the next rate review. Moreover, Joskow highlighted consumer antipathy to rising nominal prices, presaging concerns now common in behavioral economics, as a factor that may lead to considerable stickiness in regulated rates. Joskow showed that this simple insight—grounded in the basic institutions of the sector—turned many of the implications of the A-J model on their head, and he fixed by example an important standard for empirical work in regulatory economics.

The studies in this volume highlight relevant regulatory and market institutions, their interactions, and why they matter. For example, Carlton and Picker highlight the significance of institutional assignment of priority when regulatory agencies and antitrust authorities share jurisdiction, such as over merger policy. Regulatory agencies charged with oversight of a single industry or sector are likely, by design or evolution, to favor the interests of incumbent firms. Antitrust authorities, in contrast, enforce competition policy across the entire economy (apart from designated carve-outs), with enforcement mediated by the courts. Mergers that increase industry concentration and restrict competition are more likely to be approved when a single-sector agency—such as the Federal Communications Commission, Surface Transportation Board, or Department of Transportation—has been given final authority over merger approvals, often over the objections of the relevant antitrust authority. Such patterns dominated the early post-deregulation experience in airlines and railroads. Carlton and Picker argue that the assignment, and resulting concentration in railroads, may have been intended given the poor financial condition of railroads prior to deregulation (see chapter 1).

Wolak describes how differences in the institutional structure of wholesale generation markets—including characteristics such as horizontal market concentration, vertical contracting, the degree of excess capacity in transmission networks, and whether consumers face retail prices linked to wholesale prices—can interact to yield substantially different outcomes relative to competitive benchmarks. He argues that failure to appreciate these interactions was a substantial contributor to the severity of the 2000 and 2001 California electricity crisis. This insight is important not only for market design of wholesale generation markets, but also for ongoing oversight. For example, neglecting the vertical structure of electricity generation and distribution markets suggests that the lower prices in the PJM (Pennsylvania-New Jersey-Maryland) market during the early 2000s, relative to those in

California, reflected more competitive behavior by generators in PJM (Bushnell, Mansur, and Saravia 2008). Relying on this apparent competitiveness to keep prices low could be quite misleading, as Bushnell, Mansur, and Saravia demonstrate that generators in both regions exercise market power, and that it is the incentives created by significant distribution company ownership of generation assets combined with fixed retail prices that led to lower wholesale generation prices in PJM. Changes to either of those institutions, all else constant, could result in substantially higher prices of electricity in PJM.

Danzon and Keuffel's analysis of the pharmaceutical market is rich with institutional detail and the implications of those details for the behavior of firms and performance of the market. Consider, for example, the market for generic pharmaceuticals. In the United States, the combination of laws that allow pharmacists to substitute generic equivalents to prescribed branded pharmaceuticals and insurer pricing policies that reimburse pharmacists based on a generic reference price for the drug leads to intense price competition among generic manufacturers, particularly for the business of large buyers (pharmacy chains, wholesale distributors, etc.) who purchase on price and keep the difference between the reference price and their acquisition cost as profit. By contrast, many EU countries restricted pharmacies to fill prescriptions as written (distinguishing brands from the generic chemical name), and some reimbursed pharmacies a markup on the price of the drug. In those countries, generic manufacturers developed branded generic products that were promoted intensively to physicians. As predicted by models of differentiated products, this softened price competition among generic manufacturers, leading to higher prices and lower generic sales, relative to the United States. Recognizing how incentives differ across institutional settings is critical to predicting the impact of regulation, and leads to the second general theme of this volume.

Incentives Drive Behavior—and Perhaps Unintended Consequences

Firms respond to incentives. An effort to harness the power of this insight fueled the surge in incentive-based regulation that Joskow's chapter describes in detail. For example, to the extent that traditional cost-of-service utility regulation or state ownership of utilities fully reimbursed firms for their incurred costs—which varied in effect over time and space—it dulled incentives to improve efficiency and reduce operating costs. Adoption of regulatory schemes that gave firms explicit rights to some share of cost savings resulted in reductions—some quite significant—in the cost of producing electricity. The power of properly aligned incentives to affect desired outcomes is one of the great insights, and contributions, of the economic literature on regulation.

But firms also respond to incentives even when regulators do not fully appreciate the inducements they have created. Recent experience with pro-

longed electricity outages following natural disasters and system failures has led policymakers in a number of US states to question whether firms have responded to rewards for cost reduction by underproviding reliability and recovery services. Joskow describes in depth the challenges for incorporating standards for quality into incentive-based regulation, particularly where data on service quality metrics are not readily available for benchmarking exercises. Borenstein and Rose recall the spiral of ever-increasing flight frequency and falling load factors in response to the futile attempt of the Civil Aeronautics Board (CAB) to increase industry profits by increasing air fares during the 1960s and early 1970s. While the CAB could eliminate price competition through regulatory degree, the attractiveness of gaining another passenger at a price far above the incremental cost of serving them simply redirected competition to other channels, leaving airline profitability no higher than before. Hausman and Sidak point out that TSLRIC-style pricing of access to local telephone infrastructure gives potential entrants a free option to test a market and exit without paying for sunk investment costs. Not surprisingly, few choose to build their own networks when they can instead “rent” at lower cost, a conclusion reinforced in a recent economic analysis of similar access regulations and telecommunications investment across twenty European countries (Grajek and Röller 2012).

The pharmaceutical market is rife with examples of unintended incentive effects, as discussed in depth in Danzon and Keuffel’s chapter. As an example, they note that strategic responses by firms to reference pricing regulation, in which the allowed price of a drug in one jurisdiction is pegged to its price at introduction, in another location, or in another channel, may change behavior in referenced setting. For example, 1990 Medicaid “best price” rules linked the price Medicaid paid for pharmaceuticals from the average private sector price in the United States, ensuring the Medicaid program sizable discounts *relative to* the average private sector price. But the linkage also created incentives to moderate or eliminate discounts to large private sector buyers, as doing so would raise prices paid by both the private channel and Medicaid purchasers. Consistent with that incentive, private sector prices for drugs with significant Medicaid market shares were higher following adoption of this policy (Duggan and Scott Morton 2006). In Japan, biannual price reviews that ratchet prices to keep markups low interact with manufacturer competition and physician dispensing of drugs to distort the R&D process toward more frequent incremental innovation of existing drugs that enables manufacturers to restart prices at a new higher level.

Understanding incentives and how firms respond to them is critical to financial services regulation, given the complexity of the sector, the many dimensions of firm choices, and the rapid rate of innovation in this industry. Kroszner and Strahan note, for example, that the implementation of risk-based capital requirements may have had a significant role in the subsequent

rise of off-balance sheet activities beginning in the 1980s, and the explosion of securitization and derivative products, such as credit default swaps, in the 1990s and 2000s. Under these rules, mortgages required one-half the capital that banks were required to hold against commercial loans; asset-backed securities with AA or AAA ratings required just one-fifth. By shifting their portfolio away from commercial debt and toward mortgages and mortgage-backed securities, banks could reduce their costs of complying with capital requirement regulation. Unfortunately, such actions also appear to have played a critical role in setting the stage for the shock of the 2008 global financial crisis. Regulatory policies that address the “cause” of the last crisis may treat the symptom without curing the ill, if underlying incentives are not recognized and changed (see Romano, forthcoming 2014).

Innovation Changes the Game

Innovation can change the regulatory calculus in at least two ways. First, regulatory systems can distort incentives for innovation in products and services, leading to dynamic effects that may swamp static costs and benefits. Reductions in innovative activity are commonly—but not always—associated with regulation. This may arise directly from the slowness of regulatory systems to respond to firms’ requests to enter new markets, introduce new products, or change the way they organize their activity. Hausman and Sidak argue that Federal Communications Commission regulation delayed innovations in telecommunication both directly by slowing their approval (for example, cellular, and enhanced voice services such as voicemail), and indirectly, discouraging investment (e.g., Hausman 1997). Crawford points to suggestive evidence that cable systems reduced investment and innovation in service offerings during periods of binding price regulation, and expanded both when price caps were removed. Innovation can cover a multitude of sins, and retarding innovation can multiply them greatly. Markets may be imperfect, but if those imperfect markets adopt productive innovations faster than would a more perfect regulated sector, the benefits of regulation may be far less than its costs.

Delay may have both costs and benefits, such as delay required to complete clinical trials used to vet the safety and efficacy of new drugs. Some may be driven by limited regulatory resources that require “queuing” applications for review. But even those delays are rarely exogenous to the regulatory system. Danzon and Keuffel point out that the length of Food and Drug Administration (FDA) reviews appears responsive to past crises—FDA reviews tend to be more intensive and longer following well-publicized problems with new drugs, or shorter for those that treat conditions (such as HIV/AIDS) that have generated stronger political interest in speeding drugs to market. Harnessing this insight to design procedures that allocate resources to minimize the expected social cost of regulatory delay could

improve welfare; witness the impact of the “fast track” for FDA reviews and the increased use of postlaunch monitoring on drug approval times, as discussed by Danzon and Keuffel.

Regulation does not always impede innovation, however. Borenstein and Rose note that airline regulation, by suppressing price competition, channeled competition to nonprice dimensions, including innovation. The introduction and diffusion of jet aircraft was likely accelerated by price regulation that precluded airlines with turbo-prop equipment from charging a lower fare for their slower service relative to their jet-equipped rivals, and hence forced their investment in new aircraft as the only way to compete for passengers.

The second sense in which innovation matters involves the game between regulators and regulated firms. As Allan Meltzer wrote in 2009, “[T]he first law of regulation is: Lawyers and bureaucrats write regulations. Markets learn to circumvent the costly ones.” When firms respond to the incentives that regulations create, outcomes may be quite different from those intended, particularly if regulators fail to adapt the regulatory structures. Some innovations may be privately profitable but socially inefficient. Especially when these are motivated by the gains of circumventing regulation, failing to adapt regulatory structures to the changing industry dynamics can render them ineffective or even counterproductive. Although this behavior is ubiquitous, its implications for regulatory policy are far too often overlooked.

Examples of apparently unanticipated firm responses to regulations abound. Crawford’s discussion of cable systems padding their basic service tier with low-value program offerings to relax per channel price cap constraints, and shifting more popular programming to higher, unregulated service tiers, is a stark example of Meltzer’s “law.” Borenstein and Rose note that in regulated airline markets, increased schedule frequency was the most effective tool airlines had to capture share from rivals when price competition was forbidden. But in international markets where capacity and service frequency often were also regulated, carriers added piano bars, expanded gourmet meal service, and hired attractive young women in designer flight attendant uniforms. And on many of the highest price international routes, nonscheduled air carriers changed the game. These charter carriers, who typically operated outside the constraints imposed by international air service agreements, expanded to capture a substantial share of traffic with low-price, low-amenity charter flight service.

Kroszner and Strahan describe a long and checkered history of this behavior in the banking sector. From this vantage, the crisis in 2008 was notable for its breadth, depth, and impact, but the regulatory failures that contributed to it were far from novel. For example, when inflation induced high nominal interest rates in the 1970s and Regulation Q limits on deposit account rates became too binding for free toasters to offset its cost to depositors, innovations such as NOW (negotiated order of withdrawal)

accounts, cash management sweep accounts, and money market mutual funds siphoned a huge share of deposits out of these regulated savings and checking accounts. While these may have improved consumer welfare, the resulting disintermediation destabilized banks and savings and loans institutions with large portfolios of illiquid, long-term loans (including thirty-year fixed-rate mortgages), planting the seeds for a wave of failures in the late 1970s and early 1980s. Well before the 2008 financial crisis, the incentives that risk-based capital regulations under the Basel II Accord created for banks to move lending activities off-balance sheet shifted the growing risk exposures to a channel largely beyond the sight of the regulators. Distinguishing innovation that increases social welfare from innovation that may be solely or primarily for the purpose of evading or escaping some of the regulatory constraints is a considerable challenge. History may be repeating itself, as a raft of new regulations following the 2008 financial crisis reinvigorates the game of regulatory “Whac-a-Mole” (e.g., Romano, forthcoming 2014).

The value of nimble regulators is highlighted in Paul Joskow’s chapter on incentive regulation, particularly in his discussion of the British OFGEM regulation of electricity and natural gas. Given the difficulty of ascertaining *ex ante* the full breadth of responses to regulation, *ex post* adaptation seems essential. As Fred Kahn wrote in 1979, “The regulatory rule is: each time the dike springs a leak, plug it with one of your fingers; just as dynamic industry will perpetually find ways of opening new holes in the dike, so an ingenious regulator will never run out of fingers” (Kahn 1979,11). Joskow points out that this can be a double-edged sword—knowing that regulators will respond to firm choices can dampen incentives for certain behavior, such as efficiency improvements, in the first place. This analysis highlights the inevitable trade-offs among objectives when executing regulatory strategies.

Imperfect Markets Meet Imperfect Regulation

One of the most important themes to emerge from the studies in this volume is that markets and regulation both tend toward flaws, and neither may operate as the neoclassical ideal would dictate. Microeconomics courses detail a litany of “market failures” that cause market equilibria to be inefficient: too few sellers to ensure competitive prices, externalities that create a wedge between private and social costs, public goods that are underprovided in the absence of collective action, and information asymmetries or transactions costs that impede efficient trade. Yet even where regulation might be intended to restore imperfect markets to a competitive ideal, outcomes frequently are associated with higher production costs and, in some cases, higher prices, distorted product offerings, and significant rent redistribution. Responding to market imperfections with government regulation may trade

one set of costs for another, perhaps even greater, set of costs, as recognized by generations of regulatory economists.¹⁴ Choices are squarely in the economists' world of the "second-best," which dictates careful consideration of the cost and benefit trade-offs.

Economists have documented the tendency of regulation to increase costs in the regulated sector. Regulations may impede efficiency by distorting management's incentives to pursue aggressively lower cost production, as discussed in depth in Joskow's chapter. Regulators may introduce rules that directly increase costs, as for example, restrictions on the operating authorities of trucking companies that led to high incidence of empty backhauls, or entry and merger restrictions that kept banks in many states at an inefficiently small scale. By suppressing price competition, regulation may induce firms to compete on nonprice dimensions, escalating the quality and cost of providing service. This was a well-recognized problem in the regulated airline industry by the early 1970s (see Borenstein and Rose). Reforms that substitute market outcomes for regulatory decision making have led to improvements in the efficiency of generating power plants facing competitive markets instead of regulated prices (Wolak, chapter 4, this volume; Fabrizio, Rose, and Wolfram 2007; Davis and Wolfram 2012), reduced freight costs through elimination of empty backhauls and circuitous routing in trucking and increased railroad efficiency (e.g., Ellig 2002; Winston 1998), and increased airline productivity through both lower operating costs per available seat mile and higher load factors (Borenstein and Rose, chapter 2, this volume).

Regulated price structures may distort consumption decisions. "Allocative efficiency" results when prices signal consumers to use goods or services when their value to the consumer is above the production cost of the good but not otherwise, and allocate scarce goods to their highest value use. In some settings, including many of the deregulated transportation sectors, regulated prices were higher than competitive levels, and it was easy to convince consumers (though perhaps not other stakeholders) that reform was desirable. In other settings, the efficient price may be higher than the regulated price. It is hard to convince consumers who otherwise would have been able to purchase at a lower price that a postreform price increase was, in fact, beneficial for the overall economy. Finally, regulation may alter the structure of prices, affecting transfers across customer groups and distorting consumption patterns and entry decisions (e.g., Davis and Muehlegger 2010).

The welfare loss from allocative inefficiency can be large. For example, Lucas Davis and Lutz Kilian (2011) analyze the impact of natural gas well-head price ceilings, which were in place through 1989. These ceilings reduced prices for consumers lucky enough to have access to natural gas, but also

14. See, for example, discussions from Kahn (1970–71, 1979) to Joskow (2009, 2010).

discouraged natural gas exploration and production, and led to shortages and rationing of access to natural gas. Davis and Kilian show that the economic dislocations caused by these regulations persisted long after the price ceilings were abandoned, and estimate that the welfare cost of these artificially low prices averaged \$3.6 billion *per year* (in 2000 dollars) between 1950 and 2000.

The dynamic impact of regulation on the economy may swamp static costs and benefits. As noted earlier, economic regulation may distort incentives for investment and innovation by regulated firms, shift risks from investors to consumers or other stakeholder groups, and substitute bureaucratic oversight for managerial judgment in investment and new product introduction decisions. This theme appears throughout the studies in this volume, as highlighted in Crawford's discussion of cable regulation, Hausman and Sidak's analysis of telecommunications reform, and Danzon and Keuffel's examination of pharmaceutical regulation.

This may not be surprising: regulating well is very difficult. Regulators typically have far less information on the markets they regulate than do the firms whose activities they oversee, confront limited resources in executing their oversight roles, and may themselves have weak incentives to achieve the outcomes that generate the greatest social welfare. As Civil Aeronautics Board chairman and regulatory scholar Fred Kahn recalled saying in the 1978 debate over airline deregulation, "If I knew what was the most efficient configuration of routes in the airline system, then I could continue to regulate. But since I can't tell you whether it's going to be a Delta kind of operation or . . . more like the Eastern shuttle or Southwest Airlines it doesn't make sense to leave it to an ignorant person like me to tell airlines how they can best configure their routes" (Kahn 2000). The dramatic changes in airline network and pricing structures that followed deregulation substantiate his argument.

Moreover, once the "coercive power" of the state (Stigler 1971) has been invoked to regulate an industry, the injection of politics into the process may yield outcomes far from those envisioned by the social welfare maximizing economist. Carlton and Picker describe the process of regulatory rent-seeking across a number of industries, from railroads to trucking to telecommunications. They note that antitrust jurisdiction over regulated sectors may help to check agencies' temptation to align with the interests of the industry they regulate, citing, for example, MCI's successful monopolization challenge against AT&T in the 1970s. Zitzewitz echoes this message in his discussion of retail securities industry regulation, noting a long-standing criticism of the Securities and Exchange Commission (SEC), that identification with the industry it is charged with regulating has led it to focus "more aggressive enforcement action against misconduct by rogue individuals (broker fraud, insider trading) than against more systemic forms of misconduct

(analyst conflicts, mutual fund compliance issues, earnings management)” (chapter 9, this volume).

Political capture may not be the only, or even primary, concern. Regulatory rulemaking is intentionally cumbersome, in part to ensure some stability of the political bargain, enfranchise competing interests with a voice in the process, and counteract capture by the regulated industry. But as noted earlier, that stolidity makes regulators far from agile in responding to changing conditions or challenges. The more dynamic is the industry, the greater the potential cost of these frictions.

Determining the desirability of government intervention therefore requires a careful assessment of the costs of imperfect markets relative to the costs and benefits of imperfect regulation, with full recognition of the inevitable shortcomings in each. As the studies in this volume reveal, this calculus may reveal gains from more performance-based regulations in some settings, such as the distribution utilities Joskow analyzes. In other settings, exemplified by the airline and cable television industries, a market mediated primarily by competition policy can yield benefits over the more intrusive direction of price, product characteristic, or entry decisions by government agencies. And whenever some form of regulatory intervention is chosen, the returns to having a stable cadre of professional regulators with sufficient resources, knowledge, and skill to adapt efficiently to changes in the environment can be substantial.

The regulatory and policy responses subsequent to the 2008 financial crisis and the work in this volume suggest that many of the lessons elucidated here have yet to be fully recognized and embraced. This may reflect in significant part the political economy of regulation. But it may also arise in part from the lack of familiarity with or appreciation of the lessons accumulated in the study of decades of experience with regulation and regulatory reform across a multitude of sectors of the economy. It is our hope that the studies in this volume will help to fill this gap.

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