

Regulatory Policy and the Reverse Cellophane Fallacy

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I. Introduction

A central concern of antitrust analysis is determining whether or not a firm possesses significant market power. As a general matter, any investigation of whether a firm's action—whether it is a pricing action, a contracting action, a merger, or any other behavior—is likely to have anticompetitive effects starts with a market power analysis. Much economic research, therefore, has been devoted to the question of how to assess market power in real-world settings such as antitrust litigation and merger challenges.

In the economic theory of regulated industries, in contrast, relatively little attention has been paid to determining whether an already-regulated company has market power. This is because, of course, it is assumed that regulated firms have market power. Indeed, the justification for economic regulation of industries such as telecommunications, electricity, water, and gas has been that these industries are natural monopolies and that, in the absence of regulatory oversight, providers would exercise the resulting market power to the detriment of consumers. Moreover, once a firm is subject to regulation that protects it from competitive entry, the regulatory-enforced entry barriers themselves ensure that the firm has market power that is checked only by some sort of pricing supervision or that is, as we will discuss shortly, created by the pricing supervision itself.

The question of whether regulated incumbents possess market power has, however, assumed prominence in recent years as regulators grapple with policy directives to deregulate traditionally-regulated industries. Specifically, state-level regulators in the US have been confronted with the issue of whether, in light of the federal legislation dismantling entry barriers, it would be in the public interest to dismantle pricing regulation at the state level. These proceedings have predictably focused on assessing the market power of the regulated incumbents.

Applying traditional tools and benchmarks to assess market power of a regulated firm would lead to erroneous conclusions, however, to the extent that the traditional tools are founded on assumptions regarding market dynamics that are invalid in a regulated industry. The history of regulation will inevitably have altered the incentives, behavior, and investments of would-be competitors (if any), so that, for example, an absence of apparent potential competitors that might be a signal of market power in an unregulated

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market may, in a regulated market, be an artifact of the regulation itself, rather than the structural economics of the industry. If one were to conduct a traditional market power analysis in order to determine whether regulation is necessary to protect consumers, without regard for the effects that the regulation itself has had on the market, regulation could therefore become self-perpetuating. The regulatory constraints on the market would, in some circumstances, impede the normal functioning of competitive forces, resulting in a market that appears to fail competitive criteria, which in turn leads regulators to perpetuate the regulatory constraints.

In theory, economic regulation is imposed on an industry because the structure of the industry is thought to be one that would not support competition at a level that would (even if imperfect) generate benefits for consumers greater than the benefits of (also necessarily imperfect) regulatory intervention. The viability of competition in a market, however, can change over time. As technology changes, competitive strategies may become economically viable that were not viable before.¹ Put differently, a market that was a natural monopoly at one time may no longer be so. The necessity of regulation should, therefore, be reassessed from time to time. When it is reassessed, it is critical that the criteria and methodology for determining whether a firm has market power properly reflect the unique characteristics of regulated markets. In certain respects that we will elaborate in this paper, assessing market power (and market definition) for a regulated firm is substantially different from the standard antitrust methodology as codified in the U.S. Department of Justice and Federal Trade Commission's *Horizontal Merger Guidelines*² and the antitrust literature.

In this paper we show that applying the “small but significant non-transitory increase in price (“SSNIP”) test for market power that is defined in the *Horizontal Merger Guidelines* to firms in regulated industries can lead to the reverse of what is referred to in the antitrust literature as the “cellophane fallacy.” The cellophane fallacy occurs when assessing the market power of a monopolist by applying the SSNIP test at the monopoly price. Because a monopolist will rationally increase price to a point where other goods or services become substitutable, the test would lead analysts to find more substitutability (broader product markets) than is warranted, and erroneously infer a lack of market power. In the regulated setting, prices that are set by regulatory fiat at below-cost levels would cause the opposite error: what we term the “reverse cellophane fallacy.” The uneconomically low prices cause other services to appear to be weaker substitutes than they would be at competitive prices and, therefore, lead to improperly narrow market definitions and erroneous inferences of market power. This in turn leads to a self-perpetuating nature of regulation, in which regulators insist on finding that the incumbent

¹ Consider, for example, VoIP and mobile wireless telecommunications services. The development of VoIP into a commercially viable, high quality voice service has enabled cable companies to compete with incumbents in the provision of local voice telephone service using the cable companies' own facilities into customers' homes or businesses. The improvements in quality and proliferation of service features of mobile wireless telephony have turned what was once perhaps a complementary service to wireline telephony into an economic substitute.

² U.S. Department of Justice and the Federal Trade Commission, *Horizontal Merger Guidelines*, issued April 2, 1992, revised April 8, 1997 (hereafter, *DOJ/FTC Horizontal Merger Guidelines*).

lacks market power before deregulating prices, while the artificially restricted prices lead to an erroneous inference of market power.³

We test this hypothesis empirically by examining the relationship between the regulated retail and wholesale prices of local telephone service, and the extent of competitive entry in a sample of “markets” (incumbent local exchange service areas) in a single state in the U.S. in 2004. We compare the variation in regulated prices and costs to the pattern of competitive entry in these markets, and perform a multivariate regression analysis to evaluate whether, and to what extent, the margin (regulated retail price less wholesale price) had a statistically significant impact on wireline competitive entry after controlling for the effect of the size of the service area. We find that there is little or no competitive entry in those markets where the regulated retail price was held the furthest below cost, and determine that the observed positive relationship between competition and the margin is statistically significant. Our findings indicate that the relative absence of competitive activity in high-cost rural areas should not be interpreted as evidence that the incumbent would be able to exercise market power in the absence of price regulation. Rather, a proper competitive analysis must control for, and eliminate the potential errors of inference caused by, the regulated price structure.

In the following section, we describe how price regulation can lead to a biased application of the SSNIP test for market power in regulated markets, and propose a remedy, which we call the NIPAC (Non-transitory Increase in Price Above Competitive levels) test. In Section III, we explain that while market concentration metrics can provide a useful screen for market power in some cases—where the market is “structurally competitive”—even this limited application is defeated in markets where regulated prices are set below cost. In Section IV, we describe the cellophane fallacy—a limitation of SSNIP test that can result in an *overly-broad* definition of the market—and explain how it can become reversed—that is, result in an *overly-narrow* definition of the market—if applied to define a price-regulated market. In Section V, we present a case study based on a sample of local exchange telecommunications “markets” (incumbent local exchange service areas) that we believe illustrates the reverse cellophane fallacy. In Section VI, we present our conclusions.

II. Market Power and the SSNIP Test

Market power is generally defined as the ability of a company to profitably increase price by a small but significant amount above the competitive level for a significant period of time.⁴ To determine whether a SSNIP would be profitable for a given firm or candidate market, the analyst must assess whether other firms not in the candidate market are in a position to respond to a price increase over current price levels by taking away sufficient business that the price increase would cause the profits of firms in the candidate market

³ Indeed, according to Alfred E. Kahn, *The Economics of Regulation: Principles and Institutions*, Vol. II (New York: John Wiley & Sons, Inc., 1971), p. 116, “[n]o barrier to entry is more absolute than one imposed or enforced by the sovereign power of the state. All others are potentially subject to hurdling, erosion, or circumvention.”

⁴ See, for example, *DOJ/FTC Horizontal Merger Guidelines*, § 0.1, p. 2.

to fall. This is generally analyzed as a question of whether entry (or expansion of capacity) would be timely, likely, and sufficient to defeat the hypothetical price increase.⁵ Hence, the SSNIP test ultimately requires an assessment of entry and expansion conditions into the proposed market in response to the hypothetical price increase.

To understand the role of regulation in market power analysis for a given industry, one must understand the specific form that the regulation takes. In this paper we focus on the telecommunications industry, though we believe the principles we articulate are applicable more broadly. A significant and long-standing regulatory policy and source of pricing distortion in the telecommunications industry in the U.S. and abroad derives from the objective to achieve “universal service”—a term applied to policies that strive to make basic (or in some cases, advanced) telephone service “affordable” for all customers. “Universal service” is a policy by which prices are held below competitive levels in order to induce near-100 percent subscription to the public switched telephone network. An economic rationale for these policies is that local calling can generate a positive externality; one person’s decision to subscribe to the telephone network increases the value of the network to all other subscribers who may communicate with that person. In order to ensure, for instance, that rural customers in high-cost areas have access and are encouraged to subscribe to local telephone service, regulators have established policies to keep the monthly charges below long-run incremental costs to rural customers. In turn, regulated carriers were traditionally permitted to make up for this deficit by charging prices above incremental cost to business and non-rural residential customers. That is, universal service has been achieved historically by an implicit cross-subsidy scheme. In the U.S., while more recently regulators have sought to replace implicit subsidies with explicit subsidies available equally to all providers, the implicit subsidization of incumbent services provided to some residential customers in high-cost areas and to low-income customers, subsidized by above-cost prices to business and urban customers, still exists in some areas.⁶ We explore in some detail the competitive implications of rural high-cost subsidies later in this paper.

This scheme of intra-firm subsidization was viable in a regulatory framework that protected local exchange incumbents from competitive entry. With passage of the U.S. Telecommunications Act of 1996 (“TA96”), however, regulated incumbent local exchange companies have begun to emerge from a regulated monopoly environment. The purpose of TA96 was to open all telecommunications markets to competition.⁷ The provisions set forth to achieve this purpose are complex and many, including a number of wholesale regulatory obligations imposed on incumbent providers. For instance, TA96 requires RBOCs to provide any requesting telecommunications carrier:

- Network interconnection at any “feasible” point within the RBOCs network;⁸

⁵ *DOJ/FTC Horizontal Merger Guidelines*, § 3.0, p. 25.

⁶ The continuation of implicit subsidies is in part a consequence of regulators’ efforts to adopt explicit subsidies that retain (although to a lesser degree) implicit subsidies.

⁷ See, Telecommunications Act of 1996, § 253(a), which states: “No State or local statute or regulation, or other State or local legal requirement, may prohibit or have the effect of prohibiting the ability of any entity to provide any interstate or intrastate telecommunications service.”

⁸ Telecommunications Act of 1996, § 251(c)(2).

- Access to the RBOCs’ “unbundled” network facilities at some measure of cost determined by the regulator;⁹ and
- The ability to resell RBOC services at a wholesale discount reflecting the avoided costs of retailing the service.¹⁰

As a condition for the right to enter into long-distance services, the RBOCs were required to demonstrate compliance with each of these market opening provisions on a state-by-state basis. It took almost four years for the first RBOC to receive the regulatory approval necessary to provide long-distance services.¹¹ Many of these regulations had never been implemented before, especially with regard to network unbundling.¹²

In the wireline local telecommunications industry, TA96 instructed regulators to open local telecommunications markets to competition by implementing the above-noted provisions, but left it to the states to determine if and when retail local exchange prices would be deregulated. In recent years state regulators have, to varying degrees, conducted adversarial-type proceedings to assess whether the public interest would be served by relaxing or eliminating retail price regulation in light of the market-opening provisions of TA96. As we noted in our introduction, these proceedings have substantially turned on whether the incumbent providers possess significant market power.

Hence, in what has long been a regulated industry in which determination of market power was a moot issue, at least for regulators,¹³ the determination of whether an incumbent possesses significant market power has become central to recent regulatory policymaking. What has not been uniformly appreciated in these venues, however, is that the presence of regulation must affect the market power analysis, and that one cannot accept wholesale the standard market power methodology without properly reflecting the regulatory institutions relevant to the market. Regulators whose expertise tends to lie in regulatory policy, not competition policy, have been encouraged by competitive entrants to adopt formulaic approaches to determining market power without correctly incorporating the effect of regulation on the analysis. While the fundamental principles of market power analysis—whether a firm can increase price to and sustain it at a supracompetitive level—apply to any market, the process for assessing whether there is market power must be adjusted for the effects of regulation on the market.

⁹ Telecommunications Act of 1996, § 251(c)(3) and § 252(d)(1).

¹⁰ Telecommunications Act of 1996, § 251(c)(4) and § 252(d)(3)

¹¹ The first state to grant an RBOC the right to enter the long-distance market was New York in December 1999. Six months later, in June 2000, the Texas commission granted that state’s RBOC the right to enter the long-distance market. By the end of 2003, RBOCs had received regulatory approval to provide long-distance service in each state they served. See, Federal Communications Commission website, “§ 271 Applications,” www.fcc.gov/Bureaus/Common_Carrier/in-region_applications/.

¹² Robert W. Crandall and Leonard Waverman, “The Failure of Competitive Entry into Fixed-Line Telecommunications: Who is at Fault?,” *Journal of Competition Law and Economics*, Vol. 2, No. 1 (2006), pp. 113-148.

¹³ Though, of course the issue of market power was not a moot issue for the court in the divestiture case.

For a regulator facing the question of whether to deregulate prices or relax regulation in some way, the relevant policy question is not whether a regulated incumbent possesses market power under the current regulatory regime, but whether it would possess market power in the but-for world in which the proposed regulatory relief is provided. This general observation is of particular relevance to the telecommunications industry in light of the regulatory mechanisms imposed on that industry that we have discussed. To take the simplest observation, if incumbent pricing constraints that have held prices below cost are now lifted, then the incumbent can profitably increase price to cost. Regardless of the elasticity of demand or extent of competition facing the firm, increasing price from below cost to cost cannot decrease profits. Yet such a profitable price increase certainly does not indicate market power. By definition, a firm that profitably increases price (to cost) in such a circumstance is not exercising market power, but merely responding to the relief from a regulatory price distortion that would be unsustainable in a competitive market. In a textbook perfectly competitive market in which there are many firms willing and able to enter and compete at the incumbent's cost-based price, the incumbent would nevertheless increase price to a cost-based level because doing anything less would ensure failure.

If the regulated price has been held significantly below cost, then the magnitude of the price increase—from a below-cost regulated rate to a cost-based level—could be quite large. Increasing price to a supracompetitive level would therefore entail an even greater increase. The SSNIP test, however, prescribes examination of a *small* increase above *current* levels. Hence, one cannot apply the SSNIP test to a price regulated firm whose price is held below cost intentionally for policy reasons, or whose price might be inadvertently below cost due to regulatory error, and reliably determine whether that incumbent has market power. A small price increase above current suppressed levels might not result in a compensatory price and would therefore not form a basis for determining whether competitive entry would be viable.

The relevant market power question, as we have observed, is therefore this: in a but-for-regulation world—a world where prices are not controlled and entry is not protected by regulators—would the firm be able to exercise market power by profitably increasing price to and sustaining it at a significantly supracompetitive level? A key distinction between this type of analysis and the standard SSNIP test, obviously, is the requirement that the hypothetical price be raised to and sustained at a *supracompetitive* level, rather than simply the requirement in the standard approach that the price be raised a small but significant amount above its *current* level. We observe, however, that the former is indeed the proper test in all circumstances (regulated or not), and the latter, the standard SSNIP test, is presumably intended to be a proxy for it.

In unregulated markets it is reasonable and appropriate to assume, barring contrary information specific to the industry, that the current price is compensatory and is therefore at or above a competitive equilibrium price. Hence, asking whether price could be increased above current levels would, at a minimum, not suffer from the defect that the candidate price may be unsustainable even for the incumbent, and may possibly serve as a reasonable substitute for asking whether prices could be increased to a

supracompetitive level (albeit subject to the concerns raised by the cellophane fallacy). In contrast, in price regulated markets, this cannot be presumed to be a reasonable assumption, for the reasons we have discussed.

One might conclude from this discussion that any test of market power for price-regulated firms would require first identifying the “compensatory” or “competitive” price, in order to test whether the incumbent could profitably raise prices above that level. This would indeed be a daunting task, redolent of all of the challenges and disputes associated with the many years of highly resource-intensive cost cases handled by regulatory agencies, the difficulties of which led in part to replacing cost-based regulation with incentive regulation in the 1990s.¹⁴

In our view, such an analysis is not necessarily required, however. As we have observed, the fundamental determinant of whether a firm is likely to be able to exercise market power is whether entry by competitors would be sufficient, timely, and likely (to use the terminology of the *Horizontal Merger Guidelines*) that the incumbent would be prevented from increasing price and sustaining it at a supracompetitive level. If entry is easy in that sense, a firm whose prices had been held below cost could, if granted pricing flexibility, increase price to compensatory levels, but would be precluded by actual or potential entry from increasing price to supracompetitive levels. It is not necessary to know what the compensatory price level is to conclude that, if entry is sufficiently easy to defeat a supracompetitive price increase, and if there are potential entrants who could exploit that ease of entry, they would do so if the incumbent increased price to supracompetitive levels. In short, and not surprisingly, first principles tell us that the fundamental determinant of market power in both regulated and unregulated markets is entry conditions.

In application to regulated markets, one must conduct the following thought experiment: if the incumbent were to attempt to establish a significantly supracompetitive price (with the analyst not knowing what that level is) are entry conditions such that sufficient entry would likely occur to defeat the price increase and drive prices to competitive levels? We refer to this test as the NIPAC (Non-transitory Increase in Price Above Competitive levels) test, in contrast with the SSNIP test.

In principle, the NIPAC test is the same as the SSNIP test—they rely on the same economic definition and fundamental criteria for market power. In practice, as we have observed, conducting a NIPAC test differs from a SSNIP test in that the hypothetical increase in price that is being analyzed may not be small (the first S in SSNIP being “small”) because current regulated prices may be substantially below cost, and the magnitude by which they are below cost is unknown. In a regulated market, one cannot identify potential entrants and analyze whether a slight increase in price above current known levels would be sufficient to encourage those identified companies to actually

¹⁴ Robert W. Crandall, and Leonard Waverman, *Talk is Cheap: The Promise of Regulatory Reform in North American Telecommunications*, (Washington D.C.: The Brookings Institution, 1995), p. 99; and David E. M. Sappington, “Price Regulation,” *Handbook of Telecommunications Economics Volume I* (Amsterdam: Elsevier Science Publishers B.V., 2002), Table 2, p. 237.

enter. Instead, one must identify an actual or hypothetical potential entrant and ask whether a price above that which would be *compensatory to the incumbent* would support entry by that entrant. Determining whether an entrant could profitably enter a market at a price above a level that was compensatory to the incumbent, in turn, requires assessing whether the entrant is likely to be at least as efficient as the incumbent. For any long-run compensatory price P_0 for the incumbent, an entrant could sustainably offer a price less than or equal to P_0 if the entrant's long-run average costs were no greater than P_0 . Therefore, entrants who would be likely to have costs no higher than those of the incumbent would be viable entrants if the incumbent attempted to increase price above a level compensatory to itself.

It may strike the reader as unlikely that a new entrant in the telecommunications marketplace could be as efficient as an entrenched incumbent with a ubiquitous network and all of the economies of scale associated with ubiquity. In fact, however, in the telecommunications arena there were several avenues of entry provided by TA96 for which these incumbent attributes did not serve as a barrier. The first one was the fact that, as previously discussed, the regulatory rules provided entry opportunities to competitors by which the competitors could, in part or in whole, enter using elements of the incumbent's network, at regulated rates. This was intended to permit entrants to leverage the incumbent's scale economies into the entrants' cost structure. The regulated rates at which competitors could purchase these elements were set according to a theory that the prices should be based on the costs of a hypothetically, optimally efficient network using state-of-the-art technology, not the incumbent's actual network. Hence, it is not surprising that those prices turned out to be substantially below the incumbent's actual (booked) costs, further improving the business case for entry.¹⁵

The opportunity for competitors to enter the market using the incumbent's facilities was assured by federal policy under TA96. Hence, this was one avenue by which entrants could, arguably, enter the market and operate at a lower cost than those of the incumbent. States' inquiries into retail pricing deregulation did not and could not limit that right, and therefore would properly take the entry opportunities afforded by federal unbundling policies as given.

In addition, during the post-TA96 years there has been a technological sea-change such that technologies that did not meaningfully compete with wireline local exchange service have become significant direct competitors. In the residential marketplace these competitors are primarily the incumbent cable companies and the wireless companies. The incumbent cable companies, who already had massive investment in a nearly ubiquitous video network have, through additional large investments, upgraded their networks to be capable of providing high-quality telephony. Wireless service providers, whose prices and service limitations had limited the substitutability of wireless for wireline service, have, through technological advances, deregulation, and competition, decreased price, developed sophisticated, desirable service features, increased their

¹⁵ See, for example, Debra J. Aron, E. Gerry Keith, and Frank X. Pampush, "State Commissions Systematically Have Set UNE Prices Below Their Actual Costs," (LECG Working Paper, November 2003).

geographic footprint, and become a meaningful substitute for wireline service. Hence, because of these developments, intermodal competition—competition from platforms other than traditional circuit switched wireline telephony—is the primary driver of telecommunications competition in the U.S. today.

III. Market structure measures of market power

Standard antitrust analysis of market power as framed by the *Horizontal Merger Guidelines* includes not only the SSNIP test and associated analysis of entry, but also a descriptive analysis of the market. Specifically, based upon the market as defined per the SSNIP test, the *Horizontal Merger Guidelines* instruct the analyst to calculate the degree of concentration of the market and the extent to which the concentration would increase as a result of the proposed merger. The degree of market concentration is used to assess market power, and calculated using the Herfindahl-Hirschman Index (HHI), which is the sum of the squares of the market shares of the market participants.¹⁶ The use of market share and concentration measures to assess market power is not highly reliable, however, because there is no direct relationship as a matter of theory between market share and market power.¹⁷ Hence, market structure descriptive metrics such as market share and HHI are not generally used as proof of the existence of market power, but rather are treated as a screen for the necessity of further analysis. Where a firm has low market share it is generally thought that it cannot possess market power and no further analysis is necessary. Where market share is high, further analysis of economic fundamentals, such as entry conditions, is necessary to reach a conclusion regarding market power.¹⁸

The theory underlying this limited application market share and concentration metrics relates to the economic premise that, in equilibrium, the structure of a market—how many firms operate, their size relative to the overall market, and the distribution of firm size—is determined by the technology and resulting cost structure of the firms. Markets in which the firms have economies of scale over a relatively small range of output will tend to support many firms who can be expected to compete in (roughly) textbook-like

¹⁶ DOJ/FTC *Horizontal Merger Guidelines*, § 1.1, p. 15; and Herbert Hovenkamp, *Federal Antitrust Policy: The Law of Competition and Its Practice, Hornbook Series*, West Publishing Co. (1994), § 3.7d, p. 120.

¹⁷ William M. Landes and Richard A. Posner, “Market Power in Antitrust Cases,” *Harvard Law Review*, Vol. 94, No. 5 (March 1981), p. 945, footnote 20, point out that “[t]heoretically, it is possible for [a firm] to have no market power even with a 100% market share, because the supply elasticity of potential competitors might be infinite at a price slightly above that charged by [the firm].” See, also, Richard Schmalensee, “Another Look at Market Power,” *Harvard Law Review*, Vol. 95, No. 8 (June 1982).

¹⁸ The fact that market share may be indicative, but is in no way conclusive, as to whether a firm has market power is not a new insight in the antitrust world. The U.S. Department of Justice and Federal Trade Commission themselves point out that measures of market concentration and market share are but the starting point of a competitive analysis, and in isolation can provide a poor indication of a firm’s future competitive significance. See, U.S. Department of Justice and Federal Trade Commission, *Commentary on the Horizontal Merger Guidelines*, March 2006, pp. 15-16. See also, Paul L. Joskow, *Horizontal Market Power in Wholesale Power Markets*, working paper, Cambridge, MA: Massachusetts Institute of Technology (August 1995), pp. 6-7, 30; and Dennis W. Carlton, “Market Definition: Use and Abuse,” *Competition Policy International*, Vol. 3, No. 1 (Spring 2007), p. 3.

fashion to achieve a (roughly) competitive outcome, independent of entry conditions. These industries can be called “structurally competitive.” In contrast, industries in which firms enjoy significant scale economies would, in equilibrium, tend to support few or even a single firm. In such industries, whether the price and outputs resemble competitive outcomes is much more sensitive to the details of the competitive interaction between the firms and to the entry conditions.

Hence, in structurally competitive industries (those with technologies that lead to the coexistence of many competitors) the HHI or market share descriptive metrics can be a reasonable signal that a participant firm has no market power, as long as the observed structure of the market is the result of entry and exit decisions that reflect underlying technological and cost conditions. If, however, entry decisions have been distorted by regulatory intervention, then one cannot observe the extant market participation, shares, and concentration, and draw inferences about whether the market is structurally competitive. In a regulatory-distorted market, the observed market structure would be determined by the regulatory incentives rather than the underlying technology and cost characteristics. A market may indeed be structurally competitive—that is, the nature of the long run cost function may be such that the market would sustain, in unregulated equilibrium, many firms, competition among which would drive market price toward marginal cost—but there would nevertheless be little or no observed entry into the market if the incumbent’s prices are regulated to a below-cost level. Hence, an incumbent may face little or no actual competitive activity and operate in an industry with high HHI values, while having no ability to raise prices above a competitive level because doing so would invite prompt entry. If, therefore, one observes little or no competitive entry and high concentration in a price-controlled market, the HHI measure would be high, but one cannot conclude that the incumbent possesses market power or that price deregulation would be likely to lead to sustained price increases above a competitive level even if the market has been opened to competition and regulatory entry barriers have been dismantled.¹⁹ Indeed, it is well understood that these caveats apply in unregulated markets as well. The effect of below-cost price regulation is to virtually ensure that entry will be impeded and concentration would be high whether or not the market is structurally competitive.

IV. The Cellophane Fallacy

The notion that the prevailing pricing in a market can distort an analysis of market power in that market is already well understood in the context of unregulated markets and is known as the cellophane fallacy. The cellophane fallacy is a limitation or caveat of

¹⁹ In recent antitrust matters regarding the telecommunications industry, the DOJ has articulated both the court’s and the enforcement agencies’ (the DOJ’s and FTC’s) hesitation to rely exclusively on evidence of market share and market concentration in their competitive assessments. In *U.S. v. SBC Communications, Inc. and AT&T Corp* (2006), the DOJ excerpted directly from a Court of Appeals decision stating that the court “has cautioned against relying too heavily on a statistical case of market concentration alone, and that instead a broad analysis of the market to determine any effects on competition is required.” See, for example, Herbert Hovenkamp, *Federal Antitrust Policy: The Law of Competition and Its Practice, Hornbook Series*, West Publishing Co. (1994), § 3.7d, p. 120.

market definition analysis that derives from the landmark “Cellophane case.”²⁰ Du Pont at the time was the sole manufacturer of cellophane, and was accused of violating Section 2 of the Sherman Act. The analysis of du Pont’s market power hinged on the antitrust product market for cellophane: was cellophane the relevant product market, as claimed by the DOJ, or was it “flexible wrapping materials,” as claimed by du Pont? The Supreme Court sided with du Pont, and ruled that the company did not have significant market power within the broadly defined product market, flexible wrapping materials, because there were many substitutes for cellophane.²¹ The decision is cited widely in the law and economics literature as an example of an erroneous market power inference based on a faulty definition of the product market, an error that resulted from a failure to account for the effect of the prevailing price in the market.²²

The Supreme Court’s decision in the Cellophane case is criticized on the grounds that du Pont had exercised market power by raising the price of cellophane substantially, and it was this elevation of the price above the competitive level that brought cellophane into competition with other products. A profit maximizing monopolist will set a high enough price that the demand it faces is elastic—i.e., the price is high enough that an additional increase (a SSNIP) would induce customers to defect to other products. Those other products thereby become substitutes at a sufficiently high price and would, by virtue of the monopolist having set a profit maximizing price, cause profit to fall if price were increased further. Hence, the SSNIP test, when applied to a monopolist, would lead to the conclusion that the monopolist has no market power.

The cellophane fallacy is, therefore, the critique that if one conducts the SSNIP test starting at a monopoly price, one will tend to err in the direction of:

- i) Defining an overly-broad market—one that falsely includes product(s) from outside of the market; and, thereby,
- ii) Falsely inferring that the firms in the market possess no market power.

The defects of the SSNIP test in application to regulated markets such as telecommunications markets can, therefore, be seen as a cousin to the cellophane fallacy. In both cases the test can lead to erroneous results because it takes the existing price as a proxy for the competitive price and examines the effects of a small change in price from

²⁰ United States v. E.I. du Pont de Nemours & Co., 351 U.S. 377 (1956).

²¹ United States v. E.I. du Pont de Nemours & Co., 351 U.S. 377 (1956) (“We conclude that cellophane’s interchangeability with the other materials mentioned suffices to make it a part of this flexible packaging material market.”). In spite of this criticism, it is observed that some courts and legal analysts continue to apply the same market definition analysis as the courts did in the Cellophane case. Herbert Hovenkamp, *Federal Antitrust Policy: The Law of Competition and Its Practice*, Hornbook Series, West Publishing Co. (1994), § 3.7d, p. 100, footnote 6 (“In spite of the substantial, convincing criticism of du Pont’s analysis, some courts continue to apply it.”); and Philip B. Nelson and Lawrence J. White, “Market Definition and the Identification of Market Power in Monopolization Cases: A Critique and a Proposal,” Stern School of Business, New York University, Department of Economics Working Paper EC-03-26, November 2003, p. 17.

²² The two seminal economic and legal critiques of the Cellophane case are, respectively, George W. Stocking and William F. Mueller, “The Cellophane Case and the New Competition,” *American Economic Review*, Vol. 45 (1955), pp. 29-63, and Donald F. Turner, “Antitrust Policy and the Cellophane Case,” *Harvard Law Review*, Vol. 76 (1956), pp. 281-318.

the prevailing level. In the cellophane fallacy, the premise is faulty when the price is already higher than the competitive level. In the case of a regulated market, the premise is faulty when the price is held below a competitive level. Therefore, if one conducts the SSNIP test at regulated prices that are below the competitive price, the opposite errors from those that arise from the cellophane fallacy result, and we refer to this error as the reverse cellophane fallacy. In particular, when one applies a SSNIP test in a market in which price is currently below cost, one will tend to err in the direction of:

- i) Defining an overly-narrow market—one that falsely excludes product(s) from the market; and, thereby,
- ii) Falsely inferring that the firms in the market possess market power.

For reasons that we have discussed, residential basic local exchange service is a likely candidate for the reverse cellophane fallacy. Retail prices have historically been held below cost for universal service policy reasons and in some markets remain below cost despite regulatory efforts in some states to eliminate implicit subsidies.

The fact that residential prices are, in some areas, held below cost would of course discourage entry into those markets. The observation in a given regulator's jurisdiction that entry has been minimal in those geographic areas where price is likely to be below cost is consistent with the theory that entry has in fact been discouraged by uneconomic regulated prices and a reverse cellophane fallacy situation is in effect. The lack of entry in some markets has not, however, been generally recognized by regulators as evidence of below cost prices. Rather, regulators have often appeared to view the observed pattern of entry as evidence that the geographic areas without significant entry are not structurally competitive. That is, a lack of entry is often viewed as evidence that competition cannot succeed in those areas.

The empirical reality is that geographic areas with little or no entry by local exchange telecommunications competitors are typically rural areas with low population density. It is well accepted that the cost of entry and operation of a telephone network (particularly wireline, though wireless as well) on a per-customer basis in a particular geographic area is decreasing in the population density of the area. Hence, rural areas tend to be high-cost areas for telephone operators to serve. In an unregulated market, prices would be higher in rural than urban areas, all else equal. Perversely, from an economic perspective, however, it was common regulatory practice historically in the telecommunications industry to set regulated prices at a higher level in urban areas than in rural areas, on the theory that urban customers could call more people in their local area and therefore had a higher "value of service" than rural customers.²³ The effect, of course, would be to substantially discourage entry in rural areas relative to urban areas once entry constraints were lifted as long as price constraints were not alleviated.

Hence, although the observed typical pattern of entry in local telecommunications markets in the US over the last ten years—little entry in rural areas compared to the level

²³ See, for example, Michael H. Riordan, "Universal Residential Telephone Service," in *Handbook of Telecommunications Economics*, Vol. 1, Elsevier, 2002, pp. 444-450.

of entry in urban areas—is consistent with the reverse cellophane fallacy theory, the observed pattern of entry is also consistent with an alternative hypothesis that the observed pattern of entry is simply the result of the fact that costs are higher in rural areas and such areas are therefore natural monopolies. To demonstrate that the pattern of entry is in fact indicative of the reverse cellophane fallacy theory and that, in fact, firms are responding to the incentives they face resulting from distorted, below cost prices, one must therefore examine the pattern of entry controlling for costs. Our empirical analysis in the next section conducts this analysis.

V. Case study of competitive entry into local exchange markets in the U.S.: AT&T Oklahoma

In this section we consider exchange-level data for a large incumbent local exchange carrier's (AT&T) operations a single state in the U.S. (Oklahoma) in order to assess the impact of regulated prices and costs on competitive entry. AT&T (formerly Southwestern Bell Corporation or SBC) is an incumbent local exchange carrier serving Oklahoma. It does not serve the entire state, but has a service territory that is comprised of 183 separate local exchanges²⁴ dispersed throughout the state, with significant diversity in population densities, regulated prices, and competitive activity.

Regulated retail and wholesale prices for basic local exchange services in Oklahoma are set by the Oklahoma Corporation Commission. Retail prices can vary based on both the customer's "class" (business vs. residential) and location (urban vs. suburban vs. rural). Wholesale prices for unbundled network elements (UNEs) vary based on location, but not the class of the end-use customer. In Oklahoma, location-based distinctions in price are determined by the line density (i.e., number of lines per square mile) in the incumbent's exchange service area. AT&T Oklahoma's exchanges are classified into seven categories for purposes of establishing regulated retail prices and three categories for purposes of establishing regulated wholesale UNE prices.²⁵

The regulated prices for each retail and wholesale category as of 2004 are identified in Table 1. It is apparent from the table that AT&T Oklahoma's retail prices at the time these prices were in effect were negatively correlated with cost; namely, AT&T Oklahoma's business and residential retail prices *increased* as the line density of the exchange increases and the cost to a competitor of serving that exchange (identified in column (3) *declined*). As a result, the margins available to a competitor (i.e., the retail price less the wholesale UNE-P cost) were highest in the high-density/low-cost urban areas, and lowest in the low-density/low-cost rural areas.

²⁴ An exchange service area is a geographic area in which regulated prices are uniform and that usually indicates a city, town, or village. An exchange service area can include one or several central offices.

²⁵ While there are seven retail rate groups, one of the rate groups, number six, is null, so that there are effectively six separate retail rate groups.

Table 1
AT&T Oklahoma Retail and Wholesale Prices by Category (2004)

Exchange Group			Regulated Monthly Price per Line			
	Retail	Whole-sale (UNEs)	Line Density	Retail Basic Local Exchange Service		Wholesale Local Exchange "Platform" (UNE-P)
				Bus	Res	
"Rural"	1	1	12	\$22.08	\$10.22	\$36.84
	2		27	\$24.53	\$10.77	
	3		57	\$29.65	\$11.62	
"Suburban"	4	2	87	\$32.44	\$12.07	\$24.24
	5		92	\$33.17	\$12.37	
"Urban"	6	3	--	N/A	N/A	\$22.73
	7		225	\$43.18	\$13.34	

The data on competitive entry, paired with the pricing data presented in Tables 1 reveal a positive correlation between the level of competitive penetration in an exchange group and the regulated retail prices in that exchange group. That is, CLECs are most active and most successful where the incumbent's regulated retail prices are the highest and the wholesale UNE costs are the lowest. The bars in Figure 1 show CLEC penetration by retail rate group. The lowest penetration is in rate groups 1 through 3, and the highest penetration is in rate group 7. Overlaid on the penetration rate bars is a line indicating the monthly per-line retail business flat rate prices. The figure shows that there is a positive relationship between AT&T's retail business line prices and the extent of CLEC activity. Figure 2 repeats this exercise for the residential market and it shows the same qualitative result, which is a generally upward trend in both retail price and CLEC penetration in the exchanges.

Figure 1
Market Share of Business CLECs by Retail Rate Category

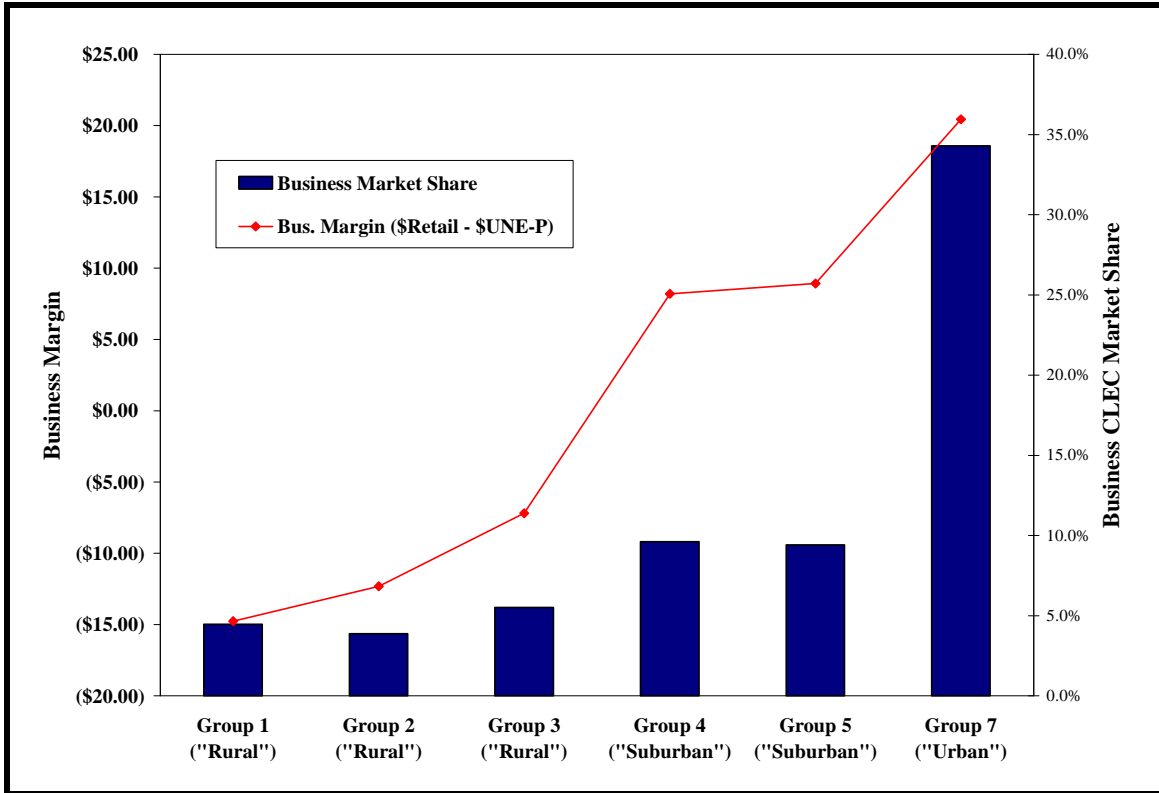
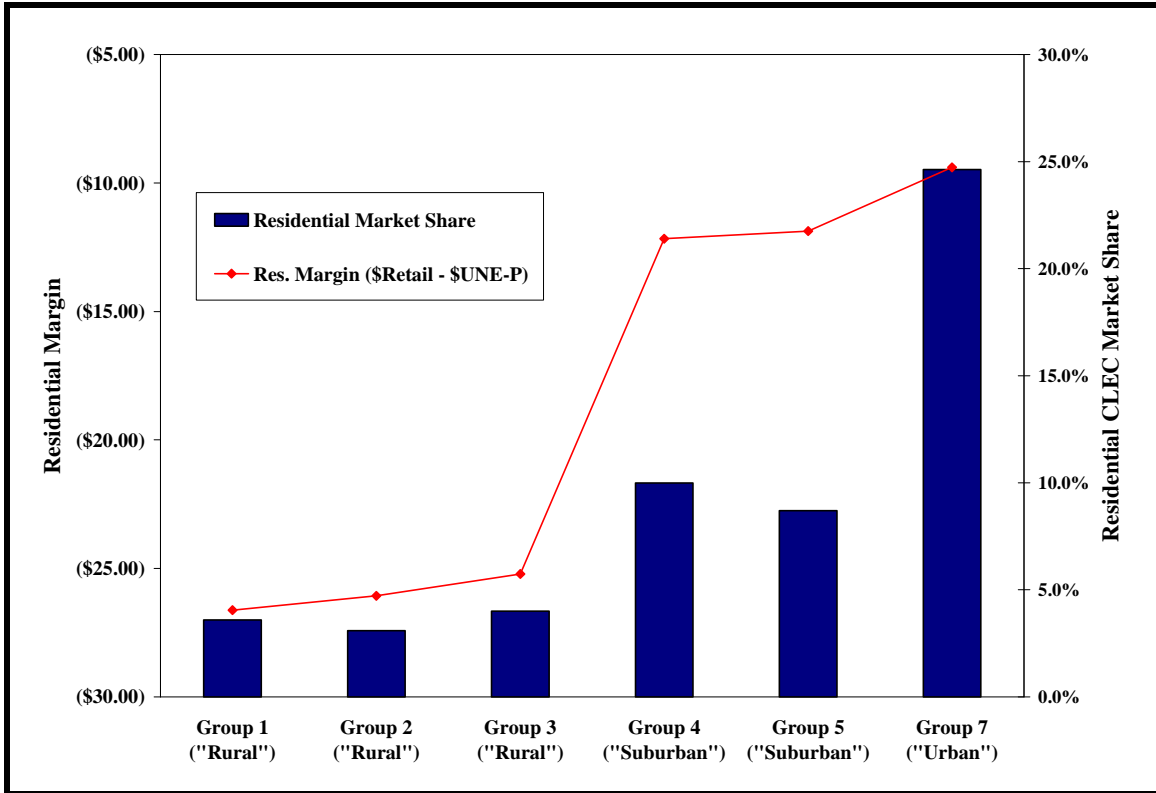


Figure 2
Market Share of Residential CLECs by Retail Rate Category



As illustrated in Figures 1 and 2, the differences between rural penetration, suburban penetration, and urban penetration appear to be related in large measure to the retail rate structure imposed in the state of Oklahoma. In unregulated markets, prices tend to be higher where costs are higher, and lower where costs are lower. This is an efficient outcome of the price system. In fact, in an unregulated market, the prices in the different regions would necessarily adjust over time so that the profitability of serving different areas would equalize, and service would be attractive in—and attracted to—all areas.²⁶ In Oklahoma, however, regulated retail prices are highest in the lowest cost areas (the urban zone) and lowest in the highest cost areas (the rural zone). The effect of this pattern of prices is that the profitability of serving an area—which is the difference between the price and the cost—is necessarily lowest in the rural areas of Oklahoma and highest in the urban areas. Naturally, potential competitors will tend, as a result, to favor entry in the most profitable areas and disfavor entry where profits are the lowest, or possibly are negative.

²⁶ More correctly, the marginal profitability in different geographic markets would become equal. That is, prices would adjust so that the profitability of serving additional customers would equalize, at which point providers would be indifferent between increasing their service in high cost areas or low cost areas.

The implication created by the positive relationship between prices and CLEC activity in Oklahoma is that the relatively low prices and, therefore, low (or negative) profit margins available in the rural areas created an effective entry barrier to wireline competition in the rural areas. However, in drawing this inference one might be concerned that the low penetration in the rural exchanges is not the result of the low prices, but rather the result of the small size of the exchanges. In order to distinguish between the effect of the size of the exchanges on CLEC penetration and the effect of the retail prices (more specifically, the price/cost margin) on CLEC penetration, we performed a multivariate regression analysis. In particular, we evaluate whether, and to what extent, AT&T Oklahoma's retail prices (relative to cost) affected CLEC entry after controlling for the effect of the size and density of lines in the exchange.

Our data consist of 183 observations on AT&T Oklahoma's exchanges, as of December 31, 2004. To estimate the determinants of CLEC entry, we estimate a straightforward limited dependent variable model of market structure. We employ an ordered probit regression with the number of CLECs competing in an exchange as the dependent variable, and AT&T Oklahoma's retail price in the exchange, less the UNE-P price (the "retail margin"), total retail access lines (as a proxy for size of the exchange), and the density of total retail access lines (as an alternative cost proxy) as the independent variables.²⁷ We use UNE-P prices as an indicator of CLEC service costs.²⁸ A description of the variables and their sources are presented in Table 3, and the regression results are provided in Table 4.

²⁷ The models are run with the `-oprobit-` command in Stata 8.0. The use of ordered probit regression is common to empirical analyses of CLEC entry. See, for example, Shane Greenstein and Michael Mazzeo, "The Role of Differentiation Strategy in Local Telecommunications Entry and Market Evolution: 1999-2002," *Journal of Industrial Economics*, Vol. 54, Issue 3 (September 2006).

²⁸ We believe that UNE-P prices were, in fact, below actual forward-looking costs, a bias that would tend to make all retail prices appear more profitable than they were. However, we are not aware of any reasons that the downward bias would vary systematically across our data and, therefore, we do not believe it would bias our results.

Table 3
Variable Descriptions and Sources

Variable	Description	Source
BUSINESS ENTRY	The number of CLECs serving one or more business customers in the exchange	a
RESIDENTIAL ENTRY	The number of CLECs serving one or more residential customers in the exchange	a
BUSINESS MARGIN	AT&T Oklahoma's monthly retail price for business flat rate, basic local exchange service in the exchange, less the monthly wholesale price to lease a UNE-Platform in the exchange	b, c
RESIDENTIAL MARGIN	AT&T Oklahoma's monthly retail price for residential flat rate, basic local exchange service in the exchange, less the monthly wholesale price to lease a UNE-Platform in the exchange	b, c
TOTAL LINES	The total number of retail local access lines (served by AT&T and CLECs) in the exchange	d
LINE DENSITY	The total number of retail local access lines (served by AT&T and CLECs) in the exchange divided by the total square miles of the exchange service area	d, e

Sources:

(a) AT&T Oklahoma, proprietary data.

(b) Retail Prices: Southwestern Bell Telephone Company of Oklahoma, Local Exchange Tariff, § 3 Exchange Rates, effective March 22, 2002.

(c) Wholesale (UNE) Prices: Ana-Marie Kovacs, *Telecom Regulatory Note: Triennial Negotiations—Focus on UNEP*, April 5, 2004.

(d) Total Lines: AT&T Oklahoma, proprietary data.

(e) Exchange Area: Federal Communications Commission, Hybrid Cost Proxy Model, October 27, 2003 (www.fcc.gov/wcb/tapd/hcpm/welcome.html)

Table 4
Ordered Probit Regressions

Regression 1		
Dependent Variable: BUSINESS ENTRY		
Independent Variable	Coefficient Estimate	z-statistic
BUSINESS MARGIN	0.0328	3.11
TOTAL LINES	0.000188	4.12
LINE DENSITY	0.001564	0.81
Observations	183	
Pseudo R-Squared	0.295	
Regression 2		
Dependent Variable: RESIDENTAIL ENTRY		
Independent Variable	Coefficient Estimate	z-statistic
RESIDENTIAL MARGIN	0.1293	6.20
TOTAL LINES	0.000191	4.21
LINE DENSITY	0.003922	1.66
Observations	183	
Pseudo R-Squared	0.289	

The analysis was performed for the business market (regression 1) and the residential market (regression 2). Both regressions demonstrate that, after controlling for the market size and line density, the regulated price-to-cost margin has a positive and statistically significant effect on CLEC entry. Controlling for the effect of the size of the exchange, there is an independent effect of the retail price on CLEC entry, and the effect is that a lower price discourages CLEC entry.²⁹ We can therefore conclude that CLECs serving

²⁹ Other specifications of the dependent variable were also considered. These included (i) total (business and/or residential) CLEC entry, as well as the number of CLEC (ii) residential lines, (iii) business lines, and (iv) total (business and residential lines). The high collinearity between business and

customers in AT&T Oklahoma's service territory were attracted to, and had more success in, areas where retail prices were higher relative to costs, and they were discouraged from serving rural customers, whose retail prices were low relative to costs.

This analysis implies that, first, the relative absence of significant competition in the rural areas cannot be interpreted as evidence that economic barriers to entry or barriers to competition exist in those exchanges. Rather, it is clear that there were regulatory barriers to entry imposed by the retail price structure. This implies, in turn, that development of significant CLEC activity in such areas would perhaps never materialize unless the retail price constraints were relaxed. Failure to relax those constraints due to an apparent lack of CLEC activity would be a self-fulfilling prophecy, and would be poor public policy.

VI. Conclusions

In this paper we identify a limitation or caveat to the standard market definition analysis set forth in the *Horizontal Merger Guidelines* that is applicable to markets subject to certain kinds of regulation. We call this limitation the reverse cellophane fallacy. Unlike its oft-cited counterpart, the cellophane fallacy, which applies where the current price exceeds the competitive equilibrium price, the reverse cellophane fallacy applies where the current price is exogenously constrained below the competitive equilibrium price. The implication for market definition analysis is that if the standard SSNIP test for market power is applied in such instances—such as where the price of one or more services is restricted by regulation—then the market will tend to be defined too narrowly and produce an inaccurately high estimate of market concentration.

To illustrate the implications of a reverse cellophane fallacy, we present a case study based on a sample of local exchange telecommunications “markets” (incumbent local exchange service areas in Oklahoma). Basic local exchange service is a likely candidate for the reverse cellophane fallacy because retail prices have historically been held below cost for universal service policy reasons, and in some markets remain below cost despite regulatory efforts in some states to eliminate implicit subsidies. The case study reveals that competitors were attracted to, and had more success in, areas where regulated retail prices were higher relative to costs, and they were discouraged from serving rural customers, whose retail prices were low relative to costs even controlling for other characteristics of the market that would reasonably affect entry, such as market size. We conclude that special care must be taken when assessing market power in price regulated markets. The notion that competition must fully develop in the presence of regulatory constraints and distortions before those constraints and distortions are removed is perverse and would result in poor public policy.

residential retail prices, required the use of a single (business or residential) price variable in these alternative specifications. The results were qualitatively the same as the results presented in Table 4, with positive and statistically significant coefficients on the independent price variables.