MARKET-BASED RATES FOR INTERSTATE GAS PIPELINES: THE RELEVANT MARKET AND THE REAL MARKET

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I. INTRODUCTION AND PURPOSE

Under a cost-of-service regime, regulators can set a utility's rates without any explicit reference to markets.[1] Employing data on costs the utility expects to incur or has incurred, regulators use economically dubious formulas to allocate these costs to individual services and to set rates that recover the reported amounts.[2] Generally, regulators need not make conjectures about the products and terms of service the utility would offer if regulation vanished, or about the speed at which competitors might enter an unregulated market. More important, regulators need not base any of their decisions on estimates of the utility's prices in an unregulated market. An oft-asserted norm asks regulators to set prices and outputs at the levels that would arise in a competitive market.[3] This norm is often without operational content and may often be incorrect as well. Perfect competition would usually be an inefficient as well as infeasible arrangement in industries where individual sellers enjoy substantial economies of scale.

We will only know competitive prices when competition arrives. A regulated price set at historical cost will only by accident also be the unregulated price in a competitive market. Economics provide no expectations that a deregulated competitive producer will have the same earnings as it would under even the most competent cost-based regulation. It is a fundamental error to confuse the costs on which buyers and sellers make market decisions with the costs on which regulators must base their decisions. Because historical costs bear no necessary relation to today's opportunities, they are irrelevant as guides for economically rational decisions. Market actors look forward, because future costs are the only ones that are avoida-

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1. Regulators must, however, acknowledge that the regulated firm's costs are determined in markets where it must bid against other purchasers of inputs into production.

2. For a discussion of the arbitrariness of regulatory allocations of cost, see William J. Baumol et al., *How Arbitrary is "Arbitrary"? — or, Toward the Deserved Demise of Full Cost Allocation,* PUB. UTILS. FORT., Sept. 3, 1987, at 16, 16-19.

3. *See, e.g.*, WILLIAM J. BAUMOL & J. GREGORY SIDAK, TRANSMISSION PRICING AND STRANDED COSTS IN THE ELECTRIC POWER INDUSTRY 21-23 (1995). *See also* Northern Natural Gas Co. v. FPC, 399 F.2d 953, 959 (D.C. Cir. 1968).

ble by changing today's decisions. Regulators look backward, calculating what must be collected today in order to recover past outlays.[4]

The gas industry's past provides one outstanding example of the importance of disregarding historical costs. Hardly anyone today applauds either the efficiency or the equitability of the Federal Power Commission's (FPC) regulation of wellhead prices between the 1950s and the 1970s.[5] Having been ordered to set maximum wellhead prices, the FPC used established cost-of-service techniques.[6] The FPC examined the costs a producer had incurred on a well or field (including the cost of replacing exhausted supplies) and then set a gas price that would recover those costs. By setting the price to recover recorded production and exploration costs, the FPC succeeded in creating an interstate shortage. The misallocations that stemmed from the shortages were surely more inefficient than whatever imperfections existed in a wellhead market that most observers agreed was competitive.[7] Purchasers with access to controlled gas used it more than they would have if faced with the opportunity costs embodied in market prices. Producers, whose resources could have been valuably employed in exploration, allocated them elsewhere. Prospective users wasted resources in attempts to influence politics and regulations to obtain priority for allocations resulting from the shortage.

In retrospect it is easy to discern the regulatory mistakes that caused the wellhead market to malfunction under price controls, and to understand the desirability of "market-based" field prices. By forcing prices to equal a figure that they called cost, regulators produced an outcome that was far from competitive. Today, the FERC uses historical cost to set interstate pipeline rates, but allows pipelines with excess capacity to discount below cost-based ceilings. If rate regulation is abandoned, the price of a given service will equal today's regulated price only by coincidence, regardless of whether the new market is competitive or monopolized. Prices of services that are in short supply relative to demand (possibly because of regulatory policy) will rise to levels above booked costs and prices of those that are being overproduced under regulation will fall below those costs.

One can evaluate a market's performance only with reference to a well-specified alternative. Perfect regulation is not a reasonable alternative to an imperfect market, and vice versa. A market may fail to perform competitively because an unregulated monopolist seeking private benefits controls the price in it. The market may also fail because a regulatory commission with the best of intentions sets economically inefficient prices

4. If regulators accept forecasts that the future will differ substantially from the past, they may allow automatic adjustments or costs projected on the basis of a "future test year."

5. For the history of wellhead regulation and its consequences, see Richard J. Pierce, Jr., *Reconstituting the Natural Gas Industry from Wellhead to Burnertip*, 9 ENERGY L.J. 1 (1988); ARLON R. TUSSING & CONNIE C. BARLOW, THE NATURAL GAS INDUSTRY: EVOLUTION, STRUCTURE, AND ECONOMICS 59-114 (1984).

6. Phillips Petroleum Co. v. Wisconsin, 347 U.S. 672 (1954).

7. Even if there were compelling reasons in equity to transfer wealth from producers to consumers, less disruptive methods were certainly available to effect the transfer.

based on historical cost. The relevant comparison is between imperfect markets and imperfect regulation. Comparing imperfections is important because markets and regulation have differing dynamics: An inefficiency in a market invites someone to profit by removing it, as when a new competitor goes up against an incumbent monopolist. If the wellhead price control example is general, an inefficiency in regulation is more likely to encourage parties to seek transfers of wealth from one another than to seek profits by proposing an efficient alternative.

II. ECONOMIC AND ANTITRUST MARKETS

A. Some Economics

In an economic market, potential buyers and sellers compare their valuations of a good in order to make the exchanges that best advance their individual interests.[8] Markets lower the cost of acquiring information because they are centralized points for comparing the offers of numerous possible trading partners. A market may be a location like a commodity exchange, or it may be a communications network such as traders use for spot gas. As people compare offers, "prices of the same goods tend to equality with due allowance for transportation costs."[9] The limiting case of a "perfectly competitive" market faces all participants with the same price. For all but the most standardized of commodities, however, perfect competition is at variance with the complexity of actual trading. One can better characterize participants in real-world markets as forming contracts rather than trading goods. The contracts they arrive at will vary with their individual situations, including their expectations and their available information. In a contract market, interpreting the convergence of price to one value as "perfection" may be quite misleading. There may simply be too great a diversity of possible services and contract terms to reach a uniform equilibrium.

By an economic standard, the market that matters for natural gas policy is a broad market for contracts. In Section IV below, we provide data which indicates that the gas market is becoming more competitive as institutions that facilitate transaction developments, and as open access pipelines afford more trading opportunities over an interconnected network. In this market, gas flows and contract terms adjust to eliminate opportunities to profit by arbitraging price differences. The growing connectedness of the market broadens the range of potential trades a buyer or seller can execute. An agent with more options cannot be worse off than with only a subset of them, and that agent may find opportunities in the larger set which are superior to those in the smaller subset. In economic jargon, the efficiency of the market increases as new trades become feasible. Holding the same collective resources as before, buyers and sellers can make mutually advantageous trades that were infeasible when the market was narrower. A less efficient market contains more obstacles to beneficial

8. ARMEN A. ALCHIAN & WILLIAM R. ALLEN, UNIVERSITY ECONOMICS 56 (3rd ed. 1972).
9. ALFRED MARSHALL, PRINCIPLES OF ECONOMICS 324 (9th variorum ed. 1920).

exchanges. Those obstacles might be informational (not knowing that a trading partner exists), or physical (no pipeline links the buyer and seller). They might also stem from monopoly or regulation.

By withholding capacity, a pipeline monopolist decreases market efficiency, since withholding capacity drives a price so high that gainful exchanges go unmade and usable capacity goes unused. The economic objection to monopoly is unmade exchanges, not high profits.[10] A regulated price which does not equal the competitive price can likewise render efficient exchanges impossible. For example, a ceiling price that is set too low will discourage economically warranted investments in supply and may ration the good to buyers who do not value it highly. Regulation may give rise to other inefficiencies, for instance, when a seller who is insulated from competition loses the incentive to effectively monitor its costs and thereby wastes scarce resources. The economic debate over deregulation is largely over a factual matter: Do the misallocative effects of unregulated monopoly (or monopoly subject to antitrust) exceed the misallocative effects of regulation?[11]

B. Some Antitrust

1. The Guidelines' Standards and the Clayton Act

Antitrust deals with the anticompetitive effects of the acquisition or exercise of market power. Its doctrines and analytical methods are the foundation for the FERC's policies toward competition. In Market-Based Rates (MBR) proceedings, the FERC often employs the same tools that the Department of Justice (DOJ) and the Federal Trade Commission (FTC) use to examine horizontal mergers under the Clayton Act.[12] This law calls on the government to halt monopolization in its incipiency, specifically by prohibiting mergers and acquisitions which "may . . . substantially . . . lessen competition," "in any line of commerce . . . in any section of the country."[13] To fulfill that mandate, the antitrust agencies have produced Merger Guidelines outlining their preferred economic model and the numerical thresholds that will bring a merger into question.[14] The process

10. The capacity will not be wasted if the owner can discriminate among customers, offering otherwise unused capacity at low prices while extracting high prices from those willing to pay.

11. Economists' interest in these so-called deadweight losses (losses of exchange value gained by no one) may not be commensurate with their empirical importance. A franchised seller, for example, may waste substantial wealth (possibly up to expected monopoly profit) competing against other applicants (who are also wasting wealth) to obtain the franchise. For theory and empirics of this phenomenon see Richard A. Posner, *The Social Costs of Monopoly and Regulation*, J. POL. ECON., Aug. 1975, at 807, 827; Thomas W. Hazlett & Robert J. Michaels, *The Cost of Rent Seeking: Evidence from Cellular Telephone License Lotteries*, 59 S. ECON. J. 425, 425-35 (1993).

12. Clayton Act, 15 U.S.C. § 12(a)(1988).

13. 15 U.S.C. § 18 (1988). The Hart-Scott-Rodino Antitrust Improvements Act of 1976 allowed the government to challenge most mergers before the fact. 15 U.S.C. § 18(a) (1988).

14. The Guidelines have evolved since their 1982 unveiling, but their analytical methods and numerical criteria are little-changed. *U.S. Department of Justice Merger Guidelines*, 4 Trade Reg. Rep. (CCH) ¶ 13,101 (1984) [hereinafter *Merger Guidelines 1984*]; *Merger Guidelines*, 49 Fed. Reg. 26,823, *reprinted in* 4 Trade Reg. Rep. (CCH) ¶ 13,102 (1984); *U.S. Department of Justice Horizontal Merger*

begins with the definition of a "relevant market" in which the merger may affect competition, and then examines the merger's effect on seller concentration and price in that market.[15] In practice the Merger Guidelines are a preliminary screen. Since economics offers few unambiguous standards for market delineation, the authorities invariably go beyond the numerical standards of the Merger Guidelines to examine institutional details of the market before deciding the legality of a suspect merger.

Their screening decision can go wrong in two ways: it may allow an anticompetitive merger to go forward, or it may prohibit a procompetitive merger. The Merger Guidelines appear to encourage erring on the side of caution.[16] Specifically, they ask if the merger is likely to produce a "small but significant and nontransitory" price increase in the relevant market.[17] The Merger Guidelines define this as a 5% increase that persists for a year.[18] The economic standard for a beneficial merger is that the cost savings to the merging parties exceed the allocative inefficiency that results if post-merger market output falls.[19] By the economic standard, the Merger Guidelines' price increase rule can lead to incorrect decisions: A merger might produce great cost savings but still lead to an increase in price. Despite the differences, the economic standard and the Merger Guidelines' standard share an important attribute: There is no known method that reliably predicts whether a proposed merger will be beneficial under either of them.

The "relevant market" of the Merger Guidelines is the smallest group of products (and producers) which if controlled or coordinated by a single entity could profitably impose a significant and nontransitory price increase.[20] The price increase standard errs on the side of pessimism. Sellers in the post-merger market (including non-merging firms) might form an overt or a tacit collusion that could act like such a monopolist, but this need not be the outcome. Beyond the threat of antitrust, the colluding parties must be able to deter members from price-shading that is individually profitable but decreases the group's profit. Without such enforcement, the collusion deteriorates into competition. More importantly, collusion is only

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Guidelines, 57 Fed. Reg. 41,552, *reprinted in* 4 Trade Reg. Rep. (CCH) ¶ 13,104 (1992) [hereinafter *Merger Guidelines 1992*].

15. For a comprehensive survey of the topic, see Gregory J. Werden, *The History of Antitrust Market Definition*, 76 MARQ. L. REV. 123 (1993).

16. For a description of how numerical criteria affect the tradeoff between the two errors, see John R. Morris & Gale R. Mosteller, *Defining Markets for Merger Analysis*, 36 ANTITRUST BULL. 599, 622-32 (1991).

17. *Merger Guidelines 1992*, *supra* note 14, § 1.0.

18. *Merger Guidelines 1984*, *supra* note 14, § 2.11. The standard is a policy choice that does not stem from any theoretical importance of the numbers chosen. Both the deadweight loss and the potential price increase depend on elasticities of supply and demand that relevant market definition does not account for explicitly.

19. Oliver E. Williamson, *Economies as an Antitrust Defense*, 58 AM. ECON. REV., Mar. 1968, at 18, 18-36.

20. *Id.* In a merger case, only a likelihood, as opposed to a certainty, of the price increase need be shown. Brown Shoe v. United States, 370 U.S. 294, 323 (1962); United States v. General Dynamics, 415 U.S. 486, 505 (1973).

one of many possible paths the market might take. A market that has experienced mergers might with equal plausibility be more competitive than it was prior to the mergers. The enlarged firms in the new market may have the resources and the risk-bearing ability to compete more vigorously and innovate more extensively than when they were small. Depending on the freedom to act as individual sellers and the expectations that those sellers have of one another's responses, almost any outcome is possible.

2. Bounding the Market - Product and Geography

Sellers in a relevant market that includes good X have power over price only if buyers have few choices other than living with high prices. If buyers can easily purchase close substitutes for X at attractive prices, the relevant market for a merger of two producers of X contains the two producers themselves, other producers of X, and producers of the substitutes. If consumers can substitute for good X, a monopoly in X alone is not worth having because the monopolist cannot exert power over the price. To successfully impose the price increase, producer(s) of X must combine or collude with producers of the substitutes. Economic theory suggests the cross-elasticity of demand as a measure of interproduct substitutability by buyers.[21] Because antitrust enforcers generally lack the data needed to accurately compute cross-elasticity, qualitative judgments must usually supplement any calculations. Sources of such judgments can include documents (Whose prices does X look at when deciding on its own price?) or statistical observations (Do many pipeline users move between firm and interruptible service as their relative prices vary?). Statements by buyers about how they will react to price changes often bear no relation to their actual behavior when changes occur.

Substitution from the supply side also constrains a producer's or group's ability to raise prices. When buyers substitute against newly monopolized good X, they increase the profitability of producing substitutes for it. If producers of substitutes respond quickly and substantially to the increase in X's price, they are in the relevant market along with the producer of X. The responsiveness of producers of substitutes lowers the likelihood that the producer of X can impose the requisite price increase in the broader market. As with substitution by buyers, lack of data with which to predict producer responses necessitates the introduction of less quantitative judgments. To estimate supply substitutions, the economist must identify existing producers, including those who do not currently produce the substitute, who will respond to the monopolization of X by increasing output substantially. Identifying such entrants may be highly conjectural, although history might provide examples of the sources of increased output following similar market changes.

21. The cross-elasticity of demand for A with respect to the price of B is the percentage change in purchases of A when the price of B changes by one percent, all else equal. High values indicate easy substitution between the goods. See generally RICHARD A. POSNER, ANTITRUST LAW: AN ECONOMIC PERSPECTIVE 125-30 (1976), for details and critiques of its use.

If competition is not to be harmed anywhere, an analyst must also examine the market's geography. Monopoly power exists within an area if the producers located there can hypothetically act to impose a price increase of the requisite size and duration.[22] Their power depends on the availability of economic substitutes. Those substitutes might be shipments from outsiders who are induced to move goods into the area when price in it increases. The substitutes may also be produced locally by firms who can switch outputs, or by newly formed firms. The market's geographic scope then depends on elasticities of supply inside and outside of the region, and on the costs of moving the good over the boundary.[23] One frequently cited (and vague) standard requires that little of the relevant good moves into the area from outside, and little of it moves out of the area from inside.[24] There may be no reasonable product flow bounds on a geographic market, as might happen when the availability of imports to substitute for domestic production creates a worldwide market. Geographic markets are often important in analyzing the options of those who must use an "essential facility," such as a pipeline that delivers to a certain city gate.

C. *Market Concentration and Market Power*

The theoretical monopolist who takes over a competitive market will lower output, raise the price, and possibly exclude sellers who wish to enter and compete in it.[25] Since such clear monopolizations seldom occur, the antitrust agencies typically face harder questions. They must, for example, decide whether a questioned merger, short of a monopoly, will significantly increase the price-setting power of the merging firms, and analyze how the merged firm's competitors (possibly including new entrants) will respond. Economics provides numerous theoretical models of competitive responses in situations where sellers have some market power.[26] Not one of those models, however, is a clear conceptual or empirical winner for determining the effects of a merger on price in the market where the merging parties operate. The lack of a dispositive paradigm also confounds the comparison of similar markets with different supplier structures, e.g., an origin/destination pair linked by two pipelines with a similar pair connected by three of them.

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22. The geographic market should consist of an area in which the defendants operate and which the plaintiff can reasonably turn to for supplies. Tampa Elec. Co. v. Nashville Coal Co., 365 U.S. 320, 327 (1961).

23. Elasticity of supply is defined as the percentage response of output in a market for a one percent increase in market price. Note that this definition loses value if producers have power to set the price.

24. Kenneth G. Elzinga & Thomas F. Hogarty, *The Problem of Geographic Market Delineation in Antimerger Suits*, ANTITRUST BULL., Spring 1973, at 45, 45-81.

25. If it is feasible, price discrimination will raise profits above those achievable under a single-price policy, and will also yield a smaller shortfall from the market's former competitive output. We do not consider price discrimination further in this section.

26. *See, e.g.*, PHILIP AREEDA & LOUIS KAPLOW, ANTITRUST ANALYSIS (4th ed. 1992); William M. Landes & Richard A. Posner, *Market Power in Antitrust Cases*, 94 HARV. L. REV. 937 (1981); Comment, *Landes and Posner on Market Power: Four Responses*, 95 HARV. L. REV. 1787, 1848 (1982).

To see the possible range of market outcomes under differing supplier structures, it is helpful to first characterize seller concentration. A monopolist has a market share of 100%.[27] In a perfectly competitive market, each seller is a price-taker, so small that its own production decision cannot affect market price. The dominant firm with a competitive fringe has a market share determined in part by the size of that fringe and its aggregate response to the dominant firm's decisions.[28] When several sellers are large enough to affect market price, economists often summarize their relative sizes in a Herfindahl-Hirschman index (HHI).[29] The HHI is the sum of squares of all sellers' market shares, expressed as decimals. A market whose two sellers control 80% and 20% shares has HHI = $.80^2 + .20^2 = 0.68$, and a market with N equally-sized firms has HHI = 1/N. In a monopoly market, HHI = 1, and as the number of equally-sized sellers increases without limit, HHI approaches zero. This limit rationalizes its use as a measure of competitiveness. Further, the HHI gives disproportionate weight to sellers with higher market shares, consistent with a possible intuition that the total market power of two large and equally-sized firms will more than double if they merge. Currently, the authorities usually approve mergers in markets whose post-merger HHI will remain less than 0.18, unless special circumstances prompt further investigation.[30]

The HHI alone is an insufficient basis for inference about the effects of market concentration on price or profits. An economist also requires information about how sellers are expected to respond to one another's decisions. If one seller chooses to change output or price, the best responses of other sellers will often entail changes of their own. The Merger Guidelines seek to determine whether after a merger the aggregate of these responses yields a new aggregate output which is small enough to be saleable at five percent above the pre-merger price. Each seller's decision depends on its beliefs about how rivals will respond, as summarized in the economic concept of "conjectural variation."[31] To explicate conjectural variation, it is possible to derive a simplified theoretical relationship that links a market's price-cost margin, the elasticity of market demand, the HHI, and the conjectures sellers hold about one another.[32] Let all sellers in the market have the same constant unit costs, c, and let each hold the same conjectures about the reactions of others, measured by a positive

27. We are assuming that the monopolist either faces no potential entrants or that it chooses price in disregard of their likely reactions.

28. Landes & Posner, *supra* note 26, devote much of their theoretical analysis to markets of this type.

29. *See, e.g., Merger Guidelines 1992, supra* note 14, § 1.5 (1992); *ANR Pipeline Co.*, 56 F.E.R.C. ¶ 61,293 (1991). In this gas inventory charge (see section B *infra*) proceeding and others, the FERC chose a ten percent threshold price increase, for reasons that are unclear.

30. *Merger Guidelines 1992, supra* note 14, § 1.51 (1992). Mergers that produce a post-merger HHI exceeding 0.18 are subject to case-specific investigation. Algebraically, an HHI exceeding that value arises in a market with approximately five equally-sized sellers.

31. DENNIS W. CARLTON & JEFFREY M. PERLOFF, MODERN INDUSTRIAL ORGANIZATION 229-80, 382-430 (2nd. ed. 1994).

32. Robert D. Willig, *Merger Analysis, Industrial Organization Theory, and Merger Guidelines, in* BROOKINGS PAPERS ON ECONOMIC ACTIVITY, MICROECONOMICS 1991, at 281, 287.

number β (see below). Elasticity of demand in the market is denoted ε, and there are no actual or potential suppliers outside of this market.[33] If each seller seeks to maximize profit, the percentage margin of market price (P) over cost is given by

$$(P - c)/P = H\beta/\varepsilon.$$

If other factors are unchanged in the above expression, the price-cost margin in the market is greater, the higher is the HHI and the lower the elasticity of demand. If the values of other terms are known, one can compare pre-merger and post-merger market margins (e.g., against a five percent standard) by calculating them for the pre-merger and post-merger values of H.

The merger's effects depend critically on the conjectural term β. The economically meaningful limits for β lie between those of perfect competition and perfect collusion. It can be shown that if $\beta = 0$, sellers are acting as if they were price-taking perfect competitors, even though each individually is large enough to influence price. The industry's margin over cost is zero, and a merger between two sellers would not raise profits or prices.[34] No matter how many or how few sellers there are in the market, a merger between two of them will be of no economic consequence if they hold such beliefs about one another. At the other limit, if $\beta = 1/H$ for all sellers, they are behaving like the members of a perfect collusion, sharing joint profits equal to those of a monopolist who controlled this market's entire supply.[35] A merger of two colluding sellers will not affect the market's monopoly-level price-cost margin. For any conjecture between these extremes, a merger short of monopoly will affect H, and hence market price. In a theoretically important case, if $\beta = 1$, each seller is said to hold "Cournot-Nash" conjectures about the others.[36] Each Cournot-Nash seller chooses output in the expectation that others will not change their outputs in response. The other sellers may in fact respond, but the Cournot-Nash market generally settles at an equilibrium whose output and price lie between those of perfect competition and pure monopoly or collusion. In a Cournot-Nash market, total output approaches the perfectly competitive level as the number of sellers increases.

While the algebra provides some insights, data requirements make it difficult or impossible in practice to predict the effects of a merger. First, the algebra presupposes that the market has been correctly defined. Using different products or geography will affect the spectrum of substitutes, and hence the elasticity of demand on which the price-cost margin depends.

33. Elasticity of demand measures the price sensitivity of buyers. It is the percentage change in the aggregate quantity they will purchase when faced with a one percent change in price. Higher absolute values indicate greater responsiveness.

34. Costs here include the "normal" profit foregone by investors who have chosen to place their capital in this industry rather than their best expected alternative.

35. This can be seen by noting that in a monopolized market H = 1 and conjectural variation is irrelevant because the monopolist has no rivals.

36. If sellers hold expectations about one another that are at variance with actual behavior, the theoretical difficulties become virtually intractable. *See*, DENNIS W. CARLTON AND JEFFREY M. PERLOFF, MODERN INDUSTRIAL ORGANIZATION 248-69 (Harper Collins, 2d ed. 1994).

Secondly, if sellers' costs differ or if those costs vary with output, inferences are more complicated. Third, conjectures are an empirical mystery. Economists have made only a handful of attempts to measure them in specific industries, and there is little agreement among the estimated values. If conjectures are not known, the seeming precision of an algebraic analysis of market power deteriorates into guesswork. Analytical simplicity makes Cournot-Nash conjectures a popular theoretical assumption, but there are no persuasive reasons to expect that real-world producers hold such beliefs about one another.[37] The modern economic literature has thrown up a plethora of models for oligopolies, while providing little guidance for empirical predictions of industry behavior.[38] Moreover, competitive strategies involve choices and reactions on numerous dimensions, including product characteristics, discounting policy, distribution methods, inventories, capital investment, and the vertical scope of operations.

Inferences from the algebra also require an assumption that the number of sellers in the market is fixed.[39] Entry that occurs in response to the higher price engendered by a merger will mitigate the merger's adverse effects. Empirically, it is generally difficult to estimate the likely volume of entry. Even if entry is estimable, however, there is no generally accepted economic theory of how incumbent sellers will behave when faced with it.[40] A producer in the market model that underlies the Merger Guidelines can further choose an output level at which some of its capacity remains idle, if doing so is most profitable. If a producer must offer all of its existing capacity to buyers, as is the case for open-access pipelines, monopolistic outcomes that result from restriction of output become unlikely.

Perhaps the most problematic aspect of the HHI approach is its empirical irrelevance. Economists have failed to find any evidence of a critical HHI above which one can reasonably suspect that overt or tacit collusion will arise.[41] If there is no critical HHI that breaks markets into those with high and low likelihoods of collusion, rational merger policy (and pipeline MBR policy), cannot employ the HHI even as a preliminary screen. Using the HHI as a screen is equivalent to a once-and-for-all random draw that chose 0.18 as a dividing line. Nor can the HHI be saved by appealing to a prior generation of econometric studies that attempt to relate profits and

37. For examples of the theoretical usefulness of Cournot-Nash, see Joseph Farrell & Carl Shapiro, *Horizontal Mergers: An Equilibrium Analysis*, 90 AM. ECON. REV. 107, 126 (1990). If demand is linear and marginal costs are constant, a Cournot-Nash market containing N firms produces (N-1)/N percent of the output of a similar perfectly competitive market.

38. For two views, compare Franklin Fisher, *Games Economists Play: A Noncooperative View*, RAND J. ECON. 113, 124 (1989) with Carl Shapiro, *The Theory of Business Strategy*, RAND J. ECON. 125, 137 (1989).

39. The assumption may not be reasonable. If all sellers have identical costs, as postulated in the equation, it may well be possible to easily open a firm with similar costs that will enter the market and affect the price-cost margin.

40. *See* CARLTON & PERLOFF, *supra* note 36, at 382, 415.

41. Noel D. Uri & Malcolm Coate, *The Department of Justice Merger Guidelines: The Search for Empirical Support*, 7 INT'L REV. L. & ECON. 113, 120 (1987).

seller concentration.[42] Even if such statistical relationships are significant, there are equally plausible models in which efficiently functioning markets, rather than collusions, give rise to a positive relationship between concentration and profits.[43]

D. Regulation and Concentration

In unregulated industries, some models of seller behavior (e.g., Cournot-Nash) conclude that a market with a lower HHI performs less monopolistically than an equivalent one with a higher HHI. In regulated industries, few if any models produce such a conclusion.[44] The regulated firm may be a natural monopoly whose cost of serving a typical customer falls as the firm grows. If competition is imposed on such a market, none of the competitors will enjoy costs as low as those of a single large server. Here, economic efficiency falls as market concentration falls. Regulation may be necessary to ensure that a single seller serves all who are willing to pay its cost of serving them.[45] Whether a single server is regulated competently, poorly, or not at all, however, the HHI in its territory for its product will equal 1.0 and be unrelated to the quality of the server's performance. A regulated utility with an obligation to serve cannot restrict output to earn supernormal profits.[46] If regulators require it to serve some customers at rates that do not recover cost, its 100% market share indicates a lack of market power. Competition to provide a regulated service can only occur with the approval of legislators and regulators.[47] They may constrain

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42. The mass of empirical studies on concentration-profits and concentration-performance relationships (in unregulated industries) also provides little rationale for the FERC to rely on concentration measures, even as a preliminary screen. A comprehensive survey (cited in the Staff's 1993 bibliography) concludes:

> [Concentration] profit studies had been the mainstay of industrial organization research for more than two decades, but they are now largely discredited. The numerous studies of the relationship between price and concentration within particular industries tended to find the relationship to be positive and statistically significant but typically not particularly important quantitatively.

GREGORY J. WERDEN, ANTITRUST DIV., U.S. DEP'T OF JUSTICE, A REVIEW OF THE EMPIRICAL AND EXPERIMENTAL EVIDENCE ON THE RELATIONSHIP BETWEEN MARKET STRUCTURE AND PERFORMANCE, ECONOMIC ANALYSIS GROUP DISCUSSION PAPER EAG 91-3 (1991). This document does not necessarily reflect the views of the Department of Justice.

43. Harold Demsetz, *Industry Structure, Market Rivalry, and Public Policy*, 16 J.L. & ECON., April 1973, at 1, 10; Sam Peltzman, *The Gains and Losses from Industrial Concentration*, 20 J.L. & ECON., Oct. 1977, at 229, 264.

44. For more general discussions of antitrust in regulated industries, see Keith S. Watson and Thomas W. Brunner, *Monopolization by Regulated 'Monopolies': The Search for Substantive Standards*, 22 ANTITRUST BULL. 559 (1977); Andrew N. Kleit & Robert J. Michaels, *Antitrust, Regulation, and Rent-Seeking: The Past and Future of Otter Tail*, 39 ANTITRUST BULL. 689, 725 (1994).

45. This statement presupposes that the server cannot price discriminate so that each customer becomes a profitable addition to its clientele, in which case all those who would be served under the regulation will also be served in an unregulated market.

46. Service obligations do not necessarily preclude such other inefficiencies as failing to produce at the lowest possible cost.

47. The regulated firm may compete for consumer dollars with unregulated sellers who produce substitute goods that are not in the regulatory jurisdiction. When regulators control their domain, they also indirectly control its competitive posture toward unregulated sellers.

competition, sometimes for the best of reasons, by regulating price, output, service offerings, quality, territory, capital investment, and the entry of competing servers. Regulation of these dimensions of service can also affect the HHI in the regulated firm's markets.

If regulated entities can compete for the right to offer service, measures of concentration are doubtful indicators of competition or its desirability.[48] Most cities, for example, can choose between corporate and municipal gas and electric distribution utilities.[49] If only one entity can hold the franchise and the city limits define the geographic market, whoever serves at the moment has a 100% share of it. That share tells nothing about the server's efficiency or about the strength of potential competition for the franchise. Alternatively, a city may be surrounded by a large corporate utility whose territory is deemed to define the market. If the city cannot serve outside of its limits, its share of sales in this market can never exceed a few percent, regardless of its competitiveness. In markets for utility services, competitors may operate under substantially different constraints. An unregulated municipal utility may be able to price its services more aggressively than a regulated corporate system. The corporate utility may have "supplier of last resort" obligations that require it to serve loads in a municipal utility's territory that the city finds unprofitable.

Even if multiple servers are simultaneously possible, concentration statistics in utility markets may mislead. If entry is suddenly allowed into a franchise market that formerly had a single server, the "share" of entrants will be small at the outset for reasons unrelated to the behavior of the franchised seller. Alternatively, if the incumbent seller is acting anticompetitively toward the entrants (e.g., because it denies them access to a facility that is essential if they are to compete) an HHI will not help in identifying that exclusion or inferring its likelihood. The speed with which seller shares change may also depend on regulation. If entry is allowed but prices are regulated, a new seller may be unable to discount rates below current costs in hopes of expanding quickly. If every one of fifty franchised taxi companies in a city must charge the same fare, adding an additional provider decreases measured concentration but has few other effects on competition.[50] If existing regulated sellers gain the right to MBRs, inferences from their "shares" may be tenuous. Open access rules may prevent

48. Some economists endorse franchise competition as a method by which a jurisdiction's residents can capture the cost savings of natural monopoly for themselves by taking competitive bids. *See* Harold Demsetz, *Why Regulate Utilities?*, 11 J.L. & ECON., April 1968, at 55, 66. Others believe that the contracting process itself may be too costly relative to the expected benefits, and that it will invite opportunistic behavior by both the government and the incumbent server. *See, e.g.*, Oliver Williamson, *Franchise Bidding for Natural Monopolies—In General and with Respect to CATV*, 7 BELL J. ECON., Spring 1976, at 73, 104.

49. In reality, electricity franchises seldom turn over, and some franchise changes reflect no more than the effects of tax-exempt finance and the preferential availability of inexpensive federally-produced power to municipal utilities. *See* Robert J. Michaels, *Deregulating Electricity: What Stands in the Way*, 15 REG., Winter 1992, at 38, 47.

50. The quality of service might change, e.g., if after entry the typical customer has a shorter wait for a taxi. This outcome, however, would also occur without changing the HHI if each existing company expanded its fleet.

them from withholding capacity from customers, in which case a high HHI will overstate market power. Alternatively, regulators may prohibit the entry of new competitors while allowing incumbents to withhold capacity. Here, the HHI will probably understate market power. The plausibility of any prediction about deregulation depends heavily on the details of the scheme.

III. Relevant Markets and Market Power at The FERC

The FERC has examined antitrust markets in numerous electricity, gas and oil pipeline proceedings. In nearly all of these diverse dockets, it has employed a single basic model. The method borrows heavily from the supply structure analyzed in the Department of Justice's (DOJ) delineation of the relevant market in *Otter Tail Power Co. v. United States.*[51] This method has guided the Commission in dockets extending from electrical transmission foreclosures in the late 1970s to interstate pipeline MBRs in the mid-1990s. We begin with an overview, not intended as a detailed history, of *Otter Tail* and subsequent applications of its market theory at the FERC. We then look more closely at the market definitions and inferences the FERC has made in various studies of pipeline MBRs.

A. Otter Tail

Otter Tail brought antitrust markets to regulated industries. That company, a vertically integrated corporate utility serving Minnesota and the eastern Dakotas, refused to transmit ("wheel") power from federal hydroelectric projects to newly-formed municipal distribution utilities in its territory.[52] Unlike any other utility, Otter Tail had also filed a statement with the FPC that it did not hold itself out to serve new municipal utilities at wholesale. The government charged Otter Tail with leveraging a transmission monopoly into a monopoly of retail service. Its denial of transmission on facilities that small towns could not economically duplicate discouraged the formation of competing municipal systems. Although the Federal Power Act did not allow federal orders to wheel, the courts determined that wheeling could be ordered as antitrust relief.

The affected cities had either received or were applying for allocations of inexpensive federal power to which they had a preference by law. If Otter Tail obtained the federal power because municipals did not exist, it was obligated to fold the price of that power into its regulated retail rates. The government's relevant market was for retail franchises, and its market share calculations were unconcerned with institutional details of regulated rates, Preference Power, and obligations to serve. The government bounded its relevant market by the territory in which Otter Tail was obliged to serve those who would not serve themselves. Otter Tail's territory was in fact largely served by others. Municipals, cooperatives, and

51. 410 U.S. 366 (1973).

52. Sources for all of the text's factual statements on *Otter Tail* are provided in Kleit & Michaels, *supra* note 44.

other corporate utilities sold over 70% of all power retailed in the territory. By the antitrust standards of its time, Otter Tail's 30% market share might have been insufficient to support allegations of monopoly power. Perhaps for this reason, the government claimed (and Otter Tail agreed) that the relevant market was for franchises in individual cities. Since 45 of the 510 towns in its service area had municipal utilities, Otter Tail had, on the government's calculation, a 91% market share, in an area where it sold under 30% of the power.

The government produced no analogous quantitative measure of Otter Tail's market power over transmission, the market it had allegedly succeeded in monopolizing. The government, however, did not assert that transmission was a relevant market, perhaps because Otter Tail owned only 6.2% of the 87,000 miles of transmission in its area. Since Otter Tail had such a low "share" of the market (and nearly 50 other transmission owners in its territory), the government instead claimed that the company had "strategic dominance," a previously unknown term in both economics and antitrust.

Both the franchise and transmission market shares mislead, but for different reasons. Otter Tail's high proportion of city franchises can only be correlated with monopoly power at retail if its rates are unregulated and it has no obligation to serve. If it can charge only regulated rates (and regulation is effective) it cannot earn the supernormal returns of a monopolist.[53] With a service obligation, the company's control of numerous franchises might indicate little more than their unprofitability to others. Otter Tail's low proportion of transmission ownership, however, might still endow it with some monopoly power. If it refuses to wheel for a town without alternative connections that seeks to municipalize, denial of access to that single line may harm competition. The harm will occur regardless of how many or how few total miles of transmission the company owns in its territory. To act monopolistically, the company need own no more than this one line.

B. Markets at the FERC

At the FERC, today's market analyses are easily identifiable as *Otter Tail*'s descendants. In over twenty years since *Otter Tail*, there have been no conceptual or empirical advances that might better rationalize the Commission's use of that case's methods. Commodities, geographic areas, and measures of seller concentration have changed over these years, but the structural methods of *Otter Tail* remain with us.

53. Here we disregard the remarks of Section A, *supra*, regarding the unlikely equality of regulated and competitive prices.

1. Electricity

The FERC has applied *Otter Tail's* methods in three broad classes of electricity proceedings.[54] The first includes dockets from the 1970s and 1980s dealing with topics that are now defunct or moribund. In some of them, the FERC examined wheeling as a potential remedy for anticompetitive arrangements between jurisdictional corporate utilities and nonjurisdictional municipal systems.[55] Although the Federal Power Act (FPA)[56] at the time foreclosed the FERC from ordering utilities to wheel in wholesale rate cases, the Commission considered, but never issued, wheeling orders on antitrust grounds using as precedent *Otter Tail* and certain rulings of the Nuclear Regulatory Commission (NRC).[57] FERC staff and intervenors sometimes calculated retail "market shares" and compared them to the shares that the antitrust courts had declared suggestive of monopoly power.[58] In other dockets, municipal utilities charged that price squeezes resulting from disparities between state and federal rates inhibited competition between them and their wholesale suppliers for industrial loads.[59] Using the same territorial standards that governed *Otter Tail*, the FERC ruled that a common border between a jurisdictional utility and its wholesale customer sufficed as evidence of competition.[60] The courts later rejected the Commission's holding that a price squeeze intervenor needed to show no active competition for an identifiable load.[61]

Electric utility mergers and power marketing plans prior to the Energy Policy Act of 1992 (EPAct)[62] make up the second class of FERC proceedings that use concentration statistics to evaluate competition. Such statistics have at times rationalized the FERC's conditioning of approval on

54. A more detailed survey of *Otter Tail's* descendants appears in Kleit & Michaels, *supra* note 44, at 714, 724.

55. These included *Florida Power & Light Co.*, 9 F.E.R.C. ¶ 61,366 (1979); *Kentucky Utils. Co.*, 23 F.E.R.C. ¶ 61,317 (1983); and *Pacific Power and Light Co.*, 26 F.E.R.C. ¶ 63,048 (1984).

56. Federal Power Act, 16 U.S.C. § 791a (1988) [hereinafter FPA].

57. The NRC can impose orders to wheel as licensing conditions for a nuclear powerplant if it finds inconsistency with the antitrust laws. 42 U.S.C. § 2135(c)(5) (1988). The NRC decisions included language to the effect that the regulated status of applicants and intervenors did not vitiate the inferences of monopoly power from market shares, for reasons that were not made explicit. The courts later stated that the NRC's antitrust language was not necessarily to be construed as equivalent to that of antitrust law. Alabama Power Co. v. Nuclear Regulatory Comm'n, 692 F.2d 1362 (11th Cir. 1982), *cert. denied*, 464 U.S. 816 (1983).

58. In ruling that, the Public Utility Regulatory Policies Act of 1978, Pub. L. No. 95-617, 92 Stat. 3117 (codified at 16 U.S.C. §§ 2601-2645 (1988) [hereinafter PURPA], prohibited wheeling orders that promised to upset existing competitive relationships, the FERC also used such market definitions. *Southeastern Power Admin. v. Kentucky Utils. Co.*, 25 F.E.R.C. ¶ 61,204 (1983).

59. FPC v. Conway Corp., 426 U.S. 271 (1976). For a summary of price squeeze issues and references, see Paul L. Joskow, *Mixing Regulatory and Antitrust Policies in the Electric Power Industry: The Price Squeeze and Retail Electric Competition*, ANTITRUST AND REGULATION: ESSAYS IN MEMORY OF JOHN J. MCGOWAN (Franklin M. Fisher ed., 1985).

60. *Connecticut Light and Power Co.*, 8 F.E.R.C. ¶ 61,187 (1979).

61. Town of Concord, Mass. v. Boston Edison Co., 915 F.2d 17 (1st Cir. 1990).

62. Pub. L. No. 102-486, 106 Stat. 2776, 2905 (codified at 42 U.S.C.A. §§ 13,201-13,556 (West Supp. 1995)).

offers of open access to transmission by the applicant utilities.[63] In these dockets, various bulk power and transmission markets have replaced retail service as the focus of analysis.[64] These markets are more in keeping with geographical reality than were Otter Tail's, extending beyond the applicant's service area to include systems that will be accessible under a more liberal transmission policy.[65] In approvals of MBRs for other bulk power coordination services, the FERC has also examined the concentration of their potential providers.[66]

As concentration in generation markets falls, the FERC policy in a third class of cases has moved to a near-presumption that the market for power sales from new generation capacity is competitive.[67] The FERC has also employed concentration statistics to evaluate MBR applications by non-utility generators.[68] In contrast, a recent appellate ruling on transmission access for a utility seeking MBRs for bulk power sales did not rely on concentration statistics. Instead, the court remanded the stranded investment provisions of an open-access transmission tariff to the FERC on grounds that the Commission had not examined their potential anticompetitive impact as a tying arrangement.[69] The court invoked none of the FERC's market concentration analysis, possibly indicating a turn from the logic of *Otter Tail.*

2. Oil Pipelines

The EPAct required that the FERC establish a "simplified and generally applicable ratemaking methodology for oil pipelines."[70] In 1993, FERC staff responded with a proposal that rates in competitive markets be

63. Merger opinions containing market share analyses include among others, Opinion No. 318, *Utah Power & Light Co.*, 45 F.E.R.C. ¶ 61,095 (1988); *Southern California Edison Co.*, 47 F.E.R.C. ¶ 61,196 (1989); Opinion No. 364, *Northeast Utils. Serv. Co. (re Public Serv. Co. of New Hampshire)*, 56 F.E.R.C. ¶ 61,296 (1991); Opinion No. 385, *Entergy Servs., Inc.*, 65 F.E.R.C. ¶ 61,332 (1993); *Cincinnati Gas and Elec. Co.*, 64 F.E.R.C. ¶ 61,237 (1993); *Midwest Power Systems, Inc.*, 71 F.E.R.C. ¶ 61,386 (1995). Power marketing opinions include, Opinion No. 349, *Public Serv. Co. of Indiana*, 52 F.E.R.C. ¶ 61,260 (1990); *Entergy Servs., Inc.*, 58 F.E.R.C. ¶ 61,234 (1992).

64. *E.g.*, In *Utah Power & Light*, the FERC determined that firm bulk power, nonfirm bulk power, firm transmission, and nonfirm transmission were relevant markets. 45 F.E.R.C. ¶ 61,095, at 61,284. In *Entergy Servs.*, the markets were for short-term firm bulk power, long-term firm bulk power, and transmission. 58 F.E.R.C. ¶ 61,234.

65. 58 F.E.R.C. ¶ 61,234, at 61,729.

66. *E.g.*, *Pacific Gas and Electric Co.*, 44 F.E.R.C. ¶ 61,010 (1988).

67. *Kansas City Power & Light Co.*, 67 F.E.R.C. ¶ 61,183 (1994). In this and related power marketing dockets, the FERC has accepted the applicant's proposal subject to filing of an open-access transmission plan.

68. *E.g.*, *Enron Power Enter. Corp.*, 52 F.E.R.C. ¶ 61,193 (1990). The FERC sometimes examines the ratio of total bids to total acceptances in a utility procurement as a measure of competition, a process for which there is no rigorous economic justification. *Id.* at 61,714-15. The FERC has expressed concern over too small a ratio in one rejection of MBRs. *See TECO Power Servs. Corp. and Tampa Elec. Co.*, 52 F.E.R.C. ¶ 61,191 (1990).

69. Cajun Elec. Power Coop. v. FERC, 28 F.3d 173 (D.C. Cir. 1994). For arguments that the provisions did not implement an anticompetitive tie, see Alfred E. Kahn, *Can Regulation and Competition Coexist? Solutions to the Stranded Cost Problem*, 7 ELEC. J., Oct. 1994, at 23, 35.

70. EPAct, *supra* note 62, § 1801(a).

put under price cap regulation, and that increases in rates in noncompetitive markets be limited by increases that the pipeline put into effect in competitive markets.[71] The staff's proposal largely formalized the standards embodied in the Commission's 1990 three-year experimental ratemaking for Buckeye Pipe Line Company.[72] There, the FERC found the Merger Guidelines useful as a first screen for evaluating markets for transportation between individual origins and destinations. As a supplement to the pipeline HHI, the staff recommended examination of the ease of entry, including entry of other modes of transportation. Geographically, the staff approved as destination markets the Department of Commerce's Bureau of Economic Analysis Economic Areas (BEAs), which delineate economic areas surrounding cities. Costs of substitution bounded BEAs, since data showed that trucks carrying oil products are good substitutes for pipelines within a BEA, but not necessarily between BEAs.[73] Neither the staff nor the *Buckeye* decisions consider the choices that might actively constrain an oil pipeline from withholding capacity in order to raise price. Instead, the decisions, (but not the staff) concentrate on the relationship between the HHI and the likelihood of collusion that might exist in unregulated industries.[74]

3. Gas Inventories and Storage

Prior to its recent work on interstate transportation tariffs, the FERC examined MBRs in two other gas industry contexts. In the first episode, no longer operative, Commission Order 500 of 1987 allowed pipeline resale ("sales") tariffs to incorporate gas inventory charges (GICs) that compensated the pipeline for standing ready to serve.[75] If a pipeline showed that its gas supply came from a competitive market and that it offered users comparable transportation, it could file for a GIC that varied with the market price of gas.[76] To determine competition in the market for gas delivera-

71. FED. ENERGY REG. COMM'N, STAFF PROPOSAL FOR REVISIONS TO OIL PIPELINE REGULATION PURSUANT TO THE ENERGY POLICY ACT OF 1992 (1993) [hereinafter STAFF PROPOSAL].

72. Opinion No. 360, *Buckeye Pipe Line Co. Ltd.*, 53 F.E.R.C. ¶ 61,473 (1990). The staff views the experiment as successful. Buckeye's prices in all markets that the FERC deemed competitive only rose by modest percentages, all by less than thresholds that could trigger the FERC's instituting a suspension or investigation. *See* 1995 Staff Paper, Fed. Energy Reg. Comm'n, Market-Based Rates for Natural Gas Companies, A Staff Paper, at 18 (1995) [hereinafter 1995 STAFF PAPER].

73. *Buckeye Pipe Line Co. Ltd.*, 50 F.E.R.C. ¶ 63,011 (1990). The staff followed the recommendations of a DOJ report on oil pipelines and recommended a critical HHI screen of 0.25 rather than the *Merger Guidelines'* 0.18. That report broadly concluded that competition was sufficiently strong in all origin markets (and crude oil destination markets) in the contiguous United States and that cost-of-service regulation was not warranted. STAFF PROPOSAL, *supra* note 71, at 33. The DOJ's analysis appears in U.S. DEP'T OF JUSTICE, OIL PIPELINE DEREGULATION (May 1986).

74. *E.g.*, 53 F.E.R.C. ¶ 61,473 (1990); STAFF PROPOSAL, *supra* note 71, at 36, citing *Buckeye*, 53 F.E.R.C. ¶ 61,473, at 62,665.

75. *Regulation of Natural Gas Pipelines After Partial Wellhead Decontrol*, Order No. 500, [1986-1990] F.E.R.C. STATS. & REGS. ¶ 30,761, 52 Fed. Reg. 30,334 (1987).

76. *Transwestern Pipeline Co.*, 43 F.E.R.C. ¶ 61,240 (1988); *Transcontinental Gas Pipe Line Corp.*, 55 F.E.R.C. ¶ 61,446 (1991); *El Paso Natural Gas Co.*, 49 F.E.R.C. ¶ 61,262 (1989). The courts ruled that the FERC could only approve a market-based GIC contingent on a finding of competition. *See* Tejas Power Corp. v. FERC, 908 F.2d 998 (D.C. Cir. 1990).

ble to the pipeline ("divertible" gas), the FERC chose to start from an HHI, after which it would consider transportation quality.[77]

In the second context, the FERC has begun to entertain MBR applications by gas storage operators. The necessary showing of competition includes calculation of an HHI (e.g., for storage facilities in the applicant's area that are connected to the same pipeline).[78] Here, too, the HHI is intended as a screen, to be augmented by findings on potential market entry and alternatives to storage in the relevant market.[79] In a prior experimental program for market-based storage rates, the market so constrained the applicant that it never negotiated a rate that was as high as the cost-of-service cap imposed by the FERC.[80]

C. MBRs for Interstate Pipelines

The FERC has produced three studies analyzing competition among pipelines. All of them utilize measures of supply concentration as screens for the market ability of pipelines to somehow coordinate their actions in reducing the availability of capacity.[81]

1. The Gallick Study

Published in 1993, economist Edward Gallick's study of potential pipeline competition derives from his work for the FTC in the late 1980s.[82] Using data from the early and mid-1980s, he used HHIs to analyze the concentration of pipelines serving Standard Metropolitan Statistical Areas (MSAs). He found that few areas were served by enough independently owned lines to pass an HHI screen for competitiveness. Gallick then examined the costs and delays of extending nearby pipelines to reach areas that might otherwise be harmed by overly high supplier concentration.[83] He concluded that after two years, competitive entry of new pipelines to these markets would significantly lower the concentration of pipelines serving them. Sixty percent of all MSAs, and 90% of the larger ones, could have HHIs below 0.25 within two years.[84] Since 90% of all gas would be consumed in competitive areas, he concluded that the FERC should consider MBRs as an alternative to cost-of-service regulation.[85]

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77. *E.g., El Paso Natural Gas Co.*, 49 F.E.R.C. ¶ 61,262 (1989).

78. *E.g., Richfield Gas Storage System*, 59 F.E.R.C. ¶ 61,316 (1992); *Petal Gas Storage Co.*, 64 F.E.R.C. ¶ 61,190 (1993).

79. *See Petal Gas Storage Co.*, 64 F.E.R.C. ¶ 61,190, at 62,573.

80. *Koch Gateway Pipeline Co.*, 66 F.E.R.C. ¶ 61,385, at 62,301 (1994).

81. For a summary of other early work on MBRs see Dan Alger and Michael Toman, *Market-Based Regulation of Natural Gas Pipelines*, 2 J. REG. ECON. 263, 280 (1990).

82. EDWARD C. GALLICK, COMPETITION IN THE NATURAL GAS PIPELINE INDUSTRY: AN ECONOMIC POLICY ANALYSIS (1993).

83. Gallick used construction cost data to estimate a critical distance of 140 miles below which new construction would be economic. GALLICK, *supra* note 82, at 57.

84. GALLICK, *supra* note 82, at 89. His choice of 0.25 rather than the DOJ's 0.18 rests on another FTC study. GALLICK, *supra* note 82, at 90.

85. Most of the problem markets were in Florida, due to that state's odd location and shape. GALLICK, *supra* note 82, at 79.

Like the FERC's later analysts, Gallick rationalizes the HHI as "a crude index of the likelihood of successful coordination or collusion among the colluding group of gas suppliers."[86] He does not discuss the effects of regulation on the ability to withhold supplies or on the observed concentration of pipelines at city-gates.[87] Prior to the optional expedited certificate provisions of Order 436, however, regulation should have been particularly important in determining concentration.[88] Virtually all then-extant pipelines had been constructed under certificate procedures that required them to have long-term contracts with producers and local distribution companies (LDCs), and allowed rate-basing only upon a showing of market need. Although open access had begun and transportation had replaced sales as the majority of pipeline throughput at the time of publication, its author notes the change only in passing.[89] He does not analyze the conditions, if any, under which to expect that a pipeline's market power is independent of the transactional structure that governs its industry.

2. The 1993 Task Force

a. The Task Force Report

In May 1992, the FERC established a Pipeline Competition Task Force, chaired by then-Commissioner Branko Terzic. His May 1993 report for the group discussed how competition might evolve as pipelines filed and implemented their settlements under Order 636.[90] Addressing transportation between market centers, the report identified two "key issues" for judging market power: "[h]ow much transporter concentration is acceptable?" and "[h]ow much do pipeline paths from other producing areas (or to other market areas) count as competitors?"[91] The Task Force used the HHI to measure concentration, noting that the index "does not measure competition directly," but that "[h]igh concentration can suggest market power."[92] After examining two examples of competition along parallel pipeline paths, the Task Force concluded that "under the right condi-

86. GALLICK, *supra* note 82, at 29.

87. GALLICK, *supra* note 82, at 38. Below we argue that even if output restrictions are feasible, collusion should be peculiarly easy to detect in this industry.

88. Order No. 436, *Regulation of Natural Gas Pipelines After Partial Wellhead Decontrol*, [1982-1985] F.E.R.C. STATS. & REGS. ¶ 30,665, 50 Fed. Reg. 42,408 (1985), *vacated and remanded*, Associated Gas Distribs. v. FERC, 824 F.2d 981 (D.C. Cir. 1987), *cert. denied*, 485 U.S. 1006 (1988).

89. GALLICK, *supra* note 82, at 92.

90. BRANKO TERZIC, FED. ENERGY REG. COMM'N, PIPELINE COMPETITION TASK FORCE ON COMPETITION IN NATURAL GAS TRANSPORTATION (May 24, 1993) [hereinafter cited as 1993 TASK FORCE REPORT]. *See generally* Order No. 636, *Pipeline Service Obligations and Revisions to Regulations Governing Self-Implementing Transportation and Regulation of Natural Gas Pipelines After Partial Wellhead Decontrol under Part 284 of the Commission's Regulations*, III F.E.R.C. STATS. & REGS. ¶ 30,939, 57 Fed. Reg. 13,267 (1992).

91. 1993 TASK FORCE REPORT, *supra* note 90, at 10.

92. 1993 TASK FORCE REPORT, *supra* note 90, at 12. The report does not further discuss the occasions on which such a suggestion may be legitimate.

tions, three to five competitors may contest key routes."[93] Although it did not detail what those conditions might be, the Task Force understood that "[f]or a pipeline to exercise market power, it must be able *profitably* to withhold or restrict its customers' access to transportation capacity," including "any relevant capacity on other pipelines."[94] Instead of examining the record under open access, the report offered only hypothetical examples of capacity withholding.[95]

b. The Discussion Paper

The FERC staff's Discussion Paper for the Task Force summarizes the antitrust reasoning that apparently underlies the Task Force's recommendations.[96] Its bibliography contains numerous economic references on the relationship between supplier concentration and the competitive performance of a market.[97] Two appendices to the Discussion Paper contain articles on the theoretical links between market structure and performance. The first contains a mathematical exposition of how concentration-performance relationships in oligopolies depend on assumptions about seller conjectures.[98] Its author does not examine the possible effects of rate regulation or open access on the theoretical relationships he derives.[99] More relevant to pipelines, the paper contains no analysis of markets where a regulated capacity provider in effect competes with customers who can release their entitlements to others. The second appendix particularizes the economic model of the first appendix to network industries which are regulated and have large sunk costs.[100] Although its authors acknowledge

93. 1993 TASK FORCE REPORT, *supra* note 90, at 8. The paths studied originated in Louisiana and extended to Pennsylvania and Illinois.

94. 1993 TASK FORCE REPORT, *supra* note 90, at 21 (emphasis in original). The Task Force states that "[m]arket power appears as prices that are above market clearing levels." 1993 TASK FORCE REPORT, *supra* note 90. It does not explain how to identify such prices, and does not mention our point *supra* that regulated rates which recover historical costs will seldom equal competitive equilibrium prices.

95. Under open access there has been extensive discounting of transportation services. If a pipeline can easily withhold capacity, withholding should sometimes be a more profitable strategy than discounting. We discuss this matter in Section V *infra*.

96. STAFF REPORT, FED. ENERGY REG. COMM'N, ON DEVELOPING A FRAMEWORK FOR ASSESSING COMPETITION IN NATURAL GAS TRANSPORTATION, A DISCUSSION PAPER FOR COMMISSIONER TERZIC'S TASK FORCE, Nov. 20, 1992 [hereinafter cited as 1992 DISCUSSION PAPER].

97. 1992 DISCUSSION PAPER, *supra* note 96. We know of no bibliographic entry that examines the relationship in industries that are under regulation such as affects pipelines.

98. Richard P. O'Neill, *Common Framework for the Discussion of Structure and Performance*, Nov. 1991, *reprinted in*, 1992 DISCUSSION PAPER, *supra* note 96, app. B.

99. The paper only analyzes markets in which new competitors do not enter even if incumbent sellers are making substantial economic profits. This may be an attempt to model regulation of entry apart from regulation of rates.

100. Richard P. O'Neill et al., *A Further Discussion of Market Power and Competition Measures of Firms Within Connected Multi-Market Industries*, July 1989, *reprinted in*, 1992 DISCUSSION PAPER, *supra* note 96, app. C. The role of regulation is unclear in the paper, since the entities modeled in it are apparently free to choose their own rates and policies regarding capacity availability.

that regulation can restrict competitive entry, they do not examine the predictive value of an HHI in an industry with restricted entry and obligations to serve.[101]

The Task Force's work is consistent with the theory exposited in the Staff's Appendices, but the relevance of that theory to pipelines is not made clear. As we have noted above, the conjectures that sellers hold about one another's behavior are critical determinants of any conclusions about the relationship between market structure and performance. Much of the theoretical work in the FERC staff's appendices assumes that sellers hold Cournot-Nash conjectures, which typically lead to an inverse relation between a market's competitive performance and its HHI.[102] The staff, however, acknowledges that few attempts have been made to estimate conjectures numerically. Neither of the two attempts cited finds substantial evidence of Cournot-Nash conjectures in real-world markets.[103] The staff rationalizes its reliance on such theories as follows:

> Many studies are forced to make simplifying assumptions by the lamppost principle. The lamppost principle is simple: work where the light (theory or data) is good. But we are often trapped by the lamppost principle. Because H [the Herfindahl index] appears in models when behavior is Cournot, the H is given more credibility as a statistic. This statistic is only a valid descriptive statistic for performance, market behavior, or welfare effects when behavior is Cournot. In markets more or less competitive than Cournot, H does not describe performance. To the extent the market diverges from a Cournot equilibrium, H is an arbitrary measure of performance.[104]

3. Staff's 1995 MBR Study

The 1993 Task Force stressed that the FERC's future MBR policies would depend on the content of Order 636 settlements, on how secondary markets and market centers developed, and on how pipeline operations evolved.[105] In response to evolving competition since Order 636, in 1995 the FERC issued a Notice of Proposed Rulemaking on MBRs.[106] In connection with that docket, the FERC staff produced a paper that summarized the Commission's earlier market analyses and broadly recommended continuation of existing methods.[107] The staff proposed no major departures from established procedures for evaluating competition, and eluci-

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101. 1992 DISCUSSION PAPER, *supra* note 96, at 4.

102. 1992 DISCUSSION PAPER, *supra* note 96, app. B, at 20-39.

103. 1992 DISCUSSION PAPER, *supra* note 96, app. B, at 54. The cited studies are Frank Gollop and Mark Roberts, *Firm Interdependence in Oligopolistic Markets*, 10 J. ECONOMETRICS 313-331 (1979); Gyoichi Iwata, *Measurement of Conjectural Variation in Oligopoly*, 42 ECONOMETRICA 947-966 (1974).

104. 1993 TASK FORCE REPORT, *supra* note 90, at 7. The Task Force's Report refers to the choice of a concentration measure that summarizes the "potential for market power abuse" as "[a] fairly small methodological issue." 1993 TASK FORCE REPORT, *supra* note 90, at 8.

105. 1993 TASK FORCE REPORT, *supra* note 90, at 19-28.

106. *Pricing Policy for New and Existing Facilities Constructed by Interstate Natural Gas Pipelines: Notice of Public Conference and Opportunity to File Written Comments*, 59 Fed. Reg. 39,553 (1994); *Request for Comments on Alternative Pricing Methods*, 70 F.E.R.C. ¶ 61,139 (1995).

107. 1995 STAFF PAPER, *supra* note 72.

dated no new intellectual rationales for those procedures. The borrowings from antitrust pre-merger review would remain, and the staff's proposed method "would be the same for all types of services."[108]

Although data on market performance (including electronic bulletin board records containing prices) were becoming available, the staff performed no quantitative analysis of these or related data on transactions.[109] At first glance, the observed evolution of the industry under open access should have caused the staff to reexamine its presumptions. Seller concentration in many parts of the industry was virtually unchanged from before open access, but markets with unchanging supply structures were producing increasingly more competitive outcomes. The 1993 Task Force apparently had good reason to recommend close examination of the effects of the new regulations. In the next section, we summarize some of the new knowledge.

IV. Competition Since Open Access

A rational choice of pipeline ratemaking policies requires that we first examine the market for the gas they transport. By virtually all evidence that we present below, the gas market has become unified, national, and increasingly competitive since the institution of open access. To understand the consequences of gas market developments for pipeline MBRs, we begin by examining markets that encompass networks. Network analysis and our ensuing examination of network data provide strong logic and evidence for a major revision of policy. They show that pipeline markets defined over an origin, a destination, and the direct links between them are inappropriate for today's industry, and are likely to lead to erroneous conclusions about MBRs.[110]

The FERC will be better able to tailor procompetitive policies if its future analyses are informed by a network model. Competition is at base a situation of abundant alternatives. Those alternatives are better summarized by examining open access to a network rather than to individual pipelines or paths. The past decade's expansion of interconnections and trading institutions has so increased competition that the markets the FERC believes are relevant are the ones that its policy has already rendered irrelevant. Origin-destination analysis describes opportunities in a balkanized, weakly connected pipeline network that no longer exists.

Open access to the network provides opportunities to arbitrage price differences and move gas in paths that were unavailable in the past. This expanding set of arbitrage and trading activities is fundamental to the determination of competitive prices. The price of gas at any point in an interconnected network is determined by the supplies and demands for gas not just at that point, but at all points on the network. The network encom-

108. 1995 Staff Paper, *supra* note 72, at 23.

109. As noted above, however, the staff commented favorably on the quantitative performance of the MBRs that the FERC had offered Buckeye Oil Pipeline. 1995 Staff Paper, *supra* note 72, at 18.

110. In its 1995 paper, the FERC staff uses its customary methods to screen a hypothetical origin-destination market for MBRs. 1995 Staff Paper, *supra* note 72, at 38-59.

passes a competitive gas market if prices over it converge quickly to eliminate profitable arbitrage opportunities. We infer competition by examining prices. The evidence from prices is directly available, and conclusions from observed prices are better grounded than conclusions drawn from market shares. The case in favor of the price evidence is clear: In many areas, the market shares on which the FERC might rely have hardly changed at all since open access began, while market behavior has become strikingly more competitive, both for gas and its transportation.

A. Using Prices to Measure Competition

In a competitive market with costless exchanges, only one price will prevail. If there are two distinct prices, sellers in the low-price area can profit by moving their goods into the high-price area, and buyers in the high-price area gain by purchasing from low-price sellers. The market may contain arbitrageurs whose specialty is to profit by eliminating such price differences. In a perfectly competitive market equilibrium, there are no profitable arbitrage opportunities. In a monopolized market, the monopolist's high price is sustainable only if supplies from elsewhere cannot enter the market. For a good that is costly to transport, such as gas, the market is competitive if prices at different locations are within arbitrage limits, i.e., they do not offer anyone the opportunity to profit by shifting gas from one area to another. If many traders can reach a customer over many paths from many sources of product, price cannot long exceed the competitive level. An area where price is within arbitrage limits of prices at many other locations is economically linked with all of those locations, whether they are directly connected or not. They are in the same integrated economic market and the array of prices is competitive, no matter how many or how few pipelines connect them.

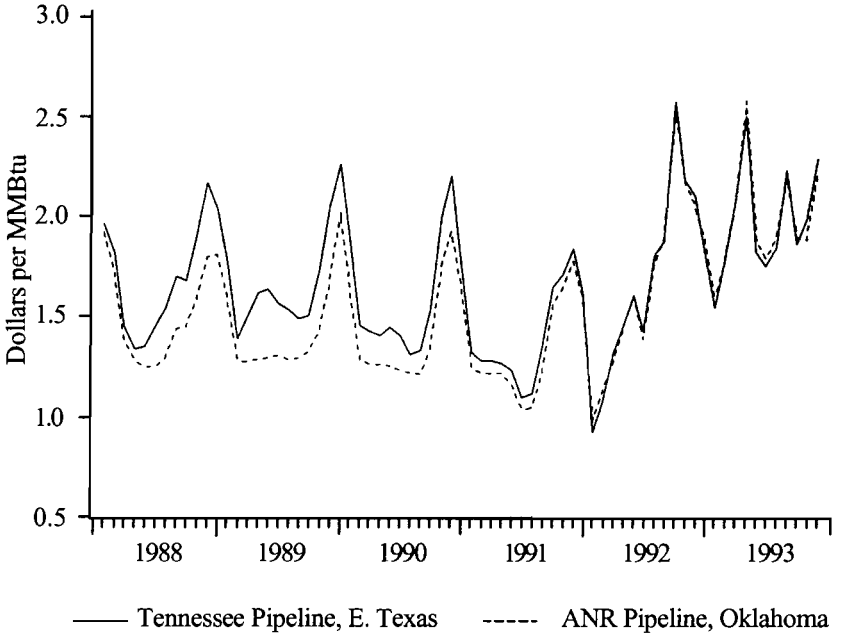
Figure 1 presents an example of competitive behavior for two gas markets that are separated from one another and located on pipelines that do not interconnect directly. The prices are *Gas Daily*'s monthly spot contract index values for East Texas gas entering Tennessee Gas Pipeline's interstate system, and for Oklahoma gas entering ANR Pipeline.[111] The evolution of these prices shows a broad pattern typical of prices since open access. Their difference diminishes with time, and their fluctuations become more closely matched. The evolution of these prices is consistent with an increase in competition since open access, as prices come to lie within a band whose limits are set by transportation and arbitrage costs. If price differences exceed the width of that band, arbitrage profits are possible. By late 1991, the prices move together so closely that the two areas appear to be in the same market.[112] The commonality of movement occurs

111. The prices are based on samples of daily observations of into-the-pipeline prices that are regularly checked for statistical consistency. *See* GAS DAILY, MONTHLY CONTRACT INDEX (Fri., April 15, 1994).

112. Empirically, price fluctuations occur even when prices in two areas are within arbitrage limits of each other, i.e., a small but nontrivial degree of randomness continues late into the period of price observations in Figure 1. After 1991, the coefficient of correlation between the prices equals 0.95 (A

despite the fact that the two areas are not directly connected. The prices have converged because producers in the areas can deliver gas to interconnected downstream locations among which arbitrage is possible.

Figure 1: Price Convergence between Spot Markets



Data Source: *Gas Daily* monthly contract index for natural gas spot deals made during bidweek.

Information contained in the prices in different areas also determines whether or not they are in the same market. Competitive markets are characterized by easily accessible information about prices and other market conditions that allows traders to quickly discover and exploit profitable opportunities. If a competitive market encompasses two locations, it will be impossible to use information about a price change at one location to make a profitable arbitrage trade at the other. If, for example, the two prices rose and fell in identical patterns, but those in one area consistently lagged behind those in the other, profitable arbitrage could occur. One could profit by buying gas (or selling it short) in the lagging area, using price in the leading area as a guide. The manner in which the two series on the graph move together appears to indicate that information about one

coefficient equal to zero indicates pure randomness of their movements relative to each other, and a coefficient equal to one indicates perfect correlation of their movements). Since there is no numerical criterion for determining the magnitude of correlation that puts the two areas in the same market, we will shortly introduce the clearer standards of cointegration. These issues are discussed in De Vany and Walls, *Network Connectivity and Price Convergence: Gas Pipeline Deregulation*, 3 RESEARCH IN TRANSPORTATION ECONOMICS 1-36 (1994).

price will not be of help in predicting the other price.[113] Prices in the example are so informative that they do not allow profitable arbitrage between the present and the future. When prices contain the same information, they are in the same market. A market encompassing both producing areas (and possibly more) will be the relevant market for evaluating the competitive consequences of MBRs, since this is the area within which information and trading constrain prices to competitive levels.

Prices at two locations (or at two dates) are said to be informationally efficient if both usually contain the same relevant economic information.[114] They contain such information if arbitrage leads to prices that are arbitrage-proof. If, for example, price movements in one area consistently lagged behind price movements in the other, these prices would not contain all relevant information. If so, arbitrage profits remain possible despite the underlying correlation. The prices in Figure 1 demonstrate informational efficiency. In an informationally efficient market, price changes reflect only the arrival of new information or the appearance of new constraints. Examples of such factors include changes in transmission prices and changes in the cost of buying or selling gas. Again, arbitrage may act through markets other than these two, e.g., through exchanges at a common intersection.

B. Competitive Pricing in a Network

Next, consider a more complex network of open-access pipelines that encompasses a single market. Gas delivered to a point on the network must arrive at a price that is no higher than that of gas from any other possible source. Under open access, gas supplies can come from interconnected production areas, from storage, and from consuming areas if purchasers there can reassign their contractual takes. Open access means that both entitlement holders and outsiders can exchange capacity on a pipeline that links two areas, and that both can bid for unused space that reverts to the pipeline for mandatory offer as interruptible service. The economic link between the locations is not the pipeline, but rather the supply paths within the line that are held by the individual parties. The allocation of these paths is reconfigured in real time in the misleadingly-named secondary markets for capacity and reverted interruptible service. Economically, it is immaterial whether the distribution of entitlements gives their holders rights to use a single pipe or several parallel pipes. The HHI for pipelines between two points will change with their number, but that number is of no relevance to competitive outcomes under open access.

The appearance of a capacity bottleneck along a single pipeline link in the network will bring forth a cascade of reallocations. The reallocations will occur whether the bottleneck stems from the pipeline's engineering limits or from an attempt to withhold usable capacity in hopes of raising its price. First, the high price for released capacity and interruptible service

113. See the discussion on informational efficiency for networks *infra* part IV D.

114. MERTON MILLER, FINANCIAL INNOVATIONS AND MARKET VOLATILITY (1991).

will encourage those shippers who do not value their space so highly to trade it to shippers who do. The latter need not be current entitlement holders. Second, space on pipelines that are alternative (not necessarily direct) paths between the two points can be reallocated to those who sold their rights in the first bottleneck. Reallocations on those alternative pipelines will give rise to still more reallocations and their associated price changes on a third tier of alternatives. Reallocations of transportation capacity may make it advantageous for some gas buyers to change their supply areas. On all affected pipelines, there may be reallocations of firm and interruptible capacity. Even if one believes that a high HHI for pipelines between two points usefully measures the ability to withhold capacity, an HHI over only the direct path will overestimate the market power held by the pipelines comprising that path.[115]

By the FERC's origin-destination standard, a line that connects two formerly unconnected points on a network is a monopoly with an HHI of 1.0 between the points. This monopoly, however, is of little significance. A textbook monopolist gains by restricting the availability of services in its market. A new link in a network will often increase (and never decrease) the network's total potential throughput. The new link will also increase the number of paths between a given buying area and possible suppliers. If the owners of pre-existing segments of the system had monopoly power, the construction of a new link gives system users alternatives they did not have before, even if they are not directly connected with that link. By increasing the alternatives for buyers, the new link decreases any monopoly power of existing line owners, including those who are not directly interconnected with the new link. If the new link both adds capacity and adds to the alternatives of buyers, their welfare cannot possibly worsen.

Under open access, all points in the network may be in the same market. Any point upstream or downstream of a consuming area can supply gas to it. For example, a downstream LDC might release transmission capacity to a broker who uses it to sell gas to an upstream market. In effect, the downstream LDC is supplying the upstream market with delivered gas on which the LDC has a right of first refusal. Arbitrage in the market need not require physical deliveries. Offsets and futures trades can move prices toward equality between points that are only indirectly or not at all connected.

If pipelines function as clearinghouses to offset trades for one another they in effect allow their customers to arbitrage over disconnected markets. Gas does not have to flow between the pipeline systems in order to mitigate regional price differences. A customer can use the competitive futures market as a source of supply by taking delivery at the Henry Hub (the contract's standard delivery point) and using connections there and elsewhere to effect delivery. Many other sophisticated clearing and trading

115. On links of some major pipelines there may be as many as 60 or 70 LDCs who hold and offer firm capacity. *See generally Transcontinental Gas Pipe Line Corp.*, 48 F.E.R.C. ¶ 61,399 (1989).

strategies are in use and under development.[116] Such strategies can move prices to within their arbitrage limits even when connections to the pipeline network are few. Circumventing monopoly price offers a pure arbitrage profit to ingenuity.

Open access facilitates the entry of traders whose activities push price to its arbitrage limits between points on the network. If prices at two points indicate potential arbitrage profits, a newcomer can construct a path to ship between them by acquiring interruptible transmission or short-term released capacity. The combinatorics[117] of the network may provide a large number of possible paths between the points, and arbitrage will be more profitable if the gas flows along less expensive paths that are otherwise underutilized. Short-term transportation transactions make it possible to enter and exit a market quickly and without making irreversible commitments. With open access, a market entrant need not incur the sunk costs and delays of constructing a pipeline that would otherwise be barriers to competitive entry. Because "hit and run" entry is so easy under open access, gas markets have become "contestable." A contestable market produces nearly-competitive outcomes regardless of the current number of sellers.[118] Their ability to charge supracompetitive prices is limited by the constant threat that doing so will encourage rapid entry.

C. Unification of the Gas Market

If a market encompasses a unified network, policies that nominally apply to only a subset of the network will in fact affect the entire system. This "spill-over" problem is well-known in other economic contexts. The imposition of a price ceiling that causes shortages in one market will affect prices in uncontrolled markets. If prices of substitutes for the controlled good rise to politically unacceptable levels, the government must also control the prices of those substitutes. Conversely, deregulating a single market in a regulated system may produce unacceptable dislocations in those markets which remain regulated. In this and subsequent sections, we provide evidence that both gas and pipeline services are traded in a unified, nationwide market. On spillover reasoning, selective grants and denials of MBRs to origin-destination pairs in such a market will affect gas flows and efficiency everywhere.[119]

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116. Catherine Abbott, *The Expanding Domain of the Nonjurisdictional Gas Industry*, *in* PRAGER, NEW HORIZONS IN NATURAL GAS DEREGULATION (Jerome Ellig & Joseph Kalt eds., forthcoming 1995).

117. Combinatorics is the applied mathematics of counting and selection. Examples of combinatorial problems include: (1) finding how many different ways three distinct objects can be selected from a set of eight, and (2) as in the text, finding how many distinct paths through a network can link two points in it.

118. WILLIAM BAUMOL ET AL., CONTESTABLE MARKETS AND THE THEORY OF INDUSTRY STRUCTURE (1982).

119. "[A]sserting that '[n]o pipeline is an island,' the [Natural Gas Supply Association] paper said rates and tariff conditions that may make sense for a pipeline when considered in isolation might actually inhibit or prevent economically attractive gas supplies from flowing to end-use markets physically located on other pipelines." *NGSA Urges FERC to Consider Development of National Gas*

In a fragmented market, producers in different areas face differing prices. The differences will exceed arbitrage limits and prices will be poorly correlated because markets are incompletely linked. Buyers who purchase at high prices will do so for the long term because they do not have easy access to lower cost supplies. Those supplies might come from other producers or from other buyers engaged in arbitrage. Such arbitrage is a manifestation of competition. In the eyes of buyers, shipments by arbitrageurs to their area are perfect substitutes for shipments by producers. If arbitrage flows to that area can originate from anywhere in the network, then, after allowance for transportation costs, gas from anywhere is a substitute for gas from anywhere else. If substitutes define a market, the entire network is now a single market.

Economists have recently begun to use correlations of prices among commodities and areas to estimate the boundaries of markets.[120] Correlation analysis has occasionally appeared in antitrust litigation, but litigation remains dominated by the methods of market definition described above.[121] Price correlations provide evidence of competition that is independent of market structure, and hence less prone to the inferential difficulties associated with concentration measures.[122] Instead of requiring complex assumptions about the behavior of market participants, price correlations indicate how buyers have conducted business in the face of actual opportunities. The strength of correlations is evidence of how well arbitrage is facilitating efficient trades. Further, the geographic scope of competition is endogenous in a price correlation analysis, as opposed to

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Grid When Reviewing Pipelines' Order No. 636 Compliance Filings, FOSTER NAT. GAS REP., Nov. 12, 1992, at 2.

120. *See* PHILIP AREEDA & DONALD F. TURNER, 2 ANTITRUST LAW, 351-57 (1978); *See also* George J. Stigler & Robert A. Sherwin, *The Extent of the Market*, 28 J.L. & ECONS. 555 (1985); Noel D. Uri & Edward J. Rifkin, *Geographic Markets, Causality, and Railroad Deregulation*, 67 REV. ECON. & STAT. 422 (1985); Margaret E. Slade, *Exogeneity Tests of Market Boundaries Applied to Petroleum Products*, 34 J. INDUST. ECONS. 291 (1986); Pablo Spiller & Cliff J. Huang, *On the Extent of the Market: Wholesale Gasoline in the Northeastern United States*, 35 J. INDUST. ECON. 131 (1986); David T. Scheffman and Pablo T. Spiller, *Geographic Market Definition under the U.S. Department of Justice Merger Guidelines*, 30 J.L. & ECON. 123 (1987); and Phillip A. Cartwright et al., *Price Correlation and Granger Causality Tests for Market Definition*, 4 REV. INDUST. ORG. 79 (1989).

One other, more limited, price correlation study of the gas market reaches conclusions similar to those of the text but does not discuss their implications for pipeline regulation. *See* Michael J. Doane & Daniel F. Spulber, *Open Access and the Evolution of the U.S. Spot Market for Natural Gas*, 37 J.L. & ECONS. 477 (1994).

121. The two major antitrust cases to use price correlations are Marathon Oil Co. v. Mobil Corp., 530 F. Supp. 315 (N.D. Ohio), *aff'd*, 669 F.2d 378 (6th Cir. 1981), and United States v. Archer-Daniels-Midland Co., 695 F. Supp. 1000 (S.D. Iowa 1987), *rev'd*, 866 F.2d 242 (8th Cir. 1989). In the former, the courts rejected the defendant's price correlations, and in the latter the appellate court did so. As we note in the text, the competitive issues addressed in such antitrust cases are quite different from those that the FERC entertains. The inappropriateness of price correlations for antitrust does not imply their inappropriateness for the FERC. A summary of the difficulties in applying price correlations to antitrust appears in Gregory J. Werden & Luke M. Froeb, *Correlation, Causality, and All that Jazz: The Inherent Shortcomings of Price Tests for Antitrust Market Delineation*, 8 REV. INDUS. ORGANIZATION 329 (1993).

122. Price correlations might also be evidence of collusion, but no one to our knowledge has proposed collusion as a plausible structure of today's gas market.

assuming that an origin-destination pair forms a market. We next provide summaries of four such investigations of gas price behavior.

1. Cointegrated Production Area Markets

If two areas are in the same competitive market, their prices will inhabit a band whose width reflects the cost of arbitrage. Those costs include transportation, risk exposure, and information about profitable opportunities. If competition exists, it will quickly bring disparate prices back within their arbitrage limits. If, for example, bad weather increases price in area *i* while price at area *j* and transmission cost are unchanged, transactions in a competitive market will restore an equilibrium at which the two prices again differ by no more than the arbitrage limits. If the cost of arbitrage varies little over time, two areas are in the same market if the difference between their prices is relatively constant. The statistical technique known as cointegration provides a criterion under which to determine the relative constancy of such a difference.[123] If the prices are not cointegrated, there are no well-defined bounds on the difference between them.

If prices in two areas are cointegrated, the areas are in the same economic market. Although the difference between the prices varies with some randomness, there is a high probability that it will remain within arbitrage bounds. De Vany and Walls have shown that at the beginning of open access daily average prices in only a handful of pairs of production areas were cointegrated.[124] Subsequently, additional pipelines began open access operations and new network links were constructed.[125] By 1991, over 65% of production area pairs had become cointegrated, i.e., behavior of prices at the locations indicated that they were in the same market. As open access progressed, market forces came to operate over greater distances. At the end of 1991, distant pairs of markets were cointegrated to the same degree (in percentage terms) as more proximate pairs. This finding is consistent with a progressive unification of gas markets that tracks

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123. Mathematically, let the prices in markets at time t be given by $p_{i,t}$ and $p_{j,t}$. They are cointegrated if we can find constants α and β such that

$$p_{j,t} - \alpha - \beta p_{i,t} = \mu_t,$$

where μ_t is stationary, as determined by statistical tests. Intuitively, stationarity means that the difference does not become arbitrarily large as time passes to the limit. A more technical discussion and additional applications appear in G.E.P. BOX & G. JENKINS, TIME SERIES ANALYSIS (1970); and Arthur S. De Vany & W. David Walls, *Pipeline Access and Market Integration in the Natural Gas Industry: Evidence from Cointegration*, 14 ENERGY J., Winter 1993, at 1, 1-19.

124. De Vany & Walls, *supra* note 123. While daily prices seem most useful for the study of spot markets, other prices might be employed. Using regional monthly average spot prices for 1991-92, prior to pipeline operations under Order 636, the 1993 FERC Task force found a small number of relationships between prices and gas flows that were inconsistent with competitive markets. *See* 1993 TASK FORCE REPORT, *supra* note 90, at 33.

125. The growth of markets since open access is evidenced by the increase in area prices reported in GAS DAILY, which have now grown to over fifty. The growth of pipeline transportation over those years is documented in U.S. ENERGY INFORMATION ADMINISTRATION, GROWTH IN UNBUNDLED NATURAL GAS TRANSPORTATION SERVICES: 1982-1987 (1989).

the evolution of open access, increased interconnections, and the growth of market centers.[126]

2. Network Arbitrage

Generalizing the above findings that apply to pairs of markets, the statistical technique of vector autoregression (VAR) permits analysis of simultaneous arbitrage possibilities at multiple points in a network. VAR analysis builds on the concept of informational efficiency, i.e., that if prices contain the same information they will only change with the arrival of new information. If all price changes are driven by new information, past price changes or price changes elsewhere in the network are of no value for predicting future price changes in an area.[127] VAR implements these ideas by modeling the dependence of price change in a producing or consuming area on past changes in that area price and in all other prices on the network. VAR produces regression equations from whose coefficients one can infer the presence or absence of profitable arbitrage opportunities between all pairs of markets in the net. The criterion of no arbitrage opportunities between any pairs of markets is a strong one, given the large number of possible ways of choosing pairs of markets from larger sets.[128]

De Vany and Walls performed VAR tests for possible arbitrage on six sub-networks of supply basins and pipelines.[129] Examining data for July 1987 to June 1988, when only a small number of pipelines had begun open access operation, they found profitable arbitrage opportunities on all six networks, inconsistent with a unified market. By June of 1989, prices on one network (five pipelines leaving Oklahoma) had become arbitrage-proof, but not on others. By 1990, with open access on all major pipelines, five of the six networks exhibited strongly competitive, arbitrage-proof pricing.

The dynamics of market reaction also changed with open access. As markets become more interconnected, in effect reserve stocks in all markets become available to dampen price shocks in any one of them. Both the speed and the accuracy of price convergence have improved with open access. Examining the same sub-networks, De Vany and Walls found that in 1988 a standardized price shock at any one location was dampened to

126. De Vany & Walls, *supra* note 123, calculate the number of paths through the pipeline network for different years. They show that through some hubs it is possible today to reach over 140 markets on a path two pipeline links long.

127. Formally, two markets can be arbitraged if the price change at market j at time $t - 1$ can be used to predict how price in market i will change at time t.

128. *E.g.*, For 10 markets, 45 different pairs can be chosen, and for 20 markets, 190 pairs. Using a 10 market network and three time periods gives a VAR model with 320 coefficients to be estimated. If all 320 coefficients are zero (indicating no predictive ability between any pairs), a highly unlikely event *a priori*, we have very strong evidence of competitive pricing.

129. Such subsets were a necessity because of the computational difficulties associated with larger sets. Each one of their six sub-networks contained 252 pairs of spatial and temporal arbitrage possibilities. *See* De Vany and Walls, *supra* note 123.

nearly zero within seven days.[130] By 1990, such a shock would be dampened in three days, and nowhere on the network would prices move by more than a few cents in response. This small and widespread response of area prices is itself evidence for unification of the market. Such a response pattern can occur only if there are numerous changes in gas flows among regions not directly connected with the area where the shock occurred.

3. Market Hubs

Under open access, the industry has seen the growth of market centers, or hubs, at which several pipelines can interconnect.[131] New hub junctions can expand the scope of markets by expanding the number of possible arbitrage paths between producing and consuming areas.[132] By 1988, all but two pairs (out of 45) of the twenty largest pipeline nodes were connected by two or fewer links. By 1990, some of these hubs connected more than a hundred markets with one another. Examining three such hub-centered networks near major markets, De Vany and Walls found that prices between market pairs reachable through the hubs were cointegrated, and that the likelihood of cointegration did not vary with the number of paths through a hub.[133]

4. The Spot and Futures Market

Futures markets offer both physical deliveries and contracts which can be held to hedge risk. Empirical studies generally agree that futures markets are competitive and informationally efficient.[134] If the gas futures market is competitive, a nodal market on the network will be competitive if its price is cointegrated with that of gas futures. De Vany and Walls examined whether spot prices at eight different hubs and three city gates were cointegrated with futures prices. All of the city gate prices and all but one hub price were cointegrated with futures prices.[135] This is a small sample, but it is highly suggestive that the market has achieved a degree of integration that appears to cross both geography and time.[136]

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130. ARTHUR S. DE VANY & W. DAVID WALLS, THE EMERGING NEW ORDER IN NATURAL GAS: MARKETS VERSUS REGULATION 88-100 (1995). The standardized amount is one standard deviation of the observed distribution of price at that point.

131. *See* 1993 TASK FORCE REPORT, *supra* note 90, at 36-47.

132. The number of paths between any two points in a network expands as an exponent of the number of links in the system. A new hub produces more paths in the network than lead to it, and the larger the number of paths in existence, the more new paths will be produced by that hub. *See* DE VANY & WALLS, *supra* note 130, at 68-72.

133. *See* De Vany & Walls, *supra* note 123. The hubs were Northern Town Border Station, Washington; Maumee, Ohio, and Broad Run, West Virginia.

134. *See, e.g.*, Michael Hartzmark, *Luck Versus Forecast Ability: Determinants of Trader Performance in Futures Markets*, 64 J. BUS. 49, 72 (1991); and Charles Cox, *Futures Trading and Market Information*, 84 J. POL. ECON. 1215 (1976).

135. DE VANY & WALLS, *supra* note 130, at 127-40.

136. E. Brinkman & R. Rabinovitch, *Regional Limitations on the Hedging Effectiveness of Natural Gas Futures*, ENERGY J. (forthcoming 1995). In this more recent work, the authors have shown that the Henry Hub futures contract is a less effective hedge for gas moving into Rocky Mountain and West Coast areas than it is for the Gulf Coast, Appalachia and eastern Canada. The Kansas City Board of

D. MBRs in a Unified Market

Whether observed at the producing area, the market center, the city gate, or the futures market, gas prices provide abundant evidence that a highly competitive market has arisen with open access. Prices are arbitraged to the extent that it is generally impossible to consistently profit from predictable transactions. Delivered gas prices are the sum of producer prices, pipeline charges, and miscellaneous market-related costs. Producer prices are now unregulated, and most miscellaneous services sell at market prices. There remains the possibility that monopolistic pipeline rates are still causing dislocations or will do so when MBRs for transportation arrive. For example, if the pipelines in Figure 1 both act monopolistically, withholding capacity and marking up price by identical amounts, there will still be no profitable arbitrage on the network, but the pipelines will earn supernormal returns.

Most city gates are served by more than one pipeline. For those that are not, there are usually numerous paths from numerous fields that terminate at points near the city gate. For monopolistic pipeline pricing to be general under MBRs, pipelines would need to form and police collusions. Such a collusion would be easy to detect, since customers have access to public and nonpublic statistical data on capacity, as well as their own experience to go by. They can observe throughputs and can observe the activities of the pipeline and others through electronic bulletin boards (EBBs) on which released capacity and interruptible reversions are traded.[137] Treble antitrust damages and class actions will encourage pipeline shippers and entrepreneurial plaintiff's lawyers to watch closely.

A collusion among pipelines would also be more difficult to organize and coordinate than a collusion in a non-network industry. If there are a large number of possible paths between fields and consuming areas, the collusion must contain a large number of pipelines. If the market for flowing gas is national, only with extensive membership can a collusion put meaningful restrictions on the alternative paths that customers might use to escape the exaction. Even pipelines not directly interconnected must join such a collusion. The larger the colluding group, the more difficult it will be to reach agreement on sharing the gains. The sharing task is further complicated by the multiplicity of paths available to shippers, since prices on individual pipeline links must be set so that customers cannot easily arbitrage among those paths. Random gas discoveries and demand shifts in consuming areas would require that the agreement be flexible enough to accommodate such changes.

We have found no FERC proceedings in which shippers have alleged that an open-access pipeline has willfully withheld capacity or interruptible

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Trade is currently planning a new futures market whose deliveries will be made at Waha, located in West Texas, a region identified by De Vany and Walls as failing the cointegration test. Linda Micco, *Is the Midwest Futures Market Being Stalled?*, 3 GAS DAILY's NG 22 (Apr. 1995).

137. Since other colluding pipelines can look in as well, however, EBBs might ease the pipelines' task of monitoring the agreement.

service in quantities that are significant by antitrust standards.[138] There is instead considerable evidence against withholding of service. Pipelines regularly announce expansion plans when their capacity limits are reached.[139] With the help of expedited certification, pipelines under open access have persistently built new capacity, with $6.1 billion in new facilities proposed, under way, or completed during 1994.[140] Further lowering barriers to entry, pipeline construction costs have fallen by 37% in the past decade.[141] Market centers have grown substantially, but a pipeline wishing to exercise monopoly power should be reluctant to join with others in forming a market center. Such centers facilitate switching by shippers, both among pipelines and among alternatives to firm transportation, including storage. Pipelines themselves are investing in new storage facilities, although under no regulatory compulsion to do so, and are sometimes requesting authority to charge MBRs for it.[142] Oil pipelines are being converted to gas pipelines, and new pipelines are being built to competitively maximize, rather than minimize, interconnections with others.[143] Instead of behaving monopolistically, some pipelines are attempting to facilitate capacity release, presumably to win shippers from others.[144]

The evidence points to a conclusion that pipelines are already operating under a regime in which MBRs play a dominant role.[145] Discounted rates for short-term and released pipeline capacity are market rates, since they do not bump against the cost-of-service ceiling. On the other side of cost-of-service, a party that holds rights to capacity whose uncontrolled market value would exceed the nominal ceiling can realize their value by engaging in "gray market" transactions. In the gray market, a capacity holder transports gas on its own account for a third party which has actually arranged the gas purchase, and charges a single price for the bundle of gas plus transportation. Since the price of gas is unregulated, the market premium for the capacity can in effect be paid in the price at which the gas

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138. A pipeline faced with charges of withholding might claim operational necessity as a rationale for its behavior. The FERC seems an ideal forum in which to resolve the matter.

139. By installing some 98 miles of 30-inch diameter pipe to parallel and loop its Havasu crossover line, . . . [El Paso Pipeline] said it could "quickly react to changing market conditions by moving gas from any supply source to any market on its system." . . . El Paso maintained that it no longer controls the gas-flow patterns on its system and that they rather are "dictated by its shippers."

PGT May Expand Mainline Again; El Paso Can Loop Havasu Line, INSIDE FERC's GAS MARKET REP., April 21, 1995, at 17.

140. *Capping an Extended Period of Vibrant Construction Activity*, INSIDE FERC, May 15, 1995, at 12.

141. Exhibit accompanying remarks of Dr. Kenneth Lay, Enron Corp., before Pacific Coast Gas Association Annual Business Meeting, Houston, Sept. 13, 1995.

142. "[Eighteen] new [pipeline] storage projects were placed into service during 1994, representing 130 Bcf of additional working-gas capacity." *Id.*

143. *E.g.*, *Crossroads to Provide Pipeline Link from Midwest to East Coast*, INSIDE FERC's GAS MARKET REP., June 2, 1995, at 3.

144. *E.g.*, *CIG wants to Speed Capacity Awards to Keep up with Hedging Timetables*, INSIDE FERC's GAS MARKET REP., June 30, 1995, at 18.

145. For similar views, see Comments of the Interstate Natural Gas Association of America, The Path to Market-Based Pricing for Gas Services, Docket No. RM95-6-000, at 3 (April 21, 1995).

is resold to the actual user upon delivery. The gray market is not a perfect substitute for the open market since transactions in the former are more costly. Although it is hard to estimate the volume of gray market transactions, there is little evidence of capacity shortages and non-price rationing that would occur if a cost-of-service cap were a binding constraint on price.[146] If prices of pipeline services are flexible in both directions and capacity withholding is infeasible, the entire controversy over MBRs may be moot, since we already have them.

The behavior of both gas prices and pipeline rates provides abundant evidence of competition and little evidence of monopoly power. There is no known evidence that the degree of competition, in either gas or pipelines, rises with the number of pipelines serving an area. With wellhead prices decontrolled, it is clear that gas is priced competitively. With the development of an open-access pipeline network, there is growing reason to believe that pipeline services are being priced competitively. Rather than restricting the availability of capacity or allowing bottlenecks to grow, pipelines are expanding capacity and interconnecting more intricately with one another. If pipelines already operate in competitive markets, controlling their rates at historical cost of service (or any other amount) is more likely to inhibit the forces of competition than to temper the forces of monopoly.

V. Market Definition in the New Gas and Pipeline Markets

With open access, a unified national gas market has emerged, with buyers and sellers linked by a complex yet accessible net of interconnected pipelines. When the FERC considers the competitive impacts of its policies, it must keep its eyes on this broad market rather than the narrow ones it examines in MBR proceedings. Because the FERC's tools embody incorrect presumptions, they will probably point to incorrect policies. After looking at the logic of the FERC's presumptions, we propose a reversal in the commission's methods of analysis. Our proposal leads us to reexamine the logic of the staff's relevant product markets in light of recent history, and finally to reexamine the staff's arguments about pipeline undersizing.

A. Presumptions and Policy

In overseeing competition, the FERC places its initial reliance on principles taken from the Department of Justice's (DOJ) Guidelines for mergers. The Clayton Act, however, gives the DOJ clearer guidance than the NGA gives the FERC. Starting from a generally plausible presumption that markets are competitive (possibly less than perfectly so), the Clayton Act asks the DOJ to stamp out a monopoly before it can cause harm. Merger policy begins from where it wants the market to stay—in competi-

146. *See* Philip Marston, *The Rumble of Bundles: A Review of Experience Under the Capacity Release Experiment* (Repro, Hadson Corp., Washington, 1994); and *When Once Just Isn't Enough* (Graphs from presentation at DOE/NARUC Annual Natural Gas Conference, Orlando, 1995).

tion. The DOJ constructs its relevant markets and employs its chosen decision criteria with the objective of approving only those mergers that will maintain an existing state of competition.

When the FERC looks at competition, it must start elsewhere. The FERC's very existence as a regulator of price and entry is predicated on a belief that unregulated markets would be uncompetitive. The FERC expects that its regulation will mitigate market power by disallowing the prices a monopolist would charge and the outputs it would produce. In pipelines, the underlying conditions have changed. Open access has made possible a degree of competition, but probably one that falls short of perfection. The FERC must decide whether allowing competition to govern the changed market will produce better outcomes than its existing policy does. Regulation may in fact produce market outcomes superior to unregulated monopoly, but this observation tells nothing about whether regulation is preferable to competition.

Whatever the value of the DOJ's methods in merger cases, the FERC is using them to analyze the wrong problem. The DOJ's relevant market is the smallest producer group that might be able to act in concert to impose a small and sustainable price increase. That increase is over the current price, which is assumed to be competitive, or at least not anticompetitive.[147] If regulated rates bear no necessary relation to competitive rates, predictions from the HHI about how MBRs might rise above regulated levels are of little economic value. They are only predictions about how market rates might differ from rates that recover historical costs, a prediction unlikely to improve the quality of an MBR decision. The FERC's maximum acceptable price increase under MBRs is one "at or below the applicant's *approved* maximum cost-based rate plus 15%."[148] An applicant is thus more likely to get MBRs if it has already expended large amounts. An applicant whose investments were more productive per dollar than those of its competitors might violate the 15% threshold, while its competitors would not. The staff's rationale for starting from existing rates is another application of the lamppost principle:

> The regulated price has been used as the prevailing price — a proxy for the competitive price. This is necessary because almost all prices for transportation are regulated and a competitive price level would be, at best, a guess. However, the use of prevailing prices presents analytic problems. For example, three pipelines that follow parallel courses may have radically different rates because of different historical costs, despite the fact that in a competitive market they would offer almost identical services at almost identical prices. Which of the alternative pipelines' prices should be used as the "prevailing" price? This question would have to be addressed in deciding whether the prices of alternatives are appropriate references.[149]

147. More precisely, the pre-merger price rises if there is no collusion. Each producer in the DOJ's pre-merger market may have some choice about its price, and there is no necessary assumption that competition has driven price in the pre-merger market down to marginal cost.

148. 1995 STAFF PAPER, *supra* note 72, at 27 (emphasis in original, footnote omitted).

149. 1995 STAFF PAPER, *supra* note 72, at 27. The staff's assertion about identical services and prices may run into difficulty if shippers and pipelines negotiate heterogeneous contracts from an array

In effect, competition will prevail if a randomly selected number (the cost-of-service rate) that is unrelated to the likely post-MBR price falls into the right range.

On the FERC's criterion, MBRs might not produce even the rudimentary outcome of a single market price. If a market contains several pipelines with differing historical costs, the staff proposes an investigation of whose costs should be assumed to be the competitive price.[150] Let there be three pipelines with historical costs of $1, $2, and $3. If the FERC chooses $3 (and that also becomes the prevailing market price), two of the pipelines make unacceptably high profits. If the Commission chooses $1 or $2, it faces charges of confiscation and the problem of keeping the costly pipeline(s) whole. If it chooses a different benchmark for each, they cannot possibly compete to a single price without violating the 15% standard.

Competing under MBRs, some or all of these pipelines might earn high returns (or realize losses) relative to historical costs. MBRs are of value not because they link prices to historical costs, but because they facilitate rational planning for the future. Market rates send economically correct signals about where investment in new facilities will be valuable and where it will not, a signal that cost-based rates are unlikely to send as effectively. Upon institution of MBRs, the rates that prevail may or may not equal long-run competitive equilibrium rates. Only the future pattern of investments and disinvestments can determine those rates. Whatever the short-run returns to pipelines under MBRs, open access, capacity release, and interruptible reversion will foreclose withholding of capacity or service.[151] It is an absence of withholding, rather than a temporarily high or low price, that distinguishes competition from monopoly.

Beyond inducing efficient short-run allocations of capacity and long-run allocations of investment, MBRs can also resolve the inefficiencies associated with rates that are unnecessarily discriminatory. To discriminate profitably a pipeline must group its customers in accord with their elasticities of demand, in order to charge lower prices to those with a lower willingness to pay. The pipeline must also keep these customers separated or otherwise prohibit resales among them. With open access and MBRs, such a ban on capacity resale cannot stand because the pipeline's customers (and interested third parties) become its competitors. If there are disparities between price and cost among customers, capacity release facilitates arbitrage that eliminates those differences. Further, in a network market the potential victims of discrimination have alternative paths for delivery beyond capacity released by shippers on the discriminating pipeline.

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of competitive alternatives. It is unclear how one might extend a superficially appealing criterion about rates to situations that are governed by complex contracts.

150. 1995 STAFF PAPER, *supra* note 72, at 27.

151. *ANR Outlines Market-Based Pricing Proposals for Released Capacity*, FOSTER NAT. GAS REP., Dec. 2, 1993, 4.

B. *Examining Shares or Examining Barriers?*

The HHI standard of the DOJ's Guidelines determines when a relevant market can likely endure a horizontal merger without noteworthy effects on post-merger price. If a merger meets the HHI standard (and the underlying economic theory is correct), the DOJ can avoid a more speculative examination of competitive entry. If the DOJ wishes to find whether the merger will adversely affect any relevant market, it is appropriate to examine concentration first and barriers to entry later, if at all.[152] To evaluate the competitive effects of pipeline MBRs, the FERC should reverse that sequence.[153] Capacity release and interruptible reversion create the opposite of an entry barrier. A pipeline with idle capacity faces regulatory sanctions if it does *not* bring that capacity to market. If shippers can economically substitute among services of different terms and firmness (which depends on their prices), they constrain the pipeline's monopoly power in ways that do not occur in unregulated industries.

A pipeline's efforts to exact a high price for renewal of an expiring firm capacity contract will be self-defeating. A high quoted price raises the opportunity costs of other capacity holders and encourages them to release. If a pipeline attempts to withhold larger amounts of firm capacity, its interruptible service becomes more reliable and a better substitute for firm service. Unless, contrary to experience, shippers view the two services as poor substitutes regardless of their price and reliability, the attempted monopolization will be futile. A customer thus coerced into interruptible service can cushion the pain by using some smaller amount of released firm capacity, making contingency and exchange arrangements behind its city gate, and arranging for storage in both producing and consuming areas.[154] The customer need not even substitute gas for gas. It can invest in financial instruments and insurance policies to deal with either price or deliverability risks.[155]

Barriers to entry also provide a helpful perspective for examining possible analogies between pipeline MBR policy and deregulation in other industries. The staff's 1995 report contains an appendix on railroads, telecommunications, and airlines.[156] Broadly, the staff finds their perform-

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152. For more on the distinction between antitrust markets and economic markets, see David T. Scheffman & Pablo T. Spiller, *Geographic Market Definition Under the U.S. Department of Justice Merger Guidelines*, 30 J.L. & ECON., Apr. 1987, at 124, 124-28.

153. Some economists have recommended a similar screening of mergers in unregulated industries, first examining barriers to entry and only later examining concentration if barriers are high. *See* Steven C. Salop, *Symposium on Mergers and Antitrust*, 1 J. ECON. PERSPECTIVES 3, 7 (1987); Lawrence J. White, *Antitrust and Merger Policy: A Review and Critique*, 1 J. ECON. PERSPECTIVES 13, 17 (1987).

154. There is still a role for the FERC in dealing with opportunistic behavior, e.g., if the pipeline curtails interruptible service without good cause in hopes of making its overpriced firm capacity contracts look more attractive.

155. "Says [Greg Lander, Chairman and President of the National Registry of Capacity Rights], 'You deal with in money what you don't know in operational certainty.'. . . [B]ut for those in the utility business, says Lander, 'It can come as a shock that someone might settle the physical problem in money.' " Bruce W. Radford, *Simplify and Exaggerate*, 133 PUB. UTILS. FORT., Aug. 1995, at 6, 5-6.

156. 1995 STAFF PAPER, *supra* note 72, app., *Analysis of Other Industries*.

ances improved under deregulation, but also finds that deregulation in all three industries has brought with it some encounters with monopoly power. At some junctures, regulators and courts have accepted market definitions that resemble those being proposed for pipelines. Since these industries are in some ways similar to pipelines (e.g., network structure and high fixed to variable cost ratios), one might reason that those relatively successful deregulations bode well for MBR determinations that rely on the staff's proposed markets.[157] None of the deregulated industries, however, is characterized by open access, secondary markets, and mandatory offers of unused capacity.

One final potential "entrant" into deregulated markets is unlikely and unneeded. Specifically, large buyers with monopsony power may exercise countervailing power against monopolistic pipelines.[158] Economics provides no general theory of bilateral monopoly, and no reason to expect that the outcome of such bargaining will be desirable. The typical "power buyer" from a pipeline is an LDC that may have no good substitutes for firm transportation.[159] If the LDC is a highly inelastic demander of firm transportation rights to cover its worst-day situation, it will have few weapons with which to fight the victimization. It is also unclear why an LDC should care.[160] It recovers the pipeline's charges in rates to captive customers and cannot earn more than a regulated return. By holding large amounts of firm capacity that it chooses not to release (or to release only with onerous recallability provisions), the LDC can exert localized monopoly power against end-users behind its city gate. Economic misallocations and monopolizations by LDCs, however, are largely state regulatory issues.[161]

C. *Undersizing*

If a pipeline cannot credibly withhold capacity, its monopolistic potential shrinks and becomes unrelated to statistics of concentration. Unless users of long-term firm capacity have a general inability to substitute against it, release markets allow them to trade their holdings in accordance with their individual valuations, and open-access network markets allow them to do so on other pipelines. A case that substitution by customers is difficult, might be a case against MBRs. Instead of providing a theoretical or empirical study of that subject, the staff approaches the withholding

157. The link between the market analyses and the favorable experiences is unclear. The fact that interested parties (including regulatory staffs) used these market definitions in no way implies that they were dispositive in producing the good outcomes. The staff also does not look at the performance of markets affected by decisions that rejected such market definitions.

158. 1995 STAFF PAPER, *supra* note 72, at 37; *see also* Mary Lou Steptoe, *The Power-Buyer Defense in Merger Cases*, 61 ANTITRUST L.J. 493 (1993).

159. The staff asserts that this is so, without providing evidence for the view. 1995 STAFF PAPER, *supra* note 72, at 37.

160. If it operates under performance-based ratemaking or is at risk of disallowances for imprudent policy, the LDC might care.

161. They can become matters for the FERC if a large user can feasibly bypass the LDC and tap an interstate line directly.

problem by proposing a hitherto unstated objection to MBRs. Specifically, the staff claims that if MBRs are in effect, builders of new pipelines will undersize them.[162]

In the staff's illustrative example of undersizing, ABC is a hypothetical interstate pipeline seeking MBRs for firm transportation.

> ABC Pipeline might also allege [before the FERC] that released capacity on its own system and on other pipelines would provide good alternatives for [a certain LDC in this example]. However, in one very important respect released capacity, especially on ABC Pipeline itself, will have little, if any, impact on the assessment of ABC Pipeline's underlying market power in the primary long-run FT market. An analogy might help. Suppose there were only one manufacturer of automobiles, but robust used-car and leasing markets. Would the manufacturer have monopoly power? Yes. Even with a perfectly competitive secondary market for automobiles, the manufacturer could "contrive" a scarcity by making fewer new automobiles and charging a higher price than necessary to cover costs.
>
> Similarly, if a pipeline has market power, it would exploit it by "contriving a scarcity." Although a pipeline with a well-functioning capacity release program might not withhold *existing* capacity, it could choose not to expand. Customers can only release capacity they don't need; they can't build. As demand grows, a pipeline with market power could simply enjoy higher prices and refuse to build even if its customers were willing to pay the incremental cost of expansion. It would build only when the market clearing price for FT went above the monopoly price.[163]

If undersizing becomes a problem, there is a relatively unintrusive solution consistent with MBRs: If any entity (including speculators) wishes to bear the cost of a pipeline's capacity expansion and the pipeline refuses, allow the FERC to order construction. The customer bears the risk of the investment made at its request, and can enjoy the value of a successful project. The financier can act as an entrepreneur in marketing the space, in competition with all other holders of rights.[164] In the staff's hypothetical example

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162. Now a "very important" issue, undersizing is not mentioned in either the GALLICK study, *supra* note 82, or the 1993 TASK FORCE REPORT, *supra* note 90. One other study of undersizing seems inapplicable to the largely unintegrated gas industry. In the late 1970s, the DOJ claimed that the vertically integrated owners of regulated oil pipelines undersized them in order to recover profits in downstream markets that they could not extract from pipeline rates. For a summary of the issues, see Michael E. Canes & Donald A. Norman, *Pipelines and Public Policy*, OIL PIPELINES & PUB. POL'Y, 1979, at 141, 141-63.

163. 1995 STAFF PAPER, *supra* note 72, at 45 (emphasis in original, footnote omitted). The omitted footnote cites as authority Judge Hand's decision in United States v. Aluminum Co. of America, 148 F.2d 416, 424 (2nd Cir. 1945). Reliance on the logic of this case need not lead to the staff's conclusions. *See* Darius Gaskins, *Alcoa Revisited: The Welfare Implications of a Secondhand Market*, 7 J. ECON. THEORY, 1974, at 254, 254-71. The question of monopolistic undersizing depends in complex ways on whether the monopolist sells or rents the good. In pipelines, the analogous distinction is whether capacity holders can resell their holdings (not currently allowed) or are constrained to a release market. *See* Jeremy Bulow, *Durable-Goods Monopolists*, 90 J. POL. ECON., 1982, at 314, 314-332; *see also* Comments of Hadson Gas Systems, Inc., FERC Docket No. RM 95-6-000, at 9.

164. Here it may be important that regulation change to allow full resale of a holder's capacity rights, so that parties who do not directly finance construction are treated symmetrically with those who do. There has been one request for a FERC rulemaking on this issue. *Associated Gas Distributors and United Distribution Companies Request Rulemaking to Allow Direct Marketing of Firm Pipeline Capacity Rights*, FOSTER NAT. GAS REP., Dec. 30, 1993, at 26.

of an unregulated automobile manufacturer, no government agency has the power to order construction.

At the time of construction, nobody, including the FERC, knows how the demand for an unconstructed pipeline's services will vary over a pipeline's long lifespan.[165] Even if the statistical range of future demand is known, there is no easy formula from which to estimate the economically efficient size of the line. From society's viewpoint, a single large line built today is not necessarily a better use of resources than smaller, seemingly duplicative, investments spread over the future. The large line will foreclose future alternative uses for resources that will be of no value to pipeline users for years. Likewise, it is wasteful to build an overly large line whose full capacity is seldom utilized. Additions to existing facilities such as looping or compression can substitute for new construction. Open access and new market institutions also provide substitutes for new construction, because they offer choices of transportation paths and prices before them that were impossible under the old regime. In a network market, capacity additions by pipelines not directly connected with an origin-destination pair can undermine monopoly power held by pipelines that link those points.

MBRs provide signals of scarcity that cost-based rates cannot, both to allocate today's capacity and to indicate where new facilities are most valuable. If pipeline users expect that capacity on some link will be scarce a year from now, capacity releases extending beyond a year will carry premium prices that anticipate that scarcity. This price signal gives an early warning to investors that construction of competing facilities or expansion of existing ones may be warranted. Cost-of-service rates reveal nothing about where users expect new facilities to be valuable, or how valuable those facilities might be. The competitive consequences of MBRs extend both geographically and into the future. Suppressing price signals with a cost-of-service ceiling on any type of capacity transaction increases the risk that new capacity will be built in the wrong places, or in the wrong amounts.

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165. We have found only one FERC decision since open access that mentions pipeline undersizing. In a rate case, the Commission argued against an applicant's request that it reconsider a reservation charge based on 100% of a proposed pipeline's design capacity. The applicant claimed that the 100% factor would increase its risk of insufficient throughput, and in response it might choose to build an undersized line. The FERC responded:

> TransColorado further argues that high throughput percentages may force pipeline applicants to undersize proposed pipeline projects to reduce their risk. As we stated in the preliminary determination, "The central feature of the optional certificate procedures is the requirement that risk taking be entirely voluntary." This means that rates charged for new service be based on optimal use of the new facility as designed. If the sponsor of an optional certificate project "undersizes" its proposed pipeline project to reduce its risk as posited by TransColorado, the sponsor is simply making the kind of market-based decision that forms the foundation of the optional certificate procedures. An optional certificate applicant sizes its project based on the market conditions it perceives to exist. If it believes that a certain pipeline capacity cannot be optimally used, it is appropriate that it decide to lower the scale of its project to reduce its risk.

TransColorado Gas Transmission Co., 67 F.E.R.C. ¶ 61,301 (1994).

The relationship between competitive entry and undersizing is itself unclear. Gallick's finding that spurs from nearby pipelines to consuming areas can be constructed economically and quickly led to his recommendation that the FERC give thought to MBRs.[166] The FERC staff offers no rationale for its recommendation that the easy entry of competitors within a year is a necessary precondition for MBRs in markets that do not meet its HHI standard.[167] If entry takes more than a year, the staff appears to be saying that it is worse to have two years of monopoly rates followed by competition than to have rates set by historical cost for the indefinite future.

An alternative theoretical perspective gives reason to question the FERC's interest in undersizing and capacity withholding.[168] A monopolist's best strategy for maximizing long-term wealth may entail oversizing its facility beyond the economically efficient level at the time of construction. Such an investment can protect some of the monopolist's profit against potential builders of competing capacity. Simply threatening a price war against newcomers is insufficient, since the incumbent's best response to actual entry will be to accommodate the entrant, and the entrant knows this. To credibly threaten a price war that will ruin the entrant, the incumbent should build an oversized plant with low operating costs. With an unrecoverable investment in excess capacity, the incumbent can produce large quantities if entry occurs and sell each unit at slightly over operating cost. If forced to sell at such a low price, the potential entrant cannot recover the cost of a new plant, and will choose not to build it. Undersized facilities promise a profit to competitive entry rather than a loss. This theory is probably of little relevance to pipelines, since under open access an attempt at preemption by oversizing will probably be self-defeating. All of the capacity in an oversized facility must reach the market, where in the early years it can only sell at prices that do not cover the builder's cost.

D. Monopoly Power, Substitutes, and Prices

If the FERC reorients itself to market analyses that start from barriers to entry, as we recommend, it needs a method for identifying these barriers and determining their likely effects in an MBR regime. Competition is competition among alternatives, for both buyers and sellers. Access to alternatives is determined by the range of economic substitutions, and cost-

166. GALLICK, *supra* note 82, at 89-92. Regulatory delays for each of the four major pipelines or expansions reaching California since 1991 have exceeded construction times. Pacific Gas Transmission's expansion required 610 days for construction and 966 days for FERC approval. Newly-built Mojave Pipeline required 182 days for construction and 1,745 days for approval. These are unpublished figures supplied by Robert L. Bradley, Jr., of the Enron Corporation.

167. 1995 STAFF REPORT, *supra* note 72, at 26.

168. A. Michael Spence, *Investment Strategy and Growth in a New Market*, 10 BELL J. ECON., Spr. 1979, at 1, 1-19; and Richard G. Gilbert & David M.G. Newbery, *Preemptive Patenting and the Persistence of Monopoly*, 72 AM. ECON. REV., June 1982, at 514, 514-26. For an opposing view about the likelihood of such preemption, see Easterbrook, *Predatory Strategies and Counterstrategies*, 48 U. CHI. L. REV. 263 (1981).

of-service rates harm competition to the extent that they block either buyers or sellers from exercising their powers to make substitutions. Some of the best guidance for future policies toward competition is already on the record in the form of observed changes in markets since the inception of open access. Taken in conjunction with the evidence on market unification, they indicate competition of substantial scale and diversity. If this picture of the industry is an accurate one, when the FERC institutes MBRs it will be acknowledging market reality rather than changing it.

1. Which Products Matter?

If substitution defines the relevant market in which MBRs might affect competition, that market is the one in which pipeline customers arrange for supplies that are optimal from their individual viewpoints. Supply is a package of gas purchases, transportation, reliability, and financial arrangements. The optimal mix of supply-related contracts will vary with the prices of the package's components. With MBRs for pipelines and competitive conditions elsewhere, the price of any service will equal the marginal buyer's willingness to pay.[169] Buyers whose situations do not allow easy substitution will have a higher willingness to pay, but in a competitive market they will pay the same price as those buyers who are on the brink of switching.

In its studies of MBRs, the FERC has been most concerned with firm and interruptible transportation. This concern does not equate to economic relevance. "Firm" and "interruptible" are regulatory pigeonholes into which pipelines allocate costs. With MBRs, the market-clearing prices for those two forms of transportation might be quite distant from costs allocated according to existing rules. At the new prices, consumers might also have quite different views about substituting between firm and interruptible service, and about substituting either for the other services that comprise a supply package. Under MBRs, firm and interruptible transportation, as the FERC knows them, will survive only in competition with other rate and service offerings, some of which will be marketed by parties releasing capacity. Economic choices for pipeline users will depend on market conditions, which are themselves determined alongside the prices of the various services that make up a supply package. Some prices may be contractually fixed or relatively inflexible, while others may allow short-term flexibility.

With heterogeneous customers and the heterogeneous service offerings that will probably arise under MBRs, the analysis of competition requires additional care, particularly when comparing prices that are under longer-term contracts from those that are not. In its example, the staff states that interruptible and firm service are only substitutes for a hypothetical LDC if interruptible transportation (IT) is of sufficiently high qual-

169. In economics, a consumer's demand price for an extra unit of some good is the maximum price it would be willing to pay rather than go without that unit. Those with a high willingness to pay (marginal valuation) will outbid those with lower willingness. The lowest winning bidder, like all other buyers in a competitive market, pays the market equilibrium price.

ity, as measured by the probability of interruption. The pipeline seeking MBRs would "need to present evidence that IT was provided at a price that rendered the price of delivered gas using IT at or below the price of delivered gas using FT (firm transportation)."[170] A higher price for infrequent IT deliveries than for everyday FT deliveries is quite consistent with competition.[171] The LDC's least-cost strategy might be to avoid the high cost of holding firm capacity for its worst-day requirements, at the occasional risk of an exorbitant price for interruptible delivery.[172] The LDC's decision against full reliance on firm capacity indicates that IT is a substitute for it at market-determined prices.[173] By the staff's quality standard, a market may be competitive only when customers are buying supplies of a quality that would be too expensive for them at MBRs. If state regulators insist that an LDC hold an inefficiently large amount of firm interstate capacity, they will create economic misallocations with or without interstate MBRs. Such a state policy will lead to high prices for firm interstate service under MBRs, but such prices are scarcely a reason for the FERC to deny MBRs to the pipeline in question.

2. Patterns of Substitution

Long-term firm service deserves primacy in market analysis only if an open-access pipeline can meaningfully monopolize it. Virtually all of the industry's experience since open access indicates that economic substitutes for long-term firm service are abundant. Since open access, all relevant facets of the gas industry have moved from long-term arrangements to short-term ones. Because gas has become an ordinary commodity, purchasers construct increasing fractions of their supplies under short-term arrangements (longer-term contracts usually reference price changes to the spot market). The market's ability to alter prices, production, and shipping patterns as the economic environment changes allows traders to deal with contingencies that would otherwise require long-term contracts. Today's gas price efficiently incorporates information about today's market conditions and traders' expectations of the future.[174] Long-term fixed-price contracts are superior only if individual traders are better predictors than the

170. 1995 STAFF PAPER, *supra* note 72, at 42.

171. By this pricing standard, even the spot gas market may not be competitive. If there has been an unexpected rise in demand after bidweek, the price of swing market gas [increments or decrements to bidweek contracts] will be higher than the bidweek price, an increase that is necessary to elicit supplies that would have been shut in at the bidweek price. A user can protect itself against high swing prices by contracting for its worst-case requirements during bidweek, but this strategy need not be best for it.

172. The staff does not examine price/quality differences of the opposite sign, although the analysis might be useful. Specifically, when can IT sell at too large a discount relative to FT, i.e., one which overstates the difference in quality between IT and FT?

173. On the other side of the actual market, prospective capacity releasors are complaining that competition from IT has cut the prices they receive for their capacity to unacceptably low levels. *See Pipeline IT Deals Are Undercutting Released Capacity, SoCal Gas Says*, INSIDE FERC, Dec. 19, 1994, at 15.

174. Here, efficiency is used in the sense of Section IV A *supra*.

market. As predictors of future prices, spot and futures markets have substantially outperformed long-term fixed-price contracts.[175]

The FERC imposed open access on an industry dominated from birth by long-term full-requirements contracts. Those contracts may have been economically efficient for an industry without open access.[176] Long-term contracts save the costs of repetitive contracting and can deter opportunism by parties who have made large and highly specialized investments.[177] Pre-open access, a producer could best protect its exploration and production investments with a pipeline contract whose provisions would be in effect for the life of its wells. A pre-open access pipeline would contract with the producer because it needed a dependable source of gas to resell at predictable prices under its long-term contract with an LDC. A long-term requirements contract between the pipeline and the LDC would likewise facilitate payoff of the location-specific investments that each of the parties had made in order to serve and be served. Under open access, long-term requirements contracts become the exception. The producer now faces a nation of alternative buyers reachable by pipelines that cannot refuse to provide service. The LDC has a similar richness of competitive gas suppliers. If both parties have the abundant alternatives of competition, each will probably prefer short-term transactions, hedged according to their individual preferences. The long-term fixed-price LDC contracts that remain are overpriced insurance policies that persist because LDCs can transfer their risks to captive end-users.[178]

An LDC or end-user in the unified market will probably be buying spot gas under short-term agreements. Someone who purchases gas on these terms from different production areas will place little value on long-term firm transportation over a given pipeline segment. Inflexible long-term transportation and flexible short-term gas purchases are unlikely to be a useful combination.[179] Long-term firm capacity reservation will be economic in a market dominated by types of long-term gas contracts that are

175. Robert J. Michaels, *When Captive Customers Bear the Risk*, PUB. UTILS. FORT., Nov. 15, 1993, at 25.

176. In contrast to the choices that market participants have made since open access, some economists continue to argue for the superiority of long-term contracting. *See* Thomas P. Lyon & Steven C. Hackett, *Bottlenecks and Governance Structures: Open Access and Long-Term Contracting in Natural Gas*, 9 J.L. ECON. & ORGANIZATION, 1993, at 380, 380-398; and David J. Teece, *Structure and Organization of the Natural Gas Industry*, 11 ENERGY J., Mar. 1990, at 1.

177. OLIVER WILLIAMSON, THE ECONOMIC INSTITUTIONS OF CAPITALISM 103-30 (1985); Benjamin R. Klein et al., *Vertical Integration, Appropriable Rents, and the Competitive Contracting Process*, 21 J.L. & ECON. 297 (1978).

178. See Michaels, *supra* note 175, which also discusses lack of analogy between an investor holding a mix of securities and a gas purchaser holding a mix of gas contracts of different terms.

179. In its analysis of Order 636, the FERC staff argues that the Order will facilitate the formation of new long-term gas contracts, an outcome that has not materialized. As the markets have evolved, traders do not find the contracts desirable, and economists do not find them efficient. One could better praise Order 636 because it has so equalized access to pipeline transportation that it facilitates the making of short-term gas contracts that are more responsive to market conditions. OFFICE OF ECONOMIC POLICY, FED. ENERGY REG. COMM'N, COSTS AND BENEFITS OF THE FINAL RESTRUCTURING RULE, at 7-9 (1992).

in eclipse. The staff's hypothetical of an LDC with a highly inelastic demand for long-term firm capacity is fast becoming counterfactual. Recently, and more so over the near future, long-term capacity contracts between pipelines and LDCs dating from before open access will expire.[180] The available evidence is that those contracts will be replaced by shorter-term arrangements, for volumes that do not necessarily give the LDC "worst day" firm rights.[181] If pipelines prefer the income guarantees of long-term firm capacity contracts, their inability to renew such contracts on the old terms is another indication of the growth in competition that they face under open access.

Transportation service has responded to institutional changes. In the early years of open access, interruptible transportation became the choice of end-use transporters who could not obtain firm interstate rights from their LDCs. Likewise LDCs used interruptible service to reach short-term opportunities outside of their usual supply areas. As capacity release markets have become organized, their growth has diminished the role of interruptible transportation. Shippers have become increasingly able to obtain shorter-term (and sometimes long-term) firm capacity, and the fraction of interstate throughput moving by interruptible transportation has begun to fall.[182] One pipeline applying for MBRs has told the FERC that the growth of capacity release on its system is evidence that it lacks market power in interruptible transportation.[183]

Capacity releases provide evidence of competitive substitution and evidence of the forces at work to circumvent restrictions on market activity. Where users value released capacity at more than the legal ceiling rate, gray market transactions have increased. There is growing awareness that the caps inhibit desirable competition, accompanied by a growth in policy discussions about their elimination.[184] On the other side, pipelines with excess capacity to offer (and capacity release markets on these pipelines) frequently discount prices below the maximum that the FERC allows them to recover.[185] While not itself evidence against monopoly power, discount-

180. *Pipelines, Wall St. Focusing on Cost Exposure from Capacity Turnback*, INSIDE FERC, Mar. 27, 1995, at 1.

181. *Transwestern to Cover 70 % of Costs of Relinquished SoCal Gas Capacity*, INSIDE FERC'S GAS MARKET REP., May 5, 1995, at 1; *El Paso Eyes Capacity-Turnback Fee; PG&E to Walk Away from 1.14 bcf/day*, INSIDE FERC'S GAS MARKET REP., June 30, 1995, at 10.

182. *INGAA Study Finds "Sustained and Rapid" Growth in Number and Size of Capacity Release Transactions During First Three Quarters of 1994*, FOSTER NAT. GAS REP., Feb. 23, 1995, at 5; *INGAA's Annual Transportation Survey Shows Continued Decline in Interruptible Volumes, Dramatic Growth in Capacity Release*, FOSTER NAT. GAS REP., Aug. 24, 1995, at 20.

183. *Order 636 Experience Raises Secondary-Market Issues on Transco*, INSIDE FERC, Nov. 7, 1994, at 7.

184. *Commissioner Hoecker Says FERC Must Ultimately Consider Additional Approaches to Capacity Releasing*, FOSTER NAT. GAS REP., Jan. 13, 1994; *Secondary Market is the Place to Start Negotiated Rates, FERC Told*, INSIDE FERC, May 8, 1993, at 11.

185. In March 1994, normally a high-load month for gas flowing to California, released firm capacity on El Paso Pipeline was being heavily discounted: Four percent was flowing at 20% or less of the pipeline's maximum rate; 53% at 30% of the maximum rate; 22% at 55% of maximum, and 19% at 100% of the maximum. The entities paying 100% were all California "core aggregators," prohibited by

ing suggests a test of the FERC's structural theory.[186] After correcting for differences in market conditions, if the FERC's theory is true, discounting should be less frequent or less deep in areas with high HHIs, other things equal. One recent statistical study finds no differences in the depth of discounts offered at city gates served by a few pipelines (i.e., high HHI) and those served by many. Additionally, that study found that seasonal differences in discounting were insignificant, indicating that pipelines could not even exact higher prices for deliveries in peak heating periods.[187]

Growing markets for unbundled services further constrain the pricing of transportation. Unbundling allows pipeline users greater freedom to choose the size, interruptibility, and timing of their transportation. Capacity release has opened up new types of markets and ways of linking them.[188] In gas itself, the bidweek spot market is being joined by a growing swing market for those who wish to change their gas purchase or delivery plans. Increased availability of storage allows the substitution of off-peak pipeline service for on-peak, short-term firm capacity for long-term, and interruptible service for firm.

Market centers have grown both in number and in the range of services offered.[189] These services include gas and transportation exchanges (sometimes including market making), imbalance trading, scheduling, accounting, and short-term storage injections ("parking") and withdrawals ("advances"). There is no obvious limit to the locales that might serve as market centers.[190] The growth of access to pipeline electronic bulletin boards mandated under Order 636 (and growth in their standardization

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state regulation from using discounted interstate capacity. *Competition for Throughput Means Lower Rates to California Markets*, INSIDE FERC's GAS MARKET REP., April 22, 1994, at 1.

186. Discounting has been substantial since the beginning of open access. Between 1984 and 1993, the average pipeline markup per Mcf to the city gate (mainline transportation cost) fell from $1.67 to $1.19, in constant 1993 dollars. *The More Things Change. . .*, NAT. GAS WEEK, Feb. 13, 1995, at 1.

187. PAUL W. MACAVOY ET AL., FEDERAL ENERGY REGULATORY COMMISSION ORDER NO. 636 AS THE PENULTIMATE REGULATORY REFORM OF THE GAS INDUSTRY, JOHN M. OLIN FOUNDATION WORKING PAPER 38, at 35 (1995).

188. Capacity release could help K N Gas Marketing's bottom line by increasing revenues from sales to new markets that otherwise would not have been made . . . [I]n the summer months when released capacity was selling at bargain-basement prices, [K N] was able to pick up that capacity at such a discount that it was able to sell to markets it never would have cracked in the pre-Order 636 environment.

Marketers Find New Opportunities through Capacity Release Deals, INSIDE FERC's GAS MARKET REP., Dec. 2, 1994, at 1.

> Capacity release also was a factor in KCS Energy's decision to expand its market presence on the west coast. The Director of Transportation stated the "Capacity release has opened up an opportunity to take advantage of basin swaps, . . . We have a much larger capability of doing pipe-to-pipe transfers now than we did prior to Order 636."

Id. at 2.

189. Ray Klempin, *Here Come the Hubs!*, GAS DAILY's NG 1 (Sum. 1993), 20-23.

190. As examples, one proposal uses compression changes in a large interstate line to accommodate the gas flows of a market center. Another proposal intends to use the pipe network under New York City to do the same. Yet another proposed market center will not have a single pipeline operator. *CNG Transmission Files for Rates; Requests on Noram Exceed Capacity*, INSIDE FERC's GAS MARKET REP., May 20, 1994, at 17; *Gas Industry Competition Goes Underground*, ENERGY DAILY, July 14, 1995, at 2.

and detail) makes it possible for a wider set of users to evaluate and acquire alternative transportation paths. Although they are not parts of gas supply technology, the growing markets for gas futures, options, and derivative contracts further facilitate transactional flexibility. They give traders and speculators new instruments for coping with all types of risk, including risks that transportation will be unexpectedly overpriced or unavailable.

VI. Conclusions

Cost-of-service regulation does not produce competitive prices. The only place to find those prices is in competitive markets. If MBRs for interstate pipelines replace regulation, the FERC must gain a reasonable expectation of whether the markets that develop will be competitive or monopolistic. The tools the FERC has chosen to use, however, are those of an antitrust enterprise whose subject markets and policy goals are not the FERC's. Application of the antitrust tools to regulated industries, and particularly to pipelines, will be inappropriate at best and disastrous at worst. Both the antitrust paradigm and the NGA tell the FERC to determine competition by looking at the parties it regulates. In most markets, this makes sense, since corporate owners of facilities make decisions about their output and price. In pipelines, it does not. Under open access, their owners cannot decide to put less than all of their capacity on the market, and they must trade it in competition with customers and others who participate in the release and interruptible markets. The FERC must look behind the corporate veil of pipeline ownership.

In a regulated natural monopoly, efficiently served markets will have only a small number of pipelines to choose from. If pipelines in an area do not exhibit a high HHI, regulators have done their job poorly, because they have certificated an inefficiently large number of inefficiently small pipelines. The lines themselves are technological natural monopolies, but this fact is of little value for market analysis. Competition is feasible if space in them can be allocated by a market, as in capacity release, and if owners cannot withhold capacity, as is guaranteed by interruptible reversion. It is important to distinguish the structure of a market from the institutions under which people trade in it. In some cases, such as bidweek for spot gas (and most other unregulated markets), structure and institutions match in one important respect. There are many independent buyers, sellers, and speculators, each with its own corporate identity. The available theories of competition in this market may be infirm, but there is no question of who is executing the trades and might exercise market power. In interstate pipelines, structure and institutions do not match. Under open access, the pipeline whose capacity is being traded gives up important rights over that capacity, and in doing so ceases to be identifiable as the sole seller of it. The FERC mistakenly treats the pipeline as the sole seller and calculates market shares on this basis for sales of capacity that it cannot refuse to market.

There are costs of regulating and costs of not regulating. The FPC imposed cost-based wellhead price controls on a naturally competitive producing sector and generated shortages that caused far more loss to the economy than they saved for gas consumers. Wellhead prices were the final prices to be controlled in an industry where regulation had frozen all of the other sources of market flexibility. Interstate pipeline rates seem to present the obverse. Wellhead decontrol and open access have brought highly competitive markets to all other important sectors of the industry.[191] The wealth of options available to the participants in those markets has allowed them to mitigate some adverse effects of cost-based pipeline rate regulation. They can contract around monopoly by choosing gray market transactions, alternative paths in the network, unbundled substitutes for firm transportation, and financial hedges. Given the observed patterns of trade and substitution, we must seriously entertain the possibility that the interstate pipelines already operate predominantly under an MBR system, and that the FERC can best adapt to the reality by officially adopting an MBR policy. If we do have MBRs, however, the competitive forces that act to determine them bear no discernible relationship to the origin-destination concentration statistics on which the FERC bases its analysis of competition.

191. LDC monopoly power over customers behind city gates is a matter for state regulators. The impact of interstate deregulation is being felt in LDC territories, and pressure is increasing for LDCs to institute unbundled transportation programs. *See* Suedeen G. Kelly, *Intrastate Natural Gas Regulation: Finding Order in the Chaos*, 9 YALE J. ON REG. 355 (1992).