

**ENERGY INDUSTRIES:
DEREGULATED OR UNREGULATED?***

by

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April 10, 1991

* This paper extends work initiated in *Natural Monopoly Regulation: Principles and Practice*, Cambridge University Press, 1988. The authors would like to thank David Sappington for comments on portions of this paper. The views expressed here do not necessarily represent those of affiliated institutions -- the University of Florida, the University of Wyoming, or Florida's Public Utility Research Center. An earlier version was presented at the Eighth Annual Southeastern Regional Public Utilities Conference, sponsored by the University of Georgia.

Energy Industries:

Deregulated or Unregulated?

Economists and policy analysts have turned their attention to the strengths and limitations of reduced (or partial) regulation in traditional natural monopoly industries. Technological and organizational developments complicate the lives of regulators and open utilities up to new competitive threats and market opportunities. To secure both efficient production and the protection of some customers, regulators may have to move away from traditional rate of return regulation. This article provides an overview of the concepts necessary for analyzing appropriate regulatory responses. It emphasizes that a deregulated industry is not necessarily unregulated.

Evaluating public policy is difficult when that policy has not been carefully articulated or when jurisdictional disputes pit state and federal policy-makers against one another. Surely, unclear policy direction and inconsistencies characterize policies in the fossil, nuclear, and renewables sectors today. One of the key issues is the extent of regulation in these industries. As Sharon Megdal (1989) correctly points out, the term deregulation is tossed around as though its meaning were unambiguous. For some, the term applies to complete removal of price and other restrictions; for others, a reduction in intervention is all that is required for deregulation. It is probably useful to distinguish between a basically unregulated industry, and one undergoing deregulation. Furthermore, for precision, the analyst ought to be specific about which dimension of industry behavior is being deregulated.

The Political Nature of Deregulation

Deregulation is a process. At best, it reflects the view that we seldom know which is more damaging: imperfections and failures in the free market or in regulatory activity. As historical experiences reveal economic and social shortcomings of markets and governments, policymakers alter the preferred mix of exchange and command as determinants of resource allocation. Economists can

assist by ensuring the policy options are carefully articulated and analyzed. However, analysts need to be aware of the political environment: the "ideal" policy (in terms of economic performance) can be the enemy of a "very good" policy.

The "public interest" theory of regulation asserts that government intervention arises as public discontent grows over exchange-determined outcomes. Greer (1987) categorizes the concerns as related to market imperfections, market failures, dynamic incapacities, and ethical concerns. Imperfections are reflected in market power or information inadequacies: the conditions under which buyers and sellers come together deviate from competitive assumptions. Failures refer to externalities, public goods, and common property resource problems--all of which characterize some energy markets. Dynamic incapacities relate to the inability of institutional arrangements to adjust to new situations without causing undue hardship--microeconomic transition costs or macroeconomic instabilities. Finally, ethical concerns often motivate public policy: with the goal being a fair (or less unequal) income distribution, the production of merit goods (such as education), and the achievement of other social goals. Energy researchers have documented the different types of intervention introduced to address these concerns (Pirog and Stamos, 1987).

Our awareness of government shortcomings also changes over time. These limitations include government imperfections, failures, dynamic problems (myopia and delay), and inconsistencies in the application of ethical criteria. Imperfections refer to government as a monopoly, the existence of voter apathy, and persistent ignorance of officials. These problems parallel imperfections observed in markets. Government failures arise when benefit-cost analysis is

misapplied--primarily due to special interest effects, externalities, bundling of policies, and a tendency to impose uniform treatment despite diverse situations. In addition, politicians seeking campaign contributions can benefit by merely threatening to change the rules of the game--affected parties donate to prevent change. McChesney (1987) describes such rent extraction in the context of regulation. He also examines rent creation: laws are hostages, released as the blackmail is paid. Myopia and delay stem from intertemporal inconsistencies, when costs and benefits of policies differ in the long and the short run. Some analysts find that policy cycles follow the election returns: when in doubt, avoid inaction. Finally, the stated goal of fairness is often used to justify price and entry controls, although the actual incidence of the benefits and costs generally differs from popular understanding. Such considerations support the "economic theory of regulation."

Thus, the catch-all phrase "deregulation" connotes a reduction in government-induced inefficiencies, although the imprecision of the term suggests that the specific policy shift remains open to interpretation. Analysts would do well to identify the exact items no longer under the control of government administrators: for example, entry and prices in the airlines industry. Reduced expenditures on oversight activity lead to outright fraud in the savings and loan industry. Yet "deregulation" is a major misnomer, since the remaining "regulation," underpriced deposit insurance, yielded perverse incentives for S&L executives to take on risky projects.

Economists and energy analysts have long recognized the potential for regulation-induced inefficiencies. Research has shown that ideology and impacts on economic interests of politically powerful groups are key determinants of

intervention. For example, Kalt (1982) argues that the "energy crisis" of the 1970s " . . . appears to be primarily a quarrel over income distribution--and U.S. energy policies are the result of this quarrel. . . . Price controls and the Windfall Profits Tax on oil, continued price controls on natural gas, lease moratoriums and other environmental regulatory impediments on coal and the regulatory impasse on nuclear power have all [blocked or created transfers of wealth]," (p. 164). Uslaner (1989) provides additional evidence on the matter, showing how energy policy changes were stymied by the "voting paradox" reflecting multiple issues (eleven, including old gas decontrol and take-or-pay relief) and multiple constituencies (ten, ranging from consumers, regulators, pipelines, distributors, and industrial users to independent producers).

Similar analyses have been performed for environmental legislation affecting the energy industries. Pashigian (1985) and others have found that concerns for job preservation and other direct economic interests greatly influenced votes on the Clean Air Act and other environmental legislation. Joskow and Rose (1989) note that energy industries are especially conducive to regulatory income redistribution. Wealth transfers arise between various consumer groups, are split between various factors of production, and are shared among owners of various firms.

In the area of state public utility regulation, Navarro (1982) has shown that the state's regulatory climate (which affects the firm's cost of capital) is partly determined by ideology: "for an otherwise average commission with no Democratic commissioners, the probability of a very favorable rank rises 12 points and the probability of an unfavorable rank falls by 12 points," (p. 132). Direct election of commissioners increases the probability of an unfavorable

ranking by 41 points. Wealth transfers--generally in the name of "fairness"--are effected through rate design and expense/capacity disallowances. Similarly, Nowell and Tschirhart (1990) found that state regulatory adoption of PURPA standards were functions both of the public interest in economic efficiency and by the power of special interest groups. Clearly, the political economy of regulation represents a fertile field for research.

The Demise of Natural Monopoly Regulation?

Having served as a state regulatory commissioner, Megdal (1989) brings credibility to her call for greater involvement by economists in regulatory dialogues.¹ Like Kahn (1970) and Bower (1987) in New York, Cicchetti (1986) in Wisconsin, Levin in Illinois, and others, she tried to apply the tools of the economist during rate cases and generic hearings. The lessons such individuals can share with practitioners and academics deserve wide dissemination. These policy-makers have confronted the fundamental regulatory dilemmas--drawing boundaries between competitive and uncompetitive markets, and developing incentive systems to ensure least-cost production and the appropriate rate of

¹ Of course, we had better have our own analyses correct if our policy impacts are going to be positive. In her overview of issues confronting regulatory economists, Megdal implied that cost analysis and price signals needed to be different for residential and business customers: "Because businesses (unlike residential users) are allowed to deduct utility and telephone costs as costs of doing business, the real cost recognized by them is less than the price paid." (Megdal, p. 192) However, unregulated suppliers of plastic pipes do not price differently for home repair enthusiasts and commercial builders. We understand that the existence of corporate taxes raises the market price relative to self production--reinforced by personal income taxes. But the existence of this distortion is unlikely to be corrected by fine-tuning utility rate design. Furthermore, the deductibility of energy and telecommunications costs applies to other inputs purchased by businesses. Artificially raising the price of utility services to businesses leads to inefficient input mix choices.

innovation. Given the technological and commercial developments of recent decades, such boundaries are moving targets.

There is a growing consensus that analysts need a comprehensive framework for evaluating regulatory policies towards natural monopolies. The appropriate conceptual apparatus can limit knee-jerk reactions for (or against) different types of deregulation. After all, traditional rate of return regulation is only an institutional mechanism for achieving desirable economic (and social) outcomes. *Partial regulation* is a term that may be an oxymoron, like "jumbo shrimp" or "student athlete." However, we are beginning to see regulators simultaneously relaxing some restrictions while tightening others. Informed policy-makers need to determine whether deregulation or new types of price, quality, and entry regulation are the most appropriate responses to technological and commercial developments in what have been viewed as natural monopolies.

Economic Perspectives on Natural Monopoly

Without some form of intervention, industries with significant economies of scale and economies of scope may exhibit undesirable performance. Prices may be *too high* (reflecting monopoly power in some markets). Prices may be *too low* (implying predatory pricing which discourages economic entry in some markets). Prices may be *too high for some but too low for others* (involving subsidies or undue discrimination). Or prices may be *too unstable* (reflecting destructive competition when capital-intensive facilities are duplicated by entrants). These concerns with the efficiency and fairness of monopoly outcomes are legitimate and stem from analysis of the causes and effects of natural monopoly.

The historical basis for regulation asserts that "...when one firm can

supply the entire market at less cost than can two or more firms..." neither entry nor deregulation could be justified (Lowry, 1973). Economies from jointly producing several products complicates the determination of the least-cost provision of traditional utility services. When firms produce several products, identifying scale economies is problematic because total cost depends on the output mix. The basic efficiency argument for regulation still holds, although subsequent analyses by Baumol (1977) and others have formalized proper tests for determining whether a multiproduct firm is a natural monopolist for a set of services.

The implications of recent formal models for regulation are somewhat mixed. The modern contestable market literature began with Demsetz's (1968) *Competition for the Market* via a franchise. Subsequently, Baumol, Panzar, and Willing (1982) identified the conditions under which potential entry could substitute for regulation. Today, many economists view the *contestability* of a market as determining the need for regulation: potential entrants are viewed as disciplining dominant suppliers in many industries subject to traditional regulation. However, other economists are skeptical of market forces disciplining a dominant firm (Shepherd, 1984). Whether deregulation (and the threat of competitive entry) serves as an adequate substitute for regulation depends on whether there remains adequate pressure for monopoly suppliers to keep prices (and costs) down.

While the economic concepts emerging in the seventies have been made more rigorous by economists, technological developments have made it more difficult to determine the least-cost supplier for combinations of traditional utility services. In addition, strategic behavior by firms and regulators further

complicates causal linkages between industrial structure and market performance. Several issues are at the forefront of current policy debates: how to determine which industry structures (and government policies) best promote new services and production processes, how to identify when a natural monopoly situation exists given changing demands and technologies, how to select price configurations that will both recover costs and encourage efficient consumption choices, and how to ensure that those prices are *sustainable* -- that is, not susceptible to the threat of entry or self-production by current customers. In some cases, a natural monopolist's relatively efficient price structure will not be sustainable in the face of entry -- justifying limitations on the provision of utility services by unregulated firms. Alternatively, a non-natural multiproduct monopolist might be protected from socially desirable entry if regulators maintain inappropriate entry restrictions. Since 1973, technological and organizational changes have induced modifications in regulatory policies towards energy industries. Firms have responded by adopting new price structures, entering new (but related markets), and diversifying into unregulated industries.

Technological Change and Industry Restructure

The driving forces behind deregulation efforts are diverse: a renewed emphasis on perceived indirect costs of government intervention, observed technological changes in energy and telecommunications that alter optimal industry structures, and concern that the substitution of administrative processes for competitive pressures is an inadequate stimulus to innovation. Each of these points is debatable, but they certainly set the stage for current discussions.

Mandated cost allocation procedures, which often accompany rate base regulation, may have greater impacts on efficiency and equity than AJ behavior. Policy analysts are aware of potential indirect costs of regulation. For example, fully distributed cost procedures ignore elasticities and incremental costs, yielding inefficient price signals (Braeutigam, 1980). In addition, opportunities for strategic cost categorization by firms can yield misallocations (Brennan, 1990).

The other two concerns are difficult to evaluate but the potential costs of lost innovations and bureaucratic inertia can be significant. Most important, but difficult to document, is the link between competitive pressures and innovation. Utilities that are insulated from competitive pressures may be outperformed by other firms who ultimately capture segments of what had been regarded as monopoly markets. Electric utilities and gas pipelines can suffer because of regulatory inertia or inadequate cash flows for making necessary investments. In addition, regulatory lags in an inflationary environment or the absence of penalty (reward) systems for poor (strong) performance ultimately hurts consumers. For example, Bower (1987) argues the asymmetric regulatory treatment of investments in excess plant will ultimately force deregulation of the generation phase of the electric utility industry.

Consequences of Deregulation

Applying the concepts of least-cost suppliers, contestability, and sustainability to formulate public policy is problematic, since they represent idealized cases, involve difficult empirical examinations of industry cost and demand functions, and can require forecasts of technological developments and

relative price changes. Nevertheless, the ultimate goal of economists working in this arena is to examine current and future conditions and recommend which industries should be regulated, and which industries (or portions of a vertical chain) should be deregulated. Movements away from traditional regulation are warranted when contestable markets and sustainability ensure relatively efficient outcomes.

Clearly, regulatory decision-makers cannot wait for full information and complete certainty regarding impacts on all affected parties. In the late 1970's and the 1980's, policymakers made many changes in the extent of the regulators' domains, without waiting for unanimity among economists (admittedly an elusive goal) as to the efficacy of such policies. On the one hand are the trucking and airline industries which have been substantially deregulated. Here, there probably is widespread agreement among economists that this policy was proper, since firms in these industries are either not natural monopolies, or the markets are contestable. In fact, deregulation of the airlines is probably one of the crowning achievements of regulatory economic analysis, particularly since it was orchestrated by Kahn under the constant scrutiny of the public (McCraw, 1984).

On the other hand are the telecommunications, railroad, and natural gas industries which have been partially deregulated. The need for deregulation, or at least particular mixes of deregulation activity, was less clear. For instance, deregulation of telecommunications by permitting entry may prove to be wise if technological advances are spurred as a result. But if entry is only due to bad regulatory policies to begin with, viz., regulated prices that involve cross subsidies, then deregulation of entry without allowing for price flexibility by the dominant firm may prove costly. The important point is that

economists must continue to improve their methods for determining where regulation is justified and where deregulation can yield efficiency gains. These determinations will seldom be obvious or go unchallenged. Where price and entry deregulation is implemented, it must be assessed for its success or failure. For example, service reliability must continued to monitored.

Two issues are of particular importance when firms become partially regulated or diversify into potentially competitive markets: (1) What are appropriate ways to allocate shared costs within regulated and diversified firms? (2) What are the implications of selective rate reductions. To these issues we turn.

Diversification and Cost Allocation Regulation

When evaluating the introduction of new product lines by regulated firms, regulators must consider at least four issues: (1) potential for cross-subsidization; (2) effects on other firms; (3) the extent of economies associated with the new product; and (4) dilution of managerial attention and maintenance of utility incentives. The first issue, cross subsidization, can stem from inappropriate allocations of fixed or variable costs or from inefficient investments in joint facilities. Also, transfer pricing which increases the reported costs of the regulated firm might be used to shift profits from the regulated firm to an unregulated subsidiary. This possibility raises a dilemma, since when regulators mandate complete separation among business units, the firm may not achieve economies of scope. Consumers end up paying higher prices.

The second issue, the impact on other firms, raises similar regulatory trade-offs. If high cost suppliers are driven from the market due to entry by

a natural multiproduct monopoly, resource allocation is improved. However, these suppliers may claim predatory pricing if the output is produced by an unregulated subsidiary or by the regulated firm. Producers of substitute products could argue that revenues from the utility's captive consumer groups (or regulated products) cover costs associated with products subject to competition. One must be careful not to accept fully-distributed costs as indicators of subsidization. Furthermore, when a group of firms is under industry-wide regulation and price is based on industry average costs, the presence of high cost firms could increase the profits of efficient suppliers. The removal of such cost-based pricing would reduce prices and lead to bankruptcy or consolidation of inefficient firms. Such a development would again bring forth charges of predation, but these charges would be groundless.

Multiproduct economies are generally the basis for entering new (competitive) markets. Economic gains can arise from underlying technological factors or from demand interdependencies. In the latter case, the addition of a substitute or complement expands the potential application of Ramsey pricing by a regulated firm. If entry barriers can be erected, switching a product from outside to inside the firm's set of offerings can improve welfare. The data requirements for such fine-tuning are substantial, however. Similarly, determining how to share the benefits of jointly used facilities requires that regulators have full information on demand and cost interdependencies as well as the alternative available to various consumer coalitions. Often, the feasible sets of alternative price combinations (and associated "implied" cost allocations) will be quite large, so a wide range of alternative divisions of benefits is possible. This division between the firm and consumers and among consumer groups raises troublesome questions for regulators.

Regarding the fourth issue, those concerned with recent trends towards diversification argue that managerial attention may be diverted from regulated areas, that the financial position of the regulated firm can be weakened, or that regulators lack the resources to exercise adequate supervision over cost allocation and transfer pricing. Kahn (1983) views this objection to diversification as reflecting "...the conservatism and compulsive tidiness of the regulatory mentality... That is a ridiculous way to make public policy -- 'if we can't watch it, we won't let you do it.' The solution to this problem is, surely, to provide the regulatory commissions with the additional resources required," (p. 153-54).

Partial regulation usually comes about in one of two ways: (1) multiproduct firms that are subject to price and entry regulations in all their markets have these regulations lifted in a subset of the markets; or (2) multiproduct firms are permitted to enter new, competitive markets through diversification (often via unregulated subsidiaries). In either case, new policies are required that address the different incentive structures for these partially regulated firms. It is useful to reconsider sustainability as it applies to partially regulated firms, and examine cost allocation procedures which represent a common approach to regulating these firms.

The arbitrary nature of fully distributed cost (FDC) pricing is well documented. A better appellation for many regulatory costing procedures is "fully manipulable cost pricing," where a multiproduct firm is charged with allocating its total costs, including common costs, over its various products in an effort to ensure that revenue from the sale of each product covers its allocated cost (Braeutigam, 1980). The same concept has been applied when a

regulated firm diversifies into unregulated markets. Regulators usually require that the firm separate its regulated business from its unregulated business to ensure that no cross subsidies occur.

Besides potentially leading to undesirable price structures and cross subsidies, there is the danger that costing procedures may foster an unwarranted feeling of accomplishment among regulators. Sweeney (1982) finds that output-based allocation schemes can yield perverse results: we end up with prices such that one or more of them can be lowered to improve welfare without decreasing the monopolist's profit. In addition, we can have relatively high prices in unregulated markets. Sweeney explains these results by noting that because regulated products are permitted to return a "fair return" on shared input, output reductions in unregulated markets allow more of the common cost to be shifted to regulated markets. As a result, greater profits are earned in these regulated markets.

In one sense, these results may appeal to regulators. The prices are high in the unregulated markets, thereby quelling fears of cross subsidies from the regulated markets. Also, competitors in the unregulated markets would be pleased, since the monopolist is apparently not relying on profits from the regulated markets to predatory price in their markets. In the long run, the monopolist's prices could be undercut in at least some of the unregulated markets, perhaps even driving the monopolist out entirely. The advantages of natural monopoly production for multiple markets are then lost, and the regulator's optimism regarding FDC procedures proves short-lived.

If a totally regulated, multiproduct firm is partially deregulated, will it continue with the same set of products? Will it drop some of the products now

subject to competition? Will it diversify into new products? The answers to these questions can be related to conditions of cost complementarity and sustainability, although now we need to examine whether a firm's prices are sustainable under partial regulation. If a firm is a natural monopoly and only some of its markets are contestable, opening all those markets to competition may only mean higher profit for the monopoly--with little, if any, entry. Alternatively, if a firm is not a natural monopoly, or if it once was but no longer is owing to new technologies, then partial regulation should be abandoned in favor of total deregulation.

Impact of Selective Rate Changes

With deregulation, selective rate increases and decreases will differentially affect various consumer groups. Consumers with few substitutes are likely to face higher prices unless potential entry holds prices down. Alternatively, because of previous rate averaging or FDC allocations, consumers who have been subsidizing others in the past will tend to have prices which reflect the cost of serving them. The incidence of winners and losers from deregulation depends on past price patterns and the new options available to suppliers and demanders.

In some cases, deregulation could result in greater inefficiencies than before. For example, if two gas pipelines competed for business in one city, but were monopolists in smaller towns located on other portions of their routes, deregulation could result in selective rate reductions to compete with each other in the city which they jointly serve. Under complete pipeline deregulation, the monopolized markets would face higher prices than before.

Whether deregulation results in a welfare improvement depends on the net impact of price increases and decreases and associated cost changes. Because of declining long run average costs for these pipelines, all prices were not initially equal to marginal costs -- in either the larger city or the small towns. If the regulators initially had complex Ramsey rules in effect, the rules for rivalry among strong natural monopolies require that the price should not be relatively lower in the competitive market. Deregulation could be expected to disrupt the Ramsey pricing, with prices dropping in large city (competitive market) and increasing in the small towns (markets where there are no substitutes available).

Kahn draws several lessons from his analysis of rivalry between firms with similar technologies. First, suppliers with lowest long run marginal cost ought to serve the market. Kahn notes that if all prices cannot be equal to long run marginal cost, the simple Ramsey rule promoting efficiency support selective rate increases to consumers with inelastic demands. However, if competitors have similar cost structures, selective (competitive) price reductions in those markets need not be efficient.

Note that during a regulatory transition, some consumer groups are likely to have sunk costs or commitments tying them to specific vendors for some period of time. Inelastic demands associated with sunk investments at particular locations can be subjected to monopoly exploitation. Ramsey pricing rules based on relative short-run elasticities raise questions of fairness. Claims of injustice arise as price discrimination emerges. As Meyer and Tye (1985) state: "It should never be forgotten that in a market economy, whenever prices for any activity rise disproportionately above the underlying cost fundamentals, business

ingenuity (in the form of new or altered technologies, product and location substitutions, etc.) is quickly applied to finding ways to do with less" (p. 50). They are concerned with price differentials inducing investments that do not prove to be economic in the long run. Thus, they are skeptical of using Ramsey pricing when our knowledge of short and long-run demand elasticities is so limited, particularly when R&D investments will alter those elasticities.

One advantage of deregulation, is that it tends to stimulate cost reductions and encourages the exploration of demand elasticities. The complex Ramsey rules require complete information on cost functions, the direction of technological change, a demand elasticities, and demand growth. Under deregulation, enhanced economic incentives for innovative efficiency can outweigh short run inefficiencies from the behavior described above. With deregulation, identifying which firm (or location) has economic advantages is a task involving trial and error. Unless chronic excess capacity (and duplication of facilities) is likely to result, a strong case can be made that this task be left to the marketplace, rather than to administrative procedures.

Electricity, natural gas, telecommunications, and transportation markets all face some disruptions due to competitive pressures. Cicchetti (1986) has noted the regulators might follow a four-fold approach towards these industries:

- (1) allow competitive entry when efficiencies are not lost by the regulated firm;
- (2) encourage marginal cost pricing, unbundle service offerings, and incorporate peak load and cost-causation considerations into rate designs;
- (3) permit coalitions of consumers or large customers to negotiate

- contracts (so prices take into account long run demand elasticities);
- (4) avoid inefficient wheeling of electricity, by-pass of networks, and carriage of products.

Similarities among industries which have been traditionally regulated suggest that lessons can be learned from deregulation efforts to date. Until recently, the energy, telecommunications, and transportation industries had prices established for bundled services, based on embedded (or historic) costs. The implicit contract between consumers and their traditional supplies involved an obligation to serve and a commitment to continued consumption. Several of these industries had vertically integrated structures involving production, transmission (or carriage), and distribution to final demanders, so deregulation opens up the possibility of entry at various stages of production and raises issues of access to transmission facilities. Also, time-of-use patterns in these industries often reflect sensitivity to weather and economic conditions. When storage is costly, peak demands drive production capacity.

The traditional utility industries also have significant differences. Investor-owned electric utilities have tended to be more vertically integrated than gas deliver systems or transportation companies. The electrics tend to own generation, transmission, and distribution facilities (Joskow and Schmalensee, 1983). Similarly, prior to the AT&T divestiture, vertical integration characterized much of telecommunications. Sunk costs play different roles for the various industries. When such costs are significant, difficult problems are raised by consumers leaving their traditional suppliers who once had an "obligation to serve."

Contractual commitments and traditions of cooperation within the industries

also affect regulatory leverage over the phase-in of competitive pressures. For example, long-term commitments or liabilities affect the industries to different degrees. The Federal Energy Regulatory Commission has abrogated some take-or-pay contracts for gas pipelines, but corresponding contracts for electricity tend to be under state jurisdiction. Similarly, inter-utility coordination and pooling arrangements complicates the introduction of competition into many markets.

Depending on the industry, this issue arises in different degrees. When a vertically integrated firm controls resources or capacity to which another firm would like competitive access, regulators are faced with developing standards for determining the terms for access to a so-called *essential facility*. As Tye (1987) notes, public policy "...has differed significantly, varying paradoxically from mandatory requirements for open interconnection in the once-closed telecommunications industries to an extremely permissive policy by the ICC that has permitted massive cancellations of the open competitive access that previously had prevailed in the rail industry under strict regulation" (p. 337). Electricity transmission facilities and natural gas transmission pipelines are two other examples of facilities for which access issues arise. The efficiency implications of requiring access depend on the degree of monopoly power exercised by the owner of the facility.

In each of these situations, regulatory rules determine the equilibrium output mix and incentives for entry (or exit). In the case of electricity, utilities want to be reimbursed by users of their transmission lines, and view cogenerators and municipal utilities with excess capacity as competitive threats. While some of these suppliers are small (and thus electricity price takers), others are strong natural monopolies locally. Since 1983, the Federal Energy

Regulatory Commission has been experimenting with partial deregulation of price and sales of bulk power in the Southwest. Such interstate deregulation leads to competition and increased wheeling. Studies are under way to determine whether there are net efficiencies from deregulation. In general, access to and payments for transmission services determine the extent of competition. If FDC methodologies are applied to historical (embedded) costs to determine the price of transmission services, the resulting prices will be arbitrary. It is unlikely that appropriate second best outcomes are approximated by current transmission prices. In some situations, efficient production will require the denial of access.

Conclusions

The formulation of appropriate regulatory strategies when product mixes change and new competitive pressures emerge requires substantial information regarding costs and demands. Even if a firm is sustainable under partial regulation, it need not be producing efficiently, earning zero excess profits, or avoiding cross subsidies. Thus, monitoring a partially regulated firm raises a number of problems. For example, a policy of partial regulation may protect a relatively high cost multiproduct firm. Complex allocation procedures for revenues and costs overlay the regulatory process, increasing the possibilities for input and output mix distortions. Potential impacts go beyond inefficiencies associated with variants of FDC pricing.

Potential problems of cross subsidization and predatory pricing mean that regulators will require substantial information to evaluate utility behavior. Thus, price ceilings and price floors represent two instruments during a

regulatory transition to greater pricing flexibility. Determining gains to deregulation requires careful analysis of the cost and price structures that emerge in a competitive environment.

Furthermore, the economist's emphasis on efficiency as the justification for regulation must be tempered by a realization that political constituencies and powerful special interests can dominate regulatory debates. Such considerations are sometimes clothed in concerns for equity, but inappropriate regulation can induce resource misallocations, reducing the gains to intervention. The addition of issues associated with responding to and stimulating technological advance further complicate on-going debates. Regulators have an obligation to monitor changes in output mix, vertical integration, and diversification by regulated firms. But they have to be able to step back to see the big picture: deregulation can make economic sense when the justification for government controls are weakened by economic change.

Although no simple road-map exists for partial regulation or moving to full deregulation, the principles described here serve as guideposts along the way. For example, vertical integration and diversification greatly complicate regulatory oversight responsibilities. Given the complexity of the issues raised by multiproduct firms which are partially regulated, we cannot expect to find simple mathematical formulas which yield conclusions of "yes" or "no" to deregulation proposals. We do know that technological opportunities and demands are changing -- altering the gains to traditional regulation.

A complex set of issues faces electric and gas distribution utilities. Joskow and Schmalensee (1983) document the difficulties associated with establishing competition in the generation of electricity. Given permissive

regulation, technology will determine whether the gains ultimately outweigh the costs of further pricing and entry flexibility. Conservation subsidiaries, cogeneration ventures, nontraditional product lines, and independent power producers are raising further questions for regulators. The principles discussed here (and the associated references) serve as a starting point for considering the extent to which monopoly expansion into nontraditional product lines will require greater emphasis on nontraditional regulation.

The fundamental distinction between a unregulated and a deregulated firm is that the latter, in fact, is undoubtedly regulated to some degree. The objective conditions that lead to deregulation often arise as contestability becomes possible--due to technological change, the availability of substitutes, and demand growth. Yet, not all stages of production are likely to experience the same changes. Politicians and regulators will be aware of bottlenecks, market power vis a vis core customers, income distributional concerns, and other features of industrial structure, behavior, and performance. To be politically acceptable, and economically sound, some forms of intervention (or at least oversight) will continue. The task facing energy analysts is how to develop specific constraints and oversight procedures which allow us to take advantage of market processes, without introducing so much regulatory discretion into the system that the benefits are dissipated in corporate gaming and political opportunism.

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